Wilmington Healthcare Improvement Scenario:

Relapsing Remitting MS

Rachel's story

June 2020
Zinc job number: UK&IE/CLA/0519/0035

Rachel's Story was sponsored by Merck Serono Ltd who had no editorial input other than conducting an accuracy check and supplying data on request.

Who is this document for?

Commissioners

To help commissioners understand the issues of managing multiple sclerosis (MS) and relate these to population management of the condition by determining the scale of optimal pathway implications for your local health economy. Through this you can work in partnership with all health, social care and voluntary sector partners involved in the patient pathway to deliver effective change. This optimal care pathway could help commissioners to work within current budgets to ensure that NHS resources are spent efficiently.

Non-specialist neurologists and clinicians

To help non-specialists understand the optimal pathway and remind them that the NHS England Treatment Algorithm for MS is in place and there is an NHS England Accelerated Access Collaborative programme in place. This will ensure the most recent research findings and guidance influence your practice enabling you to ensure that your patients have the time and support they need to make appropriate treatment choices.

GPs

To remind GPs of the key role they play in monitoring a patient's MS treatment and managing their condition. Good liaison between the GP and MS specialist staff, especially MS nurses, ensures that GPs are fully aware of MS care requirements and the signs and symptoms suggestive of an MS relapse so that patients are quickly referred for immediate treatment.

Patients

To underline the importance of keeping well and informed about MS to ensure that patients can make the best treatment choices based on their individual situation and condition. MS specialist input combined with resources from the MS Trust, MS Society, Shift.ms and other organisations can help patients to understand all the issues and implications of living with MS and to seek immediate advice when experiencing symptoms suggestive of a relapse.

Foreword

Multiple sclerosis (MS) is a complicated, life-long degenerative neurological condition which sees patients draw on myriad services throughout their journey with the condition. It can be challenging to fully grasp the complexity of existing MS care pathways, let alone how pathways could be better engineered to meet the needs of people with MS and their families.

This NHS RightCare scenario helps to paint a vivid picture of the experiences and hurdles that people with MS face when navigating through the system, and also highlights the junctures along the way where services can diverge. The differences between optimal and suboptimal MS care pathways may appear minor, and yet can have significant knock-on effects for patient health outcomes, and further still, substantial ripple effects which remain largely unseen. Rachel's story below helps to illustrate the hidden costs to society that come about through lost employment, strained relationships, informal care demands and the impact on loved ones – with a clear risk of poorer mental health outcomes in many cases.

It is essential to step back and reflect on the full picture, especially at this time when the landscape of MS has, and continues, to change at pace. The raft of disease-modifying drugs that are now available for relapsing-remitting MS, and in the future for progressive MS too, is something to be celebrated. However, as the use and demand for these life-changing drugs rises, healthcare commissioners and planners must give careful thought to the system that underpins how these new treatments are delivered to those set to benefit from them.

The increasing availability of intravenous treatments has to be met by services with the capacity of specialist staff who are able to manage, treat, and monitor patients on an ongoing basis. As demands on MS services continue to grow, healthcare commissioners and planners will need to think wisely about where to best allocate resources, and consider treatment options which place less demand on already overstretched services. The MS Trust recently identified the extent to which the majority of MS nurse specialists are working far beyond manageable caseloads. This has serious implications for patients, and also on a personal level for staff who frequently suffer from burnout and are simply unable to deliver the quality of care that they would like.

Patients who have access to early diagnosis and specialist team assessment for effective treatment, experience fewer MS relapses, lower levels of disability, and fewer complications from their MS, resulting in less demand on services, especially emergency care. MS specialist nurses are at the heart of good MS care. They play a fundamental role in ongoing MS management, pre-treatment counselling, treatment monitoring and adjustment, and averting patients from avoidable unplanned care episodes by providing rapid direct access to expert advice. However, this vital role must be adequately resourced if it is to deliver its potential – both for patient quality of life and value for money throughout the MS care pathway.

David Martin
MS Trust, Chief Executive Officer

High level summary

- MS has been an area of unprecedented change in the number of disease-modifying drugs (DMDs) which have become available in recent years.
- Keeping pace with this evolution in the treatment landscape and monitoring requirements has been a huge challenge for clinicians and for reimbursement bodies/NHS.
- The UK was starting from a 'low base' in comparison to treatment provision across Europe.[1]
- Issues remain around access to services but there has been a huge increase in spend on DMDs within the NHS and this has been a benefit to some people with MS. Although there has been a significant spike in spend, there are still a large number of patients who could be eligible for DMDs who have not yet been offered them.
- MS services have capacity issues: in October 2018 the MS Trust identified that the majority of patients in the UK (77%) live in areas where nurse caseloads are in excess of the "sustainable caseload figure" of 315 people, and that nearly a quarter of patients live in areas where caseloads are over twice the recommended level. With so many patients still eligible for DMDs, the level of administration and monitoring required by specialist nurses far outstrips capacity within the service.[2]
- Already a quarter of a billion pounds spent on DMDs annually and so it is vital that pathways are optimised and well managed every step of the way for both patient experience and to optimise the use of taxpayer funding.
- There is a need to reduce prescribing variation of DMDs which the NHS England Treatment Algorithm for MS should address.[3]
- Systematic recording of outcome measures should improve ongoing treatment decisions.
- Outcome and service performance data needs to be accurately recorded and shared.
- New developments in oral DMDs can offer more choice for eligible patients and have the potential to increase capacity for MS specialist services by reducing outpatient appointments and infusion service requirements. Patient choice of DMD treatment should be paramount in all care pathways.

---

[1] Karampampa, K, et al. (2012). Treatment experience, burden and unmet needs (TRIBUNE) in MS study: results from five European countries. Multiple Sclerosis Journal, 18(2 suppl), 7-15.
[2] MS Trust (2018) MS Specialist nursing in the UK 2018: Results from the 2018 MS Trust Nurse Mapping Survey. Available at: www.mstrust.org.uk/sites/default/files/Nurse%20Mapping%202018%20WEB.pdf (last accessed November 2019).
[3] NHS England (2018) Treatment Algorithm for Multiple Sclerosis Disease-Modifying Therapies. Available at: www.england.nhs.uk/commissioning/wp-content/uploads/sites/12/2019/03/Treatment-Algorithm-for-Multiple-Sclerosis-Disease-Modifying-Therapies-08-03-2019-1.pdf (last accessed November 2019).

Analysis style

NHS RightCare has developed a series of conditions scenarios using a similar style of analysis where pathway studies of a fictitious, but realistic, patient are compared and contrasted. The intention is to highlight patient choice and potential improvement opportunities for patients, commissioners and operational managers.

The RightCare goal is to inspire more stakeholders to take note and take action towards positive change. The aim is to raise awareness through supporting local health economies – including clinical, commissioning and finance colleagues – to think strategically and collaboratively about engagement, education and designing optimal care for people - in this case with MS.

This example of what could be an optimal scenario has been developed with experts in this specialist field and includes prompts for commissioners to consider when evaluating their local health economy requirements.

Look out for red highlight boxes to see typical suboptimal / failure points in many pathways throughout the country.

Look out for green highlight boxes to see best practice points which are above and beyond the optimal pathway, which are already being trialled in some MS care pathways across the country.

The optimal story of Rachel's experience of a relapsing-remitting multiple sclerosis (MS) pathway, with choices and typical pathway failure points highlighted along the way

In this scenario using a fictional patient, Rachel, we examine an MS disease care pathway for someone who has highly active relapsing remitting MS (RRMS) highlighting the options for treatment in this presentation of the disease. At each stage we have modelled the costs of care, not only financial to the local health economy, but also the impact on the patient and their family's experience.

This document is intended to help commissioners and providers understand the implications, both in terms of quality of life and costs, of different care pathways for the particular patient needs and expectations.

It demonstrates how changes in treatment and management can help clinicians and commissioners improve the value and outcomes of the care pathway.

This scenario has been produced in partnership with clinical and patient stakeholders using the NHS RightCare methodology.

Context and introduction

MS is a neurological condition affecting the central nervous system, the brain and spinal cord, usually causing some level of permanent disability to develop.

There are three main subtypes of MS:[4]

- **Relapsing remitting** – RRMS has distinct attacks of symptoms, followed by remission, either fully or partially
- **Secondary progressive** – RRMS frequently becomes secondary progressive MS (SPMS), with the gradual build-up of disability
- **Primary progressive** – primary progressive MS (PPMS) manifests with progressive disability from the outset, with no periods of recovery from symptoms and there is a gradual build-up of disability.

Approximately 131,000 people in the UK have MS.[5] MS is the most common cause of non-traumatic physical disability in adults of working age. It can affect anyone, although more women than men are affected, and globally it is more prevalent in higher income countries and those further away from the equator.[6]

People with MS typically develop symptoms in their late 20s, experiencing visual and sensory disturbances, limb weakness, gait problems, and bladder and bowel symptoms.

They may initially have partial recovery, but over time develop progressive disability. The most common pattern of disease is RRMS where periods of stability (remission) are followed by episodes when there are exacerbations of symptoms (relapses).

---

[4] Lublin FD. New multiple sclerosis phenotypic classification. Eur Neurol. 2014;72 Suppl 1:1-5.

[5] MS Trust (2020) Prevalence and incidence of multiple sclerosis. Available at: www.mstrust.org.uk/a-z/prevalence-and-incidence-multiple-sclerosis (last accessed June 2020).

There is currently no accurate data on the exact number of people with MS in the UK. A study by McKenzie et al at the University of Dundee worked out a figure based on coding in GP records. This gave a figure of 127,000 people with MS in the UK in 2010. The study also found that the number of people with MS in the UK is growing by around 2.4% per year, due to people with MS living longer. Concerns were raised that this figure may include some records where there was an element of doubt about the diagnosis. If these records were excluded, it suggests that there are about 110,000 people with MS in the UK.

Prevalence rates vary around the UK. Based on the figure of 110,000 people with MS, it is estimated that the number of people with MS in each nation is:

- *England is around 90,500 or 164 per 100,000*
- *Wales about 4,300 or 138 per 100,000*
- *Northern Ireland about 3,200 or 175 per 100,000*
- *Scotland about 11,300 or 209 per 100,000*

Prevalence in the north of Scotland is particularly high. A study of north east Scotland found the level per 100,000 people in 2009 to be 229 in Aberdeen, 295 in Shetland and 402 in Orkney.

A little over 5,000 people are diagnosed with MS each year, roughly 100 a week.

[6] Browne P, et al. Atlas of Multiple Sclerosis 2013: A growing global problem with widespread inequity. Neurology. 2014; 83(11): 1022–1024.

About 85% people with MS have RRMS at onset. Around two thirds of people who start with RRMS develop SPMS: this occurs when there is a gradual accumulation of disability unrelated to relapses, which become less frequent or stop completely.[7]

RRMS patients are typically diagnosed between the ages of 20 and 40 years.

About 10 to 15% of people with MS have PPMS where symptoms gradually develop and worsen over time from the start, without ever experiencing relapses and remissions.

The cause of MS is unknown. It is thought that an abnormal immune response to environmental triggers in people who are genetically predisposed results in immune-mediated acute, and chronic, inflammation. The initial phase of inflammation is followed by a phase of progressive degeneration of the affected cells in the nervous system.

In the majority of people with MS, it is a highly disabling disease with considerable personal, social and economic consequences. People with MS live for many years after diagnosis with significant impact on their ability to work, as well as an adverse and often highly debilitating effect on their quality of life and that of their families.[7] While it is possible to be diagnosed at any age, RRMS (this case) is typically diagnosed between the ages of 20 and 40 years. Treatment is aimed at preventing relapses and subclinical or asymptomatic MRI activity and treating symptoms associated with nervous system damage; currently there is no cure.

As with any long-term condition, people with MS may need to use hospital facilities at various stages during the course of the disease. MS is generally diagnosed and treated on an outpatient basis, but people may be admitted with acute symptoms of MS prior to diagnosis and during the course of the disease for problems such as relapse or infection.

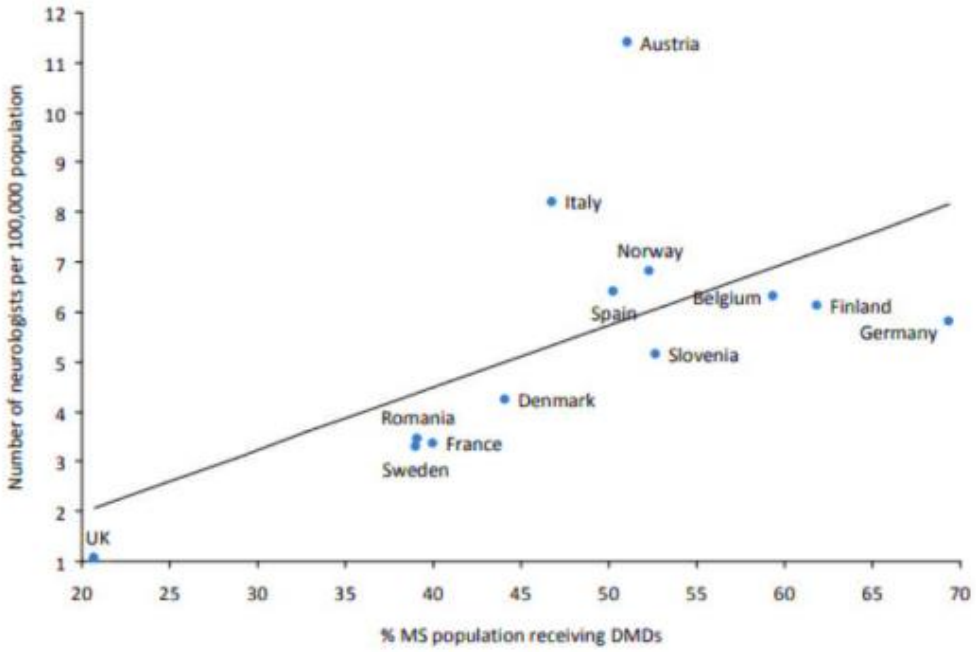
[7] NICE (2014) Multiple sclerosis in adults: management: Clinical guidance CG186. Available at: www.nice.org.uk/guidance/cg186 (last accessed November 2019).

NICE guidelines: NHS England Treatment Algorithm for MS patients

As the disease is lifelong, patients will have complex and changing needs which must be addressed by fast and responsive services enabling them to stay as well as they possibly can. This means getting early diagnosis and access to an MS specialist neurologist and nurse at the right time. This is difficult to achieve due to two primary reasons:

1. There are insufficient MS specialist neurologists and nurses in the UK in comparison to other developed countries (see figure 1).[8,9]
2. There is a great deal of complexity and ambiguity between research findings, professional guidelines and various NHS publications.[9]

Figure 1: Number of neurologists per 100,000 specialised in MS versus percentage of MS population receiving DMDs (2013)

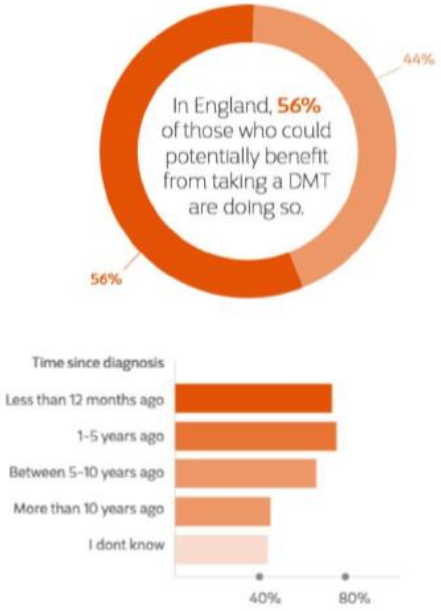


[8] Multiple Sclerosis International Federation (2013) Atlas of MS. Available at: www.atlasofms.org (last accessed November 2019).
[9] Thomas S & Giovannoni G (2019) Navigating the evolving MS service landscape. Presented at the MS Trust Conference, 3 November 2019.

Therefore, it is often difficult for clinicians to: a) be most up to date with the latest recommendations, and b) have the capacity to support patients through the decision-making processes effectively. For people with MS who are already struggling to manage the personal difficulties that accompany the condition, good medical management and timely, supportive health and social care is essential to improve both patient experiences and outcomes.

Evidence to support these factors can be seen in the large variation in patient access to DMDs and usage of these drugs across various regions of England (see figures 2 and 3).[10,11,12]

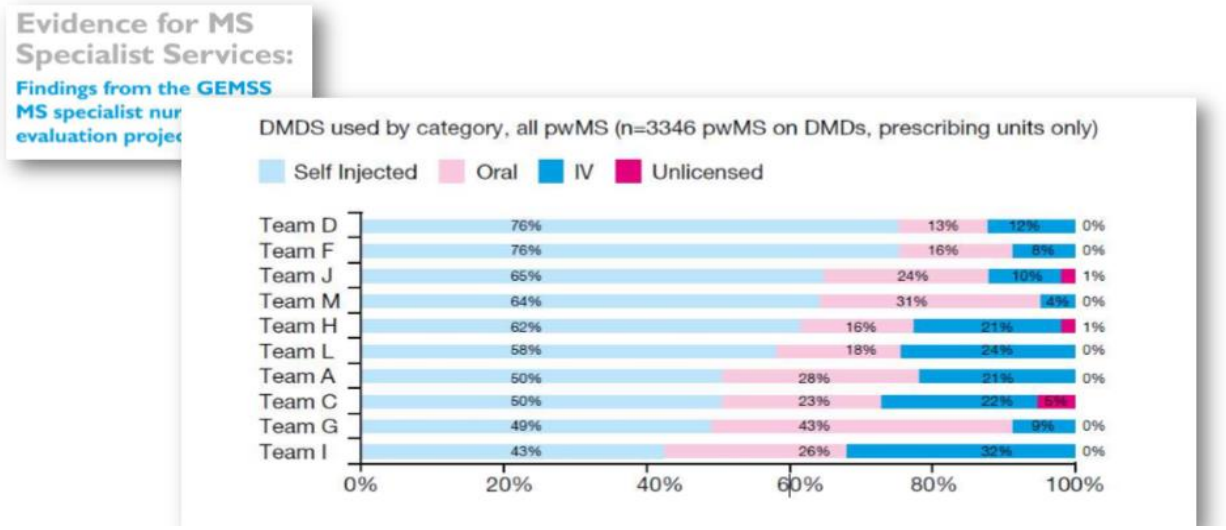
Figure 2. DMD access following diagnosis[10]



Access to DMDs by time since diagnosis

[10] MS Society (2016) MS treatment in England: is access still a lottery? Available at: www.mssociety.org.uk/get-involved/campaign-with-us/treat-me-right/is-access-to-treatment-a-lottery (last accessed November 2019).
[11]MS Trust (2015) Evidence for MS Specialist Services: Findings from the GEMSS MS specialist nurse evaluation project. Available at: www.mstrust.org.uk/sites/default/files/GEMSS%20final%20report.pdf (last accessed November 2019).
[12] MS Academy (2018) MS service variance – the way forward. Available at: https://multiplesclerosisacademy.org/2018/10/15/ms-service-variance-the-way-forward/ (last accessed November 2019).

Figure 3. Regional variation in the type of DMD offered[11]



In order to support clinicians in this complex area, NHS England (with the support of many experts in the field) has produced a comprehensive Treatment Algorithm for MS patients[3] (see figure 4), which should improve the consistency of the decision-making process for treatment, in combination with the need for multidisciplinary team meetings and the mandatory use of the Blueteq[13] database for high-cost drugs.

Figure 4. NHS England treatment algorithm for MS[3]

First-line therapy of relapsing-remitting MS	
RRMS: 2 significant relapses in last 2 years	• Interferon beta 1a and 1b • Dimethyl fumarate • Glatiramer acetate • Teriflunomide • Alemtuzumab or ocrelizumab
RRMS: 1 relapse in last 2 years AND radiological activity	• Interferon beta 1a and glatiramer acetate • Alemtuzumab or ocrelizumab
Rapidly evolving severe MS	• Alemtuzumab or ocrelizumab • Cladribine • Natalizumab

[13] Blueteq. Available at: www.blueteq.com (last access November 2019).

Goals & values

Rachel wants to:

- Feel better
- Go back to 'normal life'
- Progress in her career

Rachel is committed to:

- Her husband and children
- Her mum Margaret – who helps a lot

Sources of information

- MumsNet online forum
- MS Trust
- MS specialist nurse
- MS groups on social media

Meet Rachel

Age: 32

Sex: Female

Marital status: Married

Children: 2 & 4 years old

Location: Penrith, Cumbria

Occupation: French teacher

Income: Reliant on husband/child benefits

Education: BA, PGCE

Diagnosis: RRMS

Age symptoms started: 28

Challenges & pain points

Rachel is challenged with:

- Fatigue – has no energy
- A young family
- Staying in work
- Finances – living with MS is expensive

Rachel's pain points are:

- She feels exhausted all the time
- Why her?
- She wants to continue her career

Engagement difficulties / objections

- Finding the time to travel to hospital for treatment is difficult

Rachel is a 32-year old living in Penrith in Cumbria. She has been married to Sam, 33, a sales representative for a car spares company for six years. They have two children: Charlie, 4, who is in reception class at school, and Abigail, 2, who is in childcare. Rachel's mum Margaret lives about 14 miles away.

Rachel works as a French teacher at the local sixth form college teaching French to A level students. After her eldest, Charlie, was born she went back to work whilst her mum looked after him. Although Charlie had a couple of days at nursery each week, when Abigail arrived two years later, balancing full-time work with a baby and a toddler was no mean feat. Rachel's mum felt two little ones were too much for her to handle if she were to go back to work, so Rachel decided to negotiate part-time hours for the sixth form college. She also picked up evening adult French conversation classes so that she could let Sam take on some of the childcare when he got in from work. She hoped to go back to work full time again when Abigail

started nursery, as financially things were very tight – teaching evening classes didn't make up for the pay for the equivalent hours at the college.

Sam and Rachel had their own home, a two-up two-down terrace with a long back garden that the couple had worked hard to turn it into a productive vegetable garden. Since they had the children it had been a struggle at times to make ends, meet but they were pleased to be in their own home living in what they considered an idyllic part of the countryside.

Rachel's optimal journey

Rachel's journey started in 2014 when she developed a range of symptoms over a few weeks which she felt were a bit strange. She said she almost felt drunk after becoming a little unsteady on her feet and not being able to walk straight. She also felt constantly exhausted – probably not surprising with a demanding job, two young children, and running around the college campus to different classrooms.

She went to see her GP who thought she had a middle ear infection that was unbalancing her. The GP gave her antibiotics. Although she did improve initially, the symptoms recurred and additionally her vision was affected.

It is not uncommon for GPs to see patients many times before a referral to secondary care specialists, which can delay a prompt diagnosis. In their survey of just under 7,000 people with neurological conditions, the Neurological Alliance found that the majority of respondents saw their GP five or more times before they were referred to a neurological specialist, and most waited more than 12 months from first noticing their symptoms to seeing a neurological specialist.[14] Recently published data from almost 17,000 people with MS across Europe show that the gap between the start of symptoms and diagnosis varies considerably between countries, and is far short of the recommended standard.[15]

An even better pathway for a patient like Rachel is e-referral, where the referral gets triaged and there is no reliance on letters that could potentially get lost.

It is common in England for initial referrals to go to non-MS specialists who can often misdiagnose the condition, and some patients can wait for between 6 and 12 months for an appointment. This inevitably delays the process of receiving a diagnosis and starting on treatments. Suboptimal disease management impacts on disease progression and costs of managing MS, which may result in further relapses causing significant disability over time. Coupled with long waiting lists it is clear that patients can be waiting many months before they finally get diagnosis and treatment. Once offered treatment, patient choice about particular treatment options is not typical in all areas.

In Rachel's suboptimal scenario she developed serious abdominal pain during the long wait to see a neurologist and was rushed to A&E in an ambulance. She was treated on the ward for a urinary tract infection for four days. This episode provoked an MS relapse, which left Rachel with residual impaired mobility.

[14] Neurological Alliance (2016) Neurology and primary care: improving the transition from primary care for people with neurological conditions. Available at: www.neural.org.uk/assets/pdfs/2016-08-neuro-and-primary-care.pdf (Last accessed November 2019).

[15] Kobelt G, Thompson A, Berg J et al. New insights into the burden and costs of multiple sclerosis in Europe. Mult Scler 2017;23:1123–36.

She felt so unwell and had to see her GP again, who was very concerned this time and quickly referred her to the local general neurologist for an opinion.

Rachel saw the neurologist who did a range of investigations including an MRI scan of the brain. The neurologist thought this could be relapsing-remitting MS (RRMS) and so referred her to the regional MS expert for the diagnosis to be confirmed and consideration for a disease-modifying drug (DMD).

> Brain health for MS patients is very important, and early recognition of the condition followed by proactive management can reduce brain-related disability. An international group of MS neurologists has agreed standards for the timing of key steps in the MS care pathway which relate to brain health. The standards inform the development of an MS Brain Health quality improvement tool that will help established and developing MS clinics to strive for the best possible standard of patient care. Alongside the clinical tool, the standards also provide the basis for a checklist that will help people with MS to bring about improvements in care. The standards detail best practice timelines for referral, diagnosis and treatment of patients with suspected MS. See appendix 2 for more information.

Rachel had to wait 10 weeks for her appointment – which was not ideal even in the optimal scenario, but better than many other areas. She was finally seen by the MS specialist neurologist who agreed that she had RRMS and was eligible for DMD treatment under NHS England guidelines. Using recommendations in the NHS England Treatment Algorithm for MS, an outline of the treatment options was given.[3] A range of therapies were discussed, which all felt overwhelming to Rachel, but she was advised to take her time and look at the MS Trust MS Decisions Aid, an online decision support tool, to help consider the options (see figure 5).[16] The neurologist also arranged for her to meet with the MS nurse specialist to go through the options and their potential side effects in more detail.

[16] MS Trust (2019) Available at: www.mstrust.org.uk/about-ms/ms-treatments/ms-decisions-aid (last accessed June 2020).

Figure 5. MS Trust MS Decisions Aid online drug comparison tool [16]

Drug	Ocrelizumab	Fingolimod	Cladribine	Natalizumab	Alemtuzumab
Administration	IV	Oral	Oral	IV	IV
Frequency	Once every six months	Once daily	Two treatment courses 12 months apart	Monthly	Annually (for two treatment courses year 1 and year 2)
Monitoring	Prior to each dose, every 6 months[17]	Before starting treatment, every 3 months for first year, then less frequently	Before starting treatment, then at three and seven months in year one, and at three and seven months in year two.	Before starting treatment, every 3 months for first year, then less frequently	Before starting treatment, then every month for 4 years after last treatment

[17] Ocrevus SPC: https://www.medicines.org.uk/emc/product/8898/smpc#INDICATIONS. *Ocrelizumab monitoring on MS Trust MS Decisions Aid online drug comparison tool is 'to be confirmed'*

Rachel saw the MS nurse specialist the following week. The available treatments were discussed and Rachel had the range of investigations needed to ensure she was suitable to receive treatment.

Rachel developed a relationship with her MS nurse through several subsequent calls and emails during the following month so that she could make an informed decision on the treatments on offer. The nurse's primary objective was for Rachel to make the right decision on the DMD choices. There are two main areas that need understanding and analysis to make the management solution for Rachel:

1. Understanding drug efficacy, risks, and potential side effects.
2. Understanding the operational practicalities of drug administration and monitoring.

Below an MS specialist nurse explains how staff support and guide patients through the process, so that they can come to the right decision for them:

The benefits of the MS specialist nurses are not to be underestimated. However, not all areas have sufficient access to nurse specialists or their capacity is reduced.

The MS Trust has identified that the majority of patients in the UK (77%) live in areas where nurse caseloads are in excess of the "sustainable caseload figure" of 315 people, and that nearly a quarter of patients live in areas where caseloads are over twice the recommended level.[2]

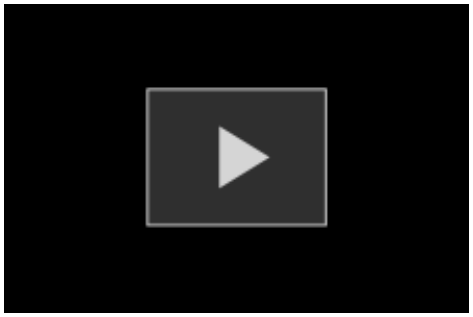
Nurse specialists are beneficial as:

- A central point of contact for support and understanding (health and wellbeing support)
- To explain the patient choices around drugs options (the risks, the side effects and the practical implications of administration)
- Support ongoing drug compliance and monitoring.

In the suboptimal scenario Rachel received very limited support from the MS specialist nurse at the outset of her diagnosis, and less contact thereafter because the nurse had a very large caseload. She was directed towards online information resources, but felt very isolated and unsure about the treatment options.

Long periods of time not being optimally managed and supported often leads to excessive pressure being placed on friends and family, particularly for patients with young families. Lost work, significant travel to medical appointments and the stress and anxiety that typically builds means that relationships can be pushed to breaking point. The UK MS Register found that just over half (54%) of people with MS had anxiety and almost half (47%) had depression which is higher than in the general population.[17]

[18] Jones KH, Ford DV, Jones PA, et al. A large-scale study of anxiety and depression in people with multiple sclerosis: a survey via the web portal of the UK MS register. PLoS One. 2012;7(7):e41910.



In the following section we explore how these two considerations might play out for Rachel.

Drug risks, side effects and efficacy rates

There are several drugs that can treat and support MS patients and Rachel's MS nurse used the MS Trust MS Decisions Aid[16] drug comparison tool to help Rachel understand her options and best choices for her (see figure 6). She brought her husband with her and they had a list of questions that were on their minds.

Figure 6. Balancing DMD side effects versus efficacy benefits

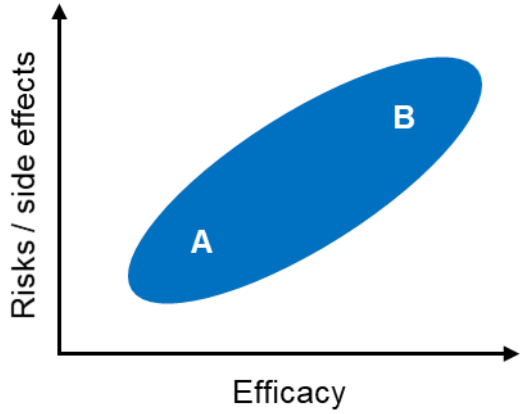


Figure 6 above, although simplistic, illustrates the types of considerations and conversations that need to take place between patients and their MS nurse or consultant. Different patients may choose option A or option B depending on their particular attitude to risk, efficacy and side effect trade-offs.

The next big decision is around the practicalities of drug administration and monitoring.[19]

[19] Note: oral drug options that take advantage of the home delivery service will have additional administration considerations that clinical teams need to take into consideration.

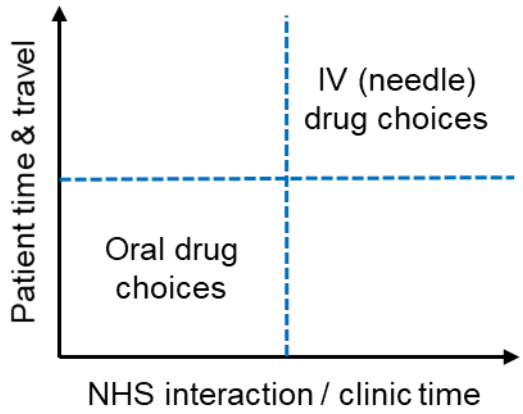
The key considerations are:

1. Mode of administration – time requirements, social impact, ease of use and convenience, willingness to adhere to programme
2. Burden of treatment and monitoring
3. Does the person have a needle phobia?
4. Time requirements – both administration and travel time
5. Social interaction – does the person prefer the social interaction of having drugs administered in a clinic environment? The reassurance of a supportive hospital environment may help some patients.

All five of these factors will require careful consideration and patients will come to different conclusions based on their personal preferences and situation. Typical thought processes that most patients will need to think through are illustrated in figure 7.

For many patients the opportunity to discuss the options is not always possible.

Figure 7. Balancing drug administration options: patient time versus clinic time



Rachel could cope with needles, so intravenous (IV) and oral drugs were both under consideration. The nurse explained the side effects, risks and efficacy benefits of each of the drugs that were an option for her: ocrelizumab, fingolimod, cladribine, natalizumab, and alemtuzumab. Rachel was also made aware of the potential adverse events associated with each of the drugs that are licensed for highly active disease. She used the MS Trust MS Decisions Aid drug comparison tool to compare the different drugs.[16]

The nurse made it very clear to Rachel that ultimately the drug choice was up to her and her consultant once she had balanced the risks and benefits for her personal situation.

The deciding factor for Rachel was the time involved. She didn't think she would be able to manage a young family as well as take the time off work for a day each month travelling to the hospital. After this evaluation Rachel showed a clear preference for an oral drug, and eventually she opted for the treatment that involved fewer doses overall, which she thought would be more convenient (and she thought better for her immune system as she would not be taking the drugs all the time).

After spending a month carefully considering her options, Rachel felt she had arrived at the right decision and was so grateful to the MS nurse for all the support and thorough guidance through this review process. The consultant was too busy to help her with this and there was no way she could have managed this alone.

Pre-treatment assessments that patients like Rachel would undergo:

- MRI
- EDSS measurement for Blueteq, as stipulated by NHSE.
- Lumbar puncture performed when there are other variables in the diagnosis. With the new McDonald Criteria, lumbar punctures are helpful in establishing the diagnosis of MS.
- Weight is measured before initiating cladribine treatment, although MS nurses may record height and weight as part of discussions about weight and health management.
- Baseline investigations:
  - First-line drugs: LFTs, TFTs, U&Es, FBC
  - High level treatments (HLT): as above plus HIV, HEP, VZV, syphilis, TB chest X-ray
  - Fingolimod: HLT, ECG
  - Lemtrada: HLT + cervical smear test for women
  - Ocrelizumab: HLT + immunoglobulin
- Female patients receive a pregnancy test in the morning prior to initiating HLT.

MS coordinators play a key administration team role for patients. This is a labour-intensive role which helps take administrative strain off MS nurses and the wider MDT.

In the suboptimal scenario Rachel opts for an intravenous drug which brings with it travel costs in excess of £250 for getting to hospital. This is both difficult for her to afford and hard to find the time.

Rachel received a phone call from a nurse who arranged delivery of the treatment, highlighting the blood monitoring requirements and contact details for the MS team. They also discussed the other members of the team that she would need to see to ensure she proactively managed her MS. A date was set for the treatment to begin.

She duly received her medication by home delivery. Contact details, monitoring requirements, and future appointments were also sent to her in an email so that she had these to hand to refer back to. The MS nurse arranged to call her a couple of weeks after the first dose.

At this call she also told Rachel she had referred her for a neuro-rehabilitation team assessment, through which she would see a neuro-physiotherapist to advise her appropriately on fatigue, exercise and pain management. They also referred her to the clinical neuro-psychologist who would help her in coming to terms with the diagnosis. She was invited to attend a neuro-exercise group at the local gym and the neuro-psychologist arranged for a six-session programme of support.

Rachel had the second dose of treatment in a month's time. She found home delivery of her medication made everything very convenient.[20] This was made even easier because her GP did the three-monthly follow-up blood tests for monitoring, which saved her from needing to make the trip into hospital. Rachel had

In the suboptimal scenario Rachel's GP would not do the blood monitoring that's required as part of the treatment so her only option is to go back to the hospital for this. Going to hospital for blood tests incurs travel time and costs for the patient, plus needing to have childcare arrangements in place, and waiting times when clinics are delayed. Extra costs are incurred for the service too.

For patients on treatment, MS services really benefit from a blood monitoring service that could be accessed by their healthcare professional regardless of where the patient lives.

In the suboptimal scenario Rachel had less contact with the MS nurse and was less well-informed on how to self-manage her condition. Due to the delay in initiating DMD treatment, she experienced poorer health and more symptoms, with increasing fatigue, spasticity and pain. Her overall resistance was low and only a few months after her diagnosis she developed a heavy cold and cough. This got progressively worse and in the middle of the night Sam had to call an ambulance to take Rachel to A&E. She had a serious chest infection, spending three days in hospital after which she had another MS relapse. Weak and fatigued following the infection she felt it was impossible to cope anymore and decided to give up work.

Using conservative assumptions, the MS Trust's 2015 GEMSS data suggested that each full-time equivalent MS nurse saved £77,400 in ambulatory care costs (GP appointments, neurology appointments and A&E visits) during the year. The authors were confident that MS nurses reduce admissions and that the savings generated are likely to far exceed the costs of employing them. The savings in 2019 are in all likelihood now far higher.[11]

[20] NB, this also has VAT saving implications for commissioners.

been to see her GP twice to discuss the diagnosis. The GP prescribed her iron and vitamin D tablets. The MS nurse had emailed her GP a checklist of how they could support Rachel which included the blood monitoring requirements and what to do if a relapse was suspected.

Future outpatient appointments focused on treatment and monitoring, family planning counselling, maintaining brain health, and supporting Rachel through her journey with MS. She had a face-to-face appointment with the MS nurse every four months, and regular phone and email contacts as needed. The nurse also arranged for Rachel, Sam and her mum to attend a series of newly diagnosed evening classes to learn more about MS and meet other people with the condition.

Rachel's diagnosis had come as a jolt to the family, and although the classes helped Sam to understand more about MS, he felt overwhelmed by what might lie ahead. Rachel however, although worried about the uncertainties of her condition, felt like she didn't want MS to beat her or disrupt normality for the kids. She busied herself with life's continuing demands, as well as the balance and fatigue management classes which kept her positive.

Infection could precipitate a relapse. As part of the MS nurse patient education, Rachel was told that if she experienced signs and symptoms suggestive of relapse, she must seek GP advice very quickly so that treatment can start. The GP was given a checklist with information about MS management and relapses to make them fully aware of care requirements. Patients with suspected relapse need prompt attention and should be seen within one week. The GP was instructed to email the MS nurse immediately – the patient would likely need oral treatment with 500 mg methylprednisolone for five days.

Rachel had regular blood monitoring tests but needed no further treatment until the following year. The next two doses of the oral drug were again delivered to her at home – each dose one month apart.

In the suboptimal scenario Rachel was more disabled and had severe pain from the spasticity in her limbs. She attended a pain clinic and was prescribed baclofen to help ease the spasticity. She required a wheelchair and aids and adaptations for her home. Her bladder problems were also worse, which meant that she had to begin intermittent self-catheterisation. As a result of this she developed another UTI, although this time it was managed in primary care.

As her walking gradually became more affected by spasticity and pain in her legs, she found that she was increasingly finding it tiring to get around from classroom to classroom during the working day. The MS nurse referred her to the neuro-rehabilitation team (specialised commissioning) where the occupational therapist recommended that she use a walking stick and baclofen was prescribed to help with her pain. The neurorehabilitation team also arranged for a respiratory assessment so that she was less likely to experience

respiratory problems. The college also worked with her to make reasonable adjustments to ensure that she could manage classes.

It was difficult to come to terms with all the changes that needed to be made in her life, especially coping with the extreme fatigue. It often meant that she had very little energy left for the family, leaving Sam to manage the children on his own. Things were tough at home and Rachel had her own anxieties about how the spasticity problems were getting in the way of intimacy with Sam.

At her next review she had her annual MRI and discussed her concerns with the MS nurse specialist, mentioning that sexual problems were particularly affecting her. The nurse referred her to a sexual dysfunction clinic and continence nurse specialist as she was also having bladder problems. The twice-yearly appointments with the MS nurse were beneficial in picking up issues quickly and between these Rachel also had the benefit of phone or email contact if she wanted advice on a particular question or problem. With the support of relationship counselling from the sexual dysfunction clinic, this really helped Rachel and Sam to pull together and manage the challenges of life as a couple with MS.

In the suboptimal scenario life carried on, but things were stressful. Without any support in place Sam and Rachel were growing distant and struggling to understand each other. Sam found it hard to be supportive in the way that Rachel needed, and Rachel was worried that the tension in the household was having an impact on the kids. Four years after her diagnosis the couple made the decision to separate and share care of the children.

Without a job Rachel was currently reliant on benefit which totalled about £6,000 a year. Unable to manage alone at home she and the children had to move in with her mum. As well as juggling her own job, Rachel's mum had the children and Rachel to cope with too. Rachel experienced periods of extreme fatigue and found it easier to use a wheelchair to get around.

For Rachel, prompt referral, diagnosis and swift treatment, combined with the support of her MS nurse and the wider neuro-rehabilitation team meant that Rachel's life was under control and she was as well as she could be, maintaining a good quality of life. She was able to ride out the challenges while she continued working until 45 and maintained a happy marriage and home life. In the suboptimal scenario however, delayed diagnosis and treatment resulted in Rachel experiencing more relapses and acquiring a greater level of impairment earlier on in her condition. Without the close support of the MS service she experienced poorer health which triggered two distressing, and costly, episodes of emergency admission to hospital. The strain of this created significant financial and relationship problems for Rachel and Sam. Ultimately this resulted in her giving up work at 34 and marital breakdown. Rachel, unable to cope alone at home with two young children, had to rely more and

more on her mother's help, which created significant financial problems and an increased burden on Rachel's mother too.

Often, the care processes for patients with MS are not managed optimally and the impact is an increase in relapse rate, a deterioration of the patient (which is irreversible) and increased hospital admissions and increased lengths of stay (especially where a lack of the appropriate community care is in place). Commonplace infections such as UTIs or respiratory infections can lead to a sudden exacerbation of a patient's MS symptoms possibly triggering a relapse. If the infection is left undetected and untreated, the patient may need admission to hospital to manage their condition and treat a relapse. Such admissions occur frequently among patients with RRMS and are largely avoidable with the right proactive care for these at-risk individuals.

The ‘bills’ and how they compare

For the financial evaluation a detailed analysis was performed by mapping the lifecycle of the optimal pathway for Rachel, while highlighting the cost differences between the range of high-impact DMD options.

Through this process it is possible to identify the cost drivers that would be incurred in primary and hospital care, using where appropriate, the NHS National Tariff Payment System[21] and NHS reference costs.[22] We have included the wider social and economic impacts of care:

- Unit costs of health and social care, including community-based social care and hospital-based health care staff[23]
- Staff costs[24]
- Drug costs[25]
- Childcare support[26]
- Exercise classes provided by third sector[27]

This does not include the cost outside the health remit or the social, emotional, physical and financial costs to the patient and family members.

This scenario is using a fictional patient, Rachel. It is intended to help commissioners and providers understand the implications of different MS DMD treatment options for patients with MS both from a quality of life and a financial cost perspective.

Note: The financial costs are indicative and calculated on a cost per patient basis. Local decisions to transform care pathways would need to take a population view of costs and improvement.

[21] NHS England and NHS Improvement (2019) 2019/20 National Tariff Payment System. Available at: https://improvement.nhs.uk/documents/4980/1920_National_Tariff_Payment_System.pdf (last accessed November 2019).
[22] NHS Improvement (2018) NHS Reference Costs. Available at: https://improvement.nhs.uk/resources/reference-costs/ (last accessed November 2019).
[23] Curtis LA & Burns A (2018) Unit Costs of Health and Social Care 2018. Available at: www.pssru.ac.uk/project-pages/unit-costs/ (last accessed November 2019).
[24] The NHS Staff Council (2019) NHS Terms and Conditions of Service Handbook. Available at: www.nhsemployers.org/employershandbook/tchandbook/afc_tc_of_service_handbook_fb.pdf (last accessed November 2019).
[25] British National Formulary. Available at: https://bnf.nice.org.uk/drug/ (last accessed November 2019).
[26] The Money Advice Service. Available at: www.moneyadviceservice.org.uk (last accessed November 2019).
[27] Neurological Commissioning Support (2012) Get e-QIPP-ed for neurology.

MS disease-modifying drug cost analysis

The drug cost range over the four years of analysis ranges from £53,100 to £100,400 – see figure 8 below.[21,28]

Figure 8. MS disease-modifying drug costs

Drug – list charges	Alemtuzumab	Fingolimod	Cladribine	Natalizumab	Ocrelizumab
Drug costs:					
Year 1	£35,225	£19,477	£26,000	£14,690	£15,967
Year 2	£21,135	£19,477	£26,000	£14,690	£15,967
Year 3	£0	£19,477	£0	£14,690	£15,967
Year 4	£0	£19,477	£0	£14,690	£15,967
Total	£56,360	£77,909	£52,000	£58,760	£63,867
VAT*	£11,272	£0	£0	£11,752	£12,773
Total (incl VAT)	**£67,632**	**£77,909**	**£52,000**	**£70,512**	**£76,640**
Drugs eligible for discounts (PAS / CAA)**					
	No	**Yes**	**Yes**	**No**	**Yes**
Admin & monitoring costs:					
Year 1	£3,397	£671	£590	£7,521	£1,289
Year 2	£1,895	£155	£172	£7,452	£1,220
Year 3	£275	£155	£148	£7,452	£1,220
Year 4	£275	£155	£148	£7,452	£1,220
Total	**£5,842**	**£1,136**	**£1,058**	**£29,877**	**£4,949**
Combined total costs - list price (drugs + admin & monitoring):					
	£73,474	**£79,045**	**£53,058**	**£100,389**	**£81,589**

Note* VAT is recoverable for the oral home delivery drugs and thus is not included as a cost within the analysis. However, VAT is included for hospital-dispensed DMDs (infusions).

Note** this analysis has costed at drug list prices. Discounts in the form of Patient Access Schemes (PAS) and Commercial Access Agreement (CAA) are confidential.

[28] Using NHS Reference Costs for 2017/18:

- Cladribine and alemtuzumab are invoiced over year 1 and year 2 with no subsequent invoicing (i.e. years 3 and 4).
- Cladribine dosage based upon weighted average of 12.7 tablets per annual treatment course (25.4 tablets in total) – based on phase 3 studies - NB the only drug where the dose is weight dependent.
- Administration and monitoring costs include clinical reviews and appointments.
- For more detail on the modelling and calculations, please contact Wilmington Healthcare.

The cost of drugs in this analysis does not reflect any agreements made commercially in confidence between a manufacturer and the NHS; Commissioners should be aware that these numbers are therefore prudent and they should be aware that some manufacturers will consider discounts. Therefore, it's important to note that the top end of the range (£100,389) would remain unchanged (at the time of publication) whereas there is likely to be a reduction to the bottom end of the range where confidential prices (PAS / CAA) are in place.

Another important consideration for commissioners, but especially operational managers within acute trusts, is the capacity of drug monitoring clinics. Figure 9 below highlights the significant range in monitoring and administration requirements across the different drugs.

Figure 9. Disease-modifying drug administration and monitoring activities

	Alemtuzumab	Fingolimod	Cladribine	Natalizumab	Ocrelizumab
Year 1	58	7	7	20	4
Year 2	53	5	5	20	3
Year 3	44	5	1	20	3
Year 4	44	5	1	20	3
Total	**199**	**22**	**14**	**80**	**13**

This analysis helps us to understand that there will be a range of probable healthcare demands, and costs, depending on the patient's choice of DMD.

For the estimated full costs of the whole five-year pathway, see figure 10 below.

Figure 10. Summary of NHS costs (excluding DMD and associated administration and monitoring)[23–29]

Health-related activities	Suboptimal costs	Optimal costs
A&E visit	£224	£0
Aids and adaptations - walking stick	£0	£9
Aids and adaptations - wheelchair services	£303	£0
Ambulance call out	£252	£0
Assessment – neuro-rehabilitation	£0	£872
Cognitive behavioural therapy	£726	£0
Chest infection - hospital admission	£709	£0
Chest X-ray	£25	£25
Class - exercise	£0	£960
Class - managing fatigue	£0	£1,254
Class - newly diagnosed information / therapy	£90	£0
Hospital episode – urinary tract infection	£3,406	£0
Intermittent catheters	£132	£0
Medical review - GP practice	£476	£408
Neuro-physiotherapist	£0	£324
Neuro-psychologist	£0	£1,488
Newly diagnosed course	£0	£20
Nurse - continence specialist	£45	£180
Nurse - MS specialist	£351	£891
Pain clinic – consultant-led first appointment	£121	£0
Pain clinic - nurse follow-ups	£68	£0
Prescription - antibiotics	£17	£9
Prescription - baclofen	£79	£24
Prescription - betmegg	£484	£303
Prescription -iron and vitamin D tablet supplements	£229	£270
Prescription issued by GP - antidepressants	£71	£0
Sexual dysfunction clinic	£0	£54
Speech and language therapist	£55	£165
Test - cervical smear	£23	£23
Test - ECG	£194	£194
Various extra blood tests (HEP, HIV, syphilis, E&Es, VZV)	£38	£38
Test - immunoglobulin	£15	£15
Pathway costs excluding drug, admin & monitoring costs	**£8,132**	**£7,524**

Figure 11. Financial summary of DMD and associated administration and monitoring costs

	Suboptimal costs	Optimal costs
Drug, admin & monitoring costs (April 15–Aug 18: 41 months)	£45,316 – £85,748	
Drug, admin & monitoring costs (Aug 14–Aug 18; 48 months)		£53,053 – £100,389

Note that the cost range in figure 11 reflects the choice of drug that is utilised by the patient – see figure 8 above. Appendix 2 lists the activities included in the drug, administration and monitoring costs.

On the assumption that Rachel stopped working in the second year of the suboptimal scenario, but continued working in the optimal scenario, the tax loss (income tax and NI contributions) over this period would be in the region of £22,200.[29] Over the same period, benefits support paid out in the suboptimal scenario would be around £24,500 (see figure 12).[30]

Figure 12. Financial summary of tax losses and benefit costs associated with unemployment consequences of the suboptimal scenario

	Suboptimal costs	Optimal costs
Estimated tax loss impact (cost to the economy) During the scenario timeframe of almost 5 years	£22,168	£0
Estimated benefit costs During the scenario timeframe of almost 5 years	£24,536	£0

Therefore, in total, these broader additional costs to the wider economy between the two scenarios within the timeframes of these stories are around £47,000.[31] If the timeframe is extended until Rachel becomes unable to continue to working in the optimal scenario (at the age of 45), the savings are in the region of £152,000.

[29] £4,630 income tax and £3,189 NI contribution per month by employee = £7,819 per annum, or £652 per month (Source: www.incometaxcalculator.org.uk/?ingr=£35,000).

[30] Calculation based on: not being able to earn any income from year two onwards; current benefit systems (not the universal credit system); benefits as at March 2019 (no inflation has been added); partner's income of £35,000 per annum; using a Penrith postcode (CA11 8WG). See PDF report in Appendix 3 for further details (Source www.entitledto.co.uk/benefits-calculator/Results/ComprehensiveCalc?cid=df7a7b65-5f4f-4750-b508-183fe26a759d&paymentPeriod=Yearly&calcScenario=CurrentSystem).

[31] Travel costs have not been included in the analysis; however, for Rachel to attend the hospital if she had chosen an IV drug would be a significant cost for the family in excess of £250. This is based on receiving IV drugs in hospital on average 4.28 times a year. Assuming a 35-mile round trip, £17.50 is a prudent cost per trip.

Figure 13. Financial summary – holistic cost impact

	Suboptimal costs	Optimal costs
Total estimated cost impact range* (within story timeframe)	**£100,152 – £140,584**	**£60,576 – £107,912**

*Range due to drug choice selected.

This analysis highlights three primary key cost driving factors:

1. Health economy pathways need to be resourced properly so that patients can be diagnosed and correctly treated promptly to avoid brain health deterioration. Reactive healthcare costs more than good quality proactive healthcare, which is illustrated in figure 10.
2. Patient education and drug choice is not only critical for patients, but it also has a material impact on financial costs to the NHS.
3. Slow and inadequate care can result in very poor quality of life that often results in unemployment, increased benefit payments and significant tax losses.

Financial calculation notes

- As noted above, the financial calculation presented here represents an indicative level of efficiency potential of the case only. Firstly, as the case is an example pathway, differential pathways for other patients may increase or reduce the potential benefit. Secondly, the potential releasing of resource associated with implementing the subcutaneous pathway across a larger cohort of patients will be subject to over-arching contractual arrangement in place between providers and commissioners, which may differ across the country. For example, some of the financial benefits identified in the case, may not be fully realisable where the elements of the pathway are subject to block contracts or risk/gain shares in place between contracting parties. Equally, the release of resource may only be realised should there be a critical mass from within the targeted patient population.
- It should also be noted that the financial calculation is considered from a commissioner perspective. The impact on income and costs (including capacity management) for provider organisations will require consideration in the implementation of the subcutaneous pathway.
- Each healthcare organisation and system will need to assess the potential for realising the financial benefits identified in the case.

Learning points for commissioners:

1. Understand the capacity of specialists in your service and make sure that you have adequate resources in place.
2. Make sure that policies and procedures are in place so that patients are well informed and supported to make the right decisions for them within the constraints and guidance from NICE.
3. Monitor the drug use/adherence and effectiveness carefully.
4. Working together is an essential part of optimising the care pathway in MS, so that care is intelligently joined up across all the teams involved in the care of people with MS.

Learning points for the public:

1. Spend time with the MS specialists in your area so that you can be well informed so that you can make the best choices and best decisions based on your individual situation and condition.
2. Use resources from the MS Trust and other organisations to help you to understand all issues and implications with regards to MS drugs.

Learning points for clinicians:

1. Use the NHS England Treatment Algorithm for MS[3] to understand the most recent research findings and guidance to streamline your guidance.
2. Ensure your patients have the time and support they need to make decisions that are appropriate for them.
3. Utilise the NICE Accelerated Access Collaborative[32] which can provide faster access to treatment.

[32] NICE Accelerated Access Collaborative. Available at: www.nice.org.uk/aac (last accessed November 2019).

Questions for GPs and commissioners to consider when deciding on treatment options

At the CCG population level, there will be large numbers of people that will experience MS in the coming months and years ahead. Therefore, the following questions are very important for immediate consideration.

In the local population, who has overall responsibility for:

- Ensuring you have sufficient MS specialists (consultants and nurses) in your service area?
- Monitoring patients (with robust data capture - especially patients on high-cost drugs) to understand how well they are performing on various treatments?
- Capacity management (clinic and nurse availability) for patient monitoring (including blood analysis)?
- Planning care models to address key stages of MS diagnosis and intervention escalation?
- Ensuring timely referral, communication and action throughout the MS pathway?
- Identifying and reporting on measurable positive and negative associated outcomes?
- Quality assurance and value for money in MS care?
- Understanding whether your health economy already has valuable local data around patient experience and outcomes for MS care in your area?
- Understanding how this local data could be used to identify and drive improvements?
- Evaluating any existing engagement activity that has already taken place with patients with regards to MS?

The above questions are vital in understanding who manages which components of the whole system. Most importantly, it is impossible to effect optimal improvement if the system is not aware of the answers.

- Do you know the number of MS patients in your locality?
- Do you know how much you are spending on MS care?
- Do you know how you compare on spend and outcome for your peers?
- Did you know you were different and are you comfortable being different?

Conclusions

- Speedy and accurate diagnosis alongside clinicians working together as a team, are vital for effective treatment.
- Early intervention and appropriate prescriptions of disease-modifying drugs (within NICE guidance criteria) is important in MS as it can lead to avoidance of hospital admissions and significant financial and emotional costs.
- As the use and demand for MS drugs increases, the capacity to manage these patients, especially in relation to infusion clinics and trained staff, could be problematic for some health economies. Greater utilisation of the subcutaneous and oral options should be considered when reviewing patient pathways and patients should always be actively engaged and consulted in this process.
- Rapid access clinics and specialist MS nurses play a crucial role in managing MS patients and should be adequately resourced; at present the UK is not well resourced compared to other developed countries.
- Commissioners are now focusing on outcomes (e.g. reductions in remissions etc) and so it is important to capture the appropriate data in order to manage this process. The introduction of Blueteq is a step in the right direction but all parties should be aware of and mitigate against the risks associated with system gamification, i.e. false measurements which suggest outcomes that can be misleading.
- Data collection and monitoring is key so that clinicians can ensure that patients on expensive drugs are doing well on them – otherwise there is a potential waste of NHS resources (current spend on DMDs is around £250 million per annum). It is therefore very important that there is investment in resources and infrastructure to undertake this monitoring in order to optimise patient outcomes and to optimise value for money spending within the NHS.

Resources

For more information about MS, its diagnosis, management, guidelines and policy see the following resources:

Organisations

- MS Trust
- Multiple Sclerosis Academy
- MS Society
- Shift.ms

Tools and support:

- NICE guidance on MS drugs
- MS Decisions Aid, MS Trust online drug comparison support tool
- NHS England Treatment Algorithm for MS
- MS Brain Health
- MS Academy DMD monitoring burden calculation tool
- Digesting Science

NHS RightCare is a proven approach that delivers better outcomes and frees up funds for further innovation. Please explore our latest publications and for more details about our programme visit www.england.nhs.uk/rightcare.

You can also contact the NHS RightCare team via email at rightcare@nhs.net

Acknowledgements

We gratefully acknowledge the support and advice from our Clinical Advisory Group (CAG) in developing the scenarios for this work. Special thanks to those who have made written contributions.

- Prof Gavin Giovannoni
- Mavis Ayers
- Ruth Stross
- David Martin
- Sue Thomas
- Sarah Mehta
- Anthony Lawton

No conflict of interest has been raised in the development of the scenarios and no CAG member has received any financial remuneration.

Appendix 1

Expert consensus on standards for multiple sclerosis care: preliminary results from a modified Delphi process

Jeremy Hobart,[1] Amy Bowen,[2] Lucy Eberhard,[3] George Pepper[4] and Gavin Giovannoni,[5] on behalf of the MS Brain Health Delphi Consensus Panel

[1]Plymouth University Peninsula Schools of Medicine and Dentistry, Plymouth, UK; [2]NHS RightCare, London, UK; [3]Oxford PharmaGenesis, Oxford, UK; [4]Shift.ms, Leeds, UK; [5]Queen Mary University London, Blizard Institute, Barts and the London School of Medicine and Dentistry, London, UK

Background

- The need for prompt diagnosis and early treatment of multiple sclerosis (MS) was highlighted by the widely endorsed policy report *Brain health: time matters in multiple sclerosis*.[1]
- The current study aimed to define international standards for the timing of key steps in the MS care pathway.
- These standards will inform the content of tools to help MS services strive for the highest level of care.

Methods

- The Delphi process is a structured communication technique for gaining consensus among experts.
- Here, the Delphi process was modified to include both a core Delphi Consensus Panel and an additional Reviewing Group (Figure 1).

Participants

- Four Chairs directed the process; they represented neurology, patient-reported outcomes, nursing/policy and the patient perspective.
- In total, 39 MS neurologists from 26 countries were invited to participate in the Delphi Consensus Panel (Figure 1); 29 agreed to participate. All were currently based in an MS clinic and were spending at least half of their clinical time seeing patients with MS.
  - Panel members were required to take part in each round to remain in the process.
  - Responses were collected via online surveys, and participants remained anonymous to analysts and Chairs throughout.
- Thirty-nine MS nurses, people with MS and allied healthcare professionals were invited to participate in the Reviewing Group; 31 agreed to participate (Figure 1).

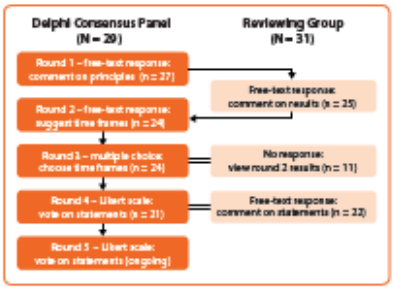


Figure 1. Modified Delphi process flow chart.

Consensus thresholds

- The predefined thresholds for consensus were at least 75% agreement and at least 66% participation compared with round 1.

Round 1 – principles

- We derived 21 time-related principles from recommendations in the report *Brain health: time matters in multiple sclerosis*.[1]
- The Panel were asked if each principle was 'an appropriate and accurate description of a good standard when considering brain health in people with MS' and were invited to suggest additional principles for inclusion.
- We then developed variables that describe the principles in clinical practice (Figure 2).

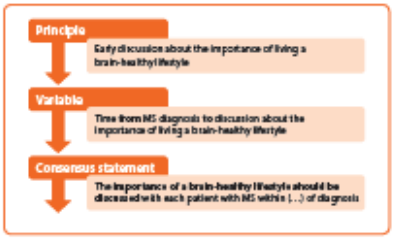


Figure 2. Example of progression from principle to consensus statement.

Standard	Definition
Core	This should currently be achieved by most MS teams worldwide, regardless of the local healthcare system, and will provide a minimum standard
Achievable	This is a realistic target for most MS teams and reflects a good standard of care
Aspirational	This might be achieved by only a few MS teams, where the local healthcare system allows, but should set the standard for high-quality care

Table 1. Definitions used for consensus standards.

Subset of achievable consensus standards

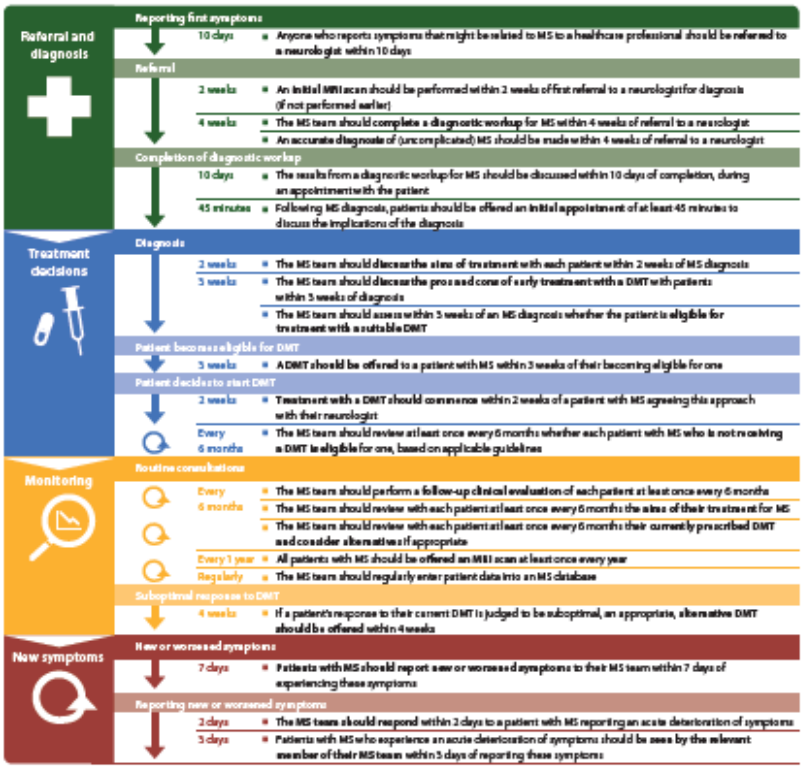


Figure 3. 'Achievable' standards related to referral, diagnosis, treatment decisions, monitoring and managing new symptoms, that gained at least 75% agreement from the Delphi Consensus Panel in round 4.

DMT, disease-modifying therapy; MRI, magnetic resonance imaging

Rounds 2 and 3 – timings

- In round 2, the Panel suggested timings for 'core', 'achievable' and 'aspirational' standards (Table 1) for each variable, by free text.
- In round 3, the Panel were shown box plots of the round 2 data and asked to choose timings from given options, taking into account the responses from the rest of the Panel. We developed consensus statements based on these results.
- Some principles were not time dependent, so these were not included in rounds 2 and 3 but taken forward to round 4.

Rounds 4 and 5 – consensus statements

- In round 4, the Panel voted on consensus statements related to symptom onset, referral, diagnosis, treatment decisions, a brain-healthy lifestyle, monitoring and managing new symptoms; participants indicated agreement (or otherwise) on a five-point Likert scale.
- In round 5, the Panel were shown the results for all statements from round 4 where consensus was not reached and were asked to vote again.
  - Those who did not agree with the statements were asked to give reasons in a free-text box.

Results

- We summarize here the results from round 1 and round 4 and present a subset of the achievable standards where consensus was reached.

Participants

- 21/27 (78%) of the Delphi Consensus Panel completed round 4 (Figure 1), thus meeting the threshold for participation.

Defining a good standard of care (round 1)

- For all 21 principles, over 75% of the Panel (n = 27) agreed that the principle was an appropriate and accurate description of a good standard.
- Three statements gained 100% (27/27) agreement:
  - 'Early discussion with patient about the aims of treatment'
  - 'Evaluation of suitability/eligibility for treatment shortly after MS diagnosis'
  - 'Regular review of the aims of treatment'.
- 'Timely offer of cognitive testing after MS diagnosis' gained the lowest agreement (78%; 21/27).
- Ten additional principles were included based on suggestions from both groups.

Consensus on key steps in the patient pathway (round 4)

- Consensus was reached on the majority of core (22/27), achievable (25/27) and aspirational (18/27) standards with timings and on four statements that did not include timings. Where consensus was not reached, the statements were taken forward to round 5; this is ongoing.
- Here, we present the standards on referral, diagnosis, treatment decisions, monitoring and managing new symptoms, which the Panel agreed should be achievable (Figure 3).

Next steps

- Additional consensus standards will be presented at a future date. These include:
  - achievable standards related to symptom onset and a brain-healthy lifestyle
  - core and aspirational consensus standards
  - round 5 consensus standards.

Conclusions

- An international group of MS neurologists has agreed standards for the timing of key steps in the MS care pathway which relate to brain health.
- The standards presented here, and those to follow, will inform the development of an MS Brain Health quality improvement tool that will help established and developing MS clinics in different countries strive for the best possible standard of patient care.
- Alongside the clinical tool, the standards also provide the basis for a checklist that will help people with MS to bring about improvements in care.

Reference

1. Giovannoni G et al. Brain health: time matters in multiple sclerosis. *Mult Scler Relat Disord* 2016;9 Suppl 1:S5–S48.

Disclosures

J Hobart has received consulting fees, honoraria, support to attend meetings or research support from Acorda, Actelion, Bayer Schering, Biogen Idec, F. Hoffmann-La Roche, Genzyme, Merck Serono, Novartis, Oxford PharmaGenesis and Teva. A Bowen has nothing to disclose. L Eberhard is an employee of Oxford PharmaGenesis. G Pepper has received consulting fees from Biogen, Novartis, Oxford PharmaGenesis and Teva. G Giovannoni has received consulting fees from Abbvie, Atara Bio, Bayer HealthCare, Biogen, Celgene Therapeutics, Vaccinex Medical, Daiichi Sankyo, Genzyme, Merck, Merck Serono, Novartis, Oxford PharmaGenesis, Protein Discovery Laboratories, Roche, Sanofi Genzyme, Synthon, Teva Neuroscience and UCB, and grants/research support from Bayer HealthCare, Biogen, Merck, Merck Serono, Novartis and Sanofi Genzyme.

Support for the preparation of this poster and for other MS brain health activities and materials has been provided by Oxford PharmaGenesis and Oxford Health Policy Forum, Oxford, UK. Funded by grants from Abbvie, Celgene and Sanofi Genzyme and by educational grants from Biogen, F. Hoffmann-La Roche and Merck Serono, all of whom had no influence on the content.

Presented at the 7th Joint ECTRIMS–ACTRIMS Meeting, 25–28 October 2017, Paris, France

MS Brain Health Time Matters

To read Brain health: time matters in multiple sclerosis, visit www.msbrainhealth.org

Appendix 2

Drug, administration and monitoring costs included in the figure 11 analysis

- HLT drugs
- Aciclovir 200mg (25-day pack)
- Anti-JCV test
- Biochemistry test
- Chlorphenamine 10mg (5 pack)
- Consultant-led neurologist outpatient visit – first attendance
- Consultant-led neurologist outpatient visit – follow-up attendance
- Diphenhydramine hydrochloride
- Full blood count test
- HBV test
- HCV test
- HPV test
- JC test
- Liver function test
- Magnetic resonance imaging scan
- Methylprednisolone, 1g vial
- MS intravenous infusion costs
- Non-consultant led neurologist outpatient visit – first attendance
- Non-consultant led neurologist outpatient visit – follow-up attendance
- Ophthalmology visit – first attendance
- Ophthalmology visit – follow-up attendance
- Paracetamol (16 tablets)
- Patient observation following first administration
- Pregnancy test
- Thyroid function tests
- Treatment of atrioventricular block (first or second degree)
- Tuberculosis skin test
- Urinalysis with microscopy test

Appendix 3

Benefits calculator – PDF output

This benefits entitlement estimate was used within the financial analysis section above.

A1C772D74_Compr
ehensiveCalcCurrent