NHS Innovation Accelerator

Economic Impact Evaluation Case Study: NeuroResponse

1. BACKGROUND

NeuroResponse has evolved from a service at University College London Hospital NHS Foundation Trust (UCLH) that enables patients with Multiple Sclerosis (MS) to contact health care professionals via phone, email or video conference between hospital visits.¹ The phone service called NeuroDirect is staffed by an MS clinical nurse specialist and a call handler who offer self-management advice, triage into appropriate clinics and liaison with GPs and multi-disciplinary teams (MDTs). The service is available Monday to Friday, 9am to 1pm.

The ‘video clinic’ component of the service enables patients to connect via secure videoconference to a consultant neurologist, clinical nurse specialist and a specialist physiotherapist. Patients can use this from their local health centre and it reduces the need to travel into central London (for appointments at UCLH). These staff will discuss the patients’ concerns and agree a care pathway alongside their local team in order to improve care.

Working with patients and families, NeuroResponse has co-designed a model of care, which centralises digital technology and addresses currently fragmented care pathways. Patients should benefit from improved access to expert neurology advice, shorter waiting times for the assessment of symptoms, early detection of infection, faster access to treatment and intelligent, secure information sharing.

The implementation of NeuroResponse is anticipated to improve clinical outcomes, reduce the utilisation of health services and reduce avoidable spend. Unplanned admissions for people with MS annually cost £43 million to the NHS.

This case study describes a cost-consequence analysis to enable a comparison of the benefits of NeuroResponse relative to its costs. The analysis was developed in spring 2017 and was based on the information and evidence available at the time. The limitations of the analysis are as follows:

- The annual cost per person of providing NeuroResponse is currently an estimate;
- The sample of patients using NeuroResponse, for which data are provided regarding UTI, is small;
- The analysis focuses on incidence of UTI and does not take account of the potential for other savings from other benefits of NeuroResponse.

2. INPUT COSTS

The current development costs for NeuroResponse are being prepared and remain commercial in confidence at present. Early indications suggest that the annual cost of delivering the service will range from £200 to £500 per person per year, depending on the degree of clinical complexity and size of scaling. Based on a population of 100,000 MS patients, (approximately the full population of people with MS in the UK),\(^2\) this is equivalent to a total annual cost of £20 million to £50 million. It is noted that this is an estimate and further work is being done to model activity and costs.

The following elements have been listed as future developments of NeuroResponse. It has been assumed that these will form part of the annual cost per person per year for provision at UK level:

- Partnering with a provider of a nurse-led call centre to deliver the telereception component of the model;
- Creating a new role of general neurology nurse to deliver the care planning component of the model;
- Work with the Queen’s Nursing Institute to create a training programme for district nurses to act as neurology champions within their local teams;
- Identification and use of user experience Outcome Based Measures;
- Exploring the potential to incorporate roles for physician associates within the NeuroResponse workforce, due to their broad skillset and ability to act as a conduit between other healthcare professionals.

3. OUTCOMES

The principal outcome envisaged from NeuroResponse is improved care for people with neurological conditions. This may include: improved access to expert neurology advice, thereby improving the quality of care; shorter waiting times for assessment of symptoms; earlier detection and more rapid treatment of infections; better co-ordinated pathways of care; better, more secure information sharing. Overall, this should result in increased efficiency within health services and in some instances reduced demand, such as hospital admissions for urinary tract infections (UTI).

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\(^2\) Multiple Sclerosis Society. MS Society briefing on UK prevalence study
https://www.mssociety.org.uk/sites/default/files/MS_prevalence_study_briefing.pdf accessed 30/05/17
The specific outcome which is cited in the information provided is the reduction in unplanned admissions for patients with MS due to UTIs. The current sample of patients using NeuroResponse, for which data are provided, is five. Of these, three have experienced urinary infections, all of which were identified and treated within their home settings. They were all assessed and the infection detected within one hour, and the tests were completed and reported within 24 hours. None of the cases resulted in a related A&E attendance. The example outcome metrics for such cases are shown in Table 3.1.

Table 3.1: Impacts, outcome metrics and values for NeuroResponse

<table>
<thead>
<tr>
<th>Impact</th>
<th>Outcome metric</th>
<th>Proxy value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoided healthcare utilisation</td>
<td>Attendance at A&amp;E</td>
<td>£137.74</td>
</tr>
<tr>
<td></td>
<td>Non-elective admission for a UTI with complications</td>
<td>£3,205.75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>£3,343.49</strong></td>
</tr>
</tbody>
</table>

These savings only relate to MS patients with a UTI that can be treated at home.

Access to the NeuroDirect teletriage pathway is also thought to contribute to an improvement in health related quality of life for patients with MS, as demonstrated by a proof of concept study (currently in press).

A range of further improvements are envisaged for NeuroResponse, which may have positive outcomes for patients and service providers. These are:

- Mitigating the short supply of disease specific nurses by creating efficiencies in specialist nurse use;
- Improving links between NHS and third sector services;
- Increasing patient empowerment;
- Bringing transparency to help navigate the health care system;
- Improving collaboration across the system;
- Bringing international partners and their innovations into the NHS;
- Creating a diversity of partnerships to fill gaps in available resources and services;
- Using social media tools to organise health related events and subsequent engagement;
- A positive impact on patient and carer stress by delivering care more appropriately at home.

4. **ECONOMIC ANALYSIS**

While it is not possible to carry out a return on investment calculation using the data available, a limited cost economic analysis is possible from the information available.

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4 NHS Payment by Results tariff 2016/17.
As the activity and costs have not yet been modelled, the cost per patient is estimated to be £200 to £500 per year if implemented across the national MS population. Key considerations in the cost per patient will include the number of staff necessary to provide the service to a given size of population; the incidence of urinary infections in the population and the proportion of these which are treatable in the home; and the level of management and infrastructure that would be necessary to support the service on a larger scale.

Nationally it is estimated that £43m per year NHS is spent on infection-related unplanned admissions for people with MS. The study sample size of five is too small to extrapolate the benefits of NeuroResponse to a population of 100,000. Table 4.1 shows the number needed to treat in one year in order for NeuroResponse to be cost saving at the estimated annual cost of £200-£500 per person per year.

Table 4.1: Number needed to treat for NeuroResponse to be cost saving for UTIs in MS patients

<table>
<thead>
<tr>
<th>Cost of a hospital admission for UTI</th>
<th>£3,205.75</th>
</tr>
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<tbody>
<tr>
<td>Annual cost of NeuroResponse for 100,000 patients at £200 per person</td>
<td>£20,000,000</td>
</tr>
<tr>
<td>Number of UTIs needed to treat to be cost neutral at £200 per person</td>
<td>6,239</td>
</tr>
<tr>
<td>Estimated incidence of UTIs required to reach cost neutral level at £200 per person in UK population of 100,000 patients with MS</td>
<td>6.2%</td>
</tr>
<tr>
<td>Annual cost of NeuroResponse for 100,000 patients at £500 per person</td>
<td>£50,000,000</td>
</tr>
<tr>
<td>Number of UTIs needed to treat to be cost neutral at £200 per person</td>
<td>15,597</td>
</tr>
<tr>
<td>Estimated incidence of UTIs required to reach cost neutral level at £500 per person in UK population of 100,000 patients with MS</td>
<td>15.5%</td>
</tr>
</tbody>
</table>

This shows that, at the lower range cost of £200 per person per year, NeuroResponse would bring a cost saving if more than 6,239 UTIs were treated at home in one year, as opposed to in hospital. This is equivalent to an incidence of UTIs of 6%, among the UK population with MS. At the higher range cost of £500 per person per year, an estimated 15,597 incidences of UTI would need to be treated at home for NeuroResponse to be cost saving, equivalent to an incidence of UTIs of 15.5% among the UK population with MS. Estimates of UTI incidence in the literature vary from 18-80%, (depending on the population studied and the timing of data collection in relation to stage of MS) and UTI is one of the most common reasons for people with MS to be admitted to hospital.6,7,8,9

This analysis does not take account of the potential for other savings from other benefits of NeuroResponse, as listed in Section 3, above.

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5. IMPACT ON EMPLOYMENT

There may be some benefits from increased employment with the NeuroResponse service operating at greater scale. There is a possibility of partnering with a provider of a nurse-led call centre to deliver the teletriage component of the model. There may also be a new role of general neurology nurse and development role of physician associates.

With greater provision of care in patients’ homes there is scope for increasing the economically productive time of carers and of patients themselves. It is not currently possible to estimate the extent of these effects.

6. CONCLUSION

It has not been possible to undertake a detailed economic evaluation or estimate the return on investment based on the information available. However, the indicative costs and the range of possible consequences are presented to illustrate the potential benefits.

Given the number of people with MS in the UK (100,000) and the cost of potentially avoidable infection related unplanned admissions among this population (£43m), there would appear to be scope for significant cost reductions from an NHS perspective, based on the cost of avoidable hospital admissions. There is also scope for gains in quality of life for patients who use the service. A UK-wide provision of this service is may result in savings for the NHS and further work is being done to model activity and costs. There is anticipated scope for this service to be extended to include other neurological conditions.

As previously mentioned, the analysis is limited as the annual cost per person of providing NeuroResponse is an estimate, the analysis focuses only on the incidence of UTI and the sample of patients using NeuroResponse, for which data are provided regarding UTI, is small. Furthermore, there may be other benefits not related to UTI that are not included.