MS Research Australia

MS Community Consultation on Priorities for MS Research

EXECUTIVE SUMMARY

Background

Why survey the Australian MS Community?

The crucial focus of MS Australia is the Australian MS community. It is essential that we have a robust and accurate representation of the whole MS community as we plan our strategy for the coming years. Even things like the terminology we use is very important, something that this survey has revealed - the preferred term for someone with MS, is a person with MS or a person living with MS.

A survey of the community allows everyone to have a say, and enables us to garner different opinions, while having robust representation of the whole community including people directly and indirectly affected by MS, as well as health professionals and researchers.

The results from this survey will help to guide our research strategy into the future.

How was the community surveyed?

This survey is a modified version of our 2016 Research Priorities Survey, which itself was based on a survey undertaken by MSUK as part of their robust priority setting process in 2012. Our questions were updated and adjusted for the Australian context. In 2021, the core questions remained the same as those asked in 2016, with some additional questions to explore specific areas. This gives us the unique ability to develop a longitudinal view of how research priorities may have changed over the last five years, especially important given the significant changes in MS medications we have seen in the past decade.

The survey asked questions about the current goals of MS Australia and the different fields and types of research in order to achieve those goals. We also asked about the priority people placed on specific research questions within each of the fields of MS research. The survey was anonymous, but demographic information was collected to confirm that the views of a broad representation of the MS community had been captured.

The survey was widely disseminated in the months of June through to August 2021 via social media channels, websites, and print and electronic newsletters of MS Australia and the state MS Societies. A very broad database of MS organisation staff, MS nurses, neurologists and researchers were also contacted to complete the survey.

Who responded in 2021?

3000 people started the survey with over 72% completing - a completion rate very close to that predicted and in line with industry standard for such a survey.

Of those that took part in the survey 1544 were people with MS. 464 are affected by MS, either being a carer or a family member of someone with MS. 72 respondents had a professional connection to MS, either as a MS nurse, neurologist, allied healthcare professional or a MS researcher. A further 178 respondents had some other connection to the MS community (see Table 1).

Person with MS	1544
Affected by MS	464
Professional	72
Other	178

Table 1: Connections to MS, the table contains the breakdown of participants and their connection to MS

Analysis showed that the survey respondents with MS were representative of the Australian MS population as they were closely aligned with the participants in the Australian MS Longitudinal Study (AMSLS) which has previously been shown to be representative of the Australian MS population[1]. The proportion of different types of MS was closely matched to that seen in the Australian MS population, with 64% of the people with MS who responded having relapsing remitting MS, 18% having secondary progressive MS and 8% having primary progressive MS. Another 7.5% did not know or had another form of demyelinating disease. The respondents with MS ranged broadly in age from 18 to over 65, with a slightly younger average age of 50 years, compared to the AMSLS average of 55 years, and a slightly higher percentage of women, 82% rather than 77% seen in the AMSLS. People with MS across the full spectrum of severity, from those living well with MS to those with significant levels of disability, were also well represented in the survey.

What type of MS do you have?	
Relapsing remitting MS	990 (64%)
Secondary Progressive MS	284 (18%)
Primary Progressive MS	128 (8%)
I don't know	69 (4%)
Other (please specify)	54 (3.5%)
Clinically Isolated Syndrome (CIS)	16 (1%)

Table 2: A breakdown of people with MS who responded and the type of MS. 3 respondents choice not to disclose MS type.

This is very similar to the breakdown from the 2016 survey, but the total number of people with MS who responded in 2021 was nearly twice as many as in 2016 (1544 compared to 774).

Survey Data

Due the robust and in-depth nature of this survey the results can be filtered by various different demographic conditions, including disease type, disease duration, disease severity. However, given the large number of different iterations that can be produced, this report will cover the results seen from all respondents, people living with MS and people affected by MS (those with MS, family friends and carers). An interactive display of the survey results will be made available which will allow people to filter responses according to their interests.

Results

Overall Research Priorities

The first part of the survey asked respondents to rank from 1 to 6 the most important overall goals for MS research. From highest to lowest priority, the top ranked goals were as follows:

1. Finding a cure for MS via repair and regeneration of cells
2. Preventing MS
3. Better treating MS
4. Improving the diagnosis of MS
5. Improving MS management and care
6. Predicting an individual's disease course

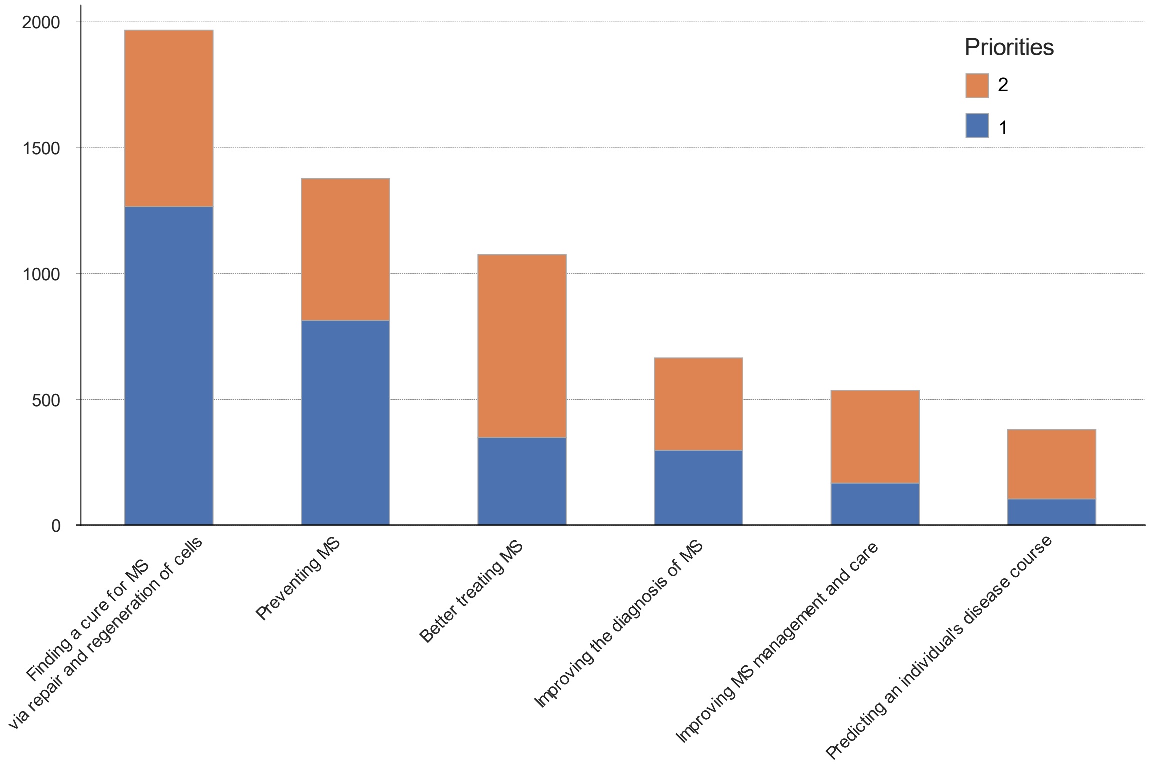


Figure 1 Research Priorities: Survey Participants were asked to rank each priority from 1 to 6 (most important to least important). This graph shows the top two rankings for all the participants.

Figure 1 shows the priority order for all respondents to the survey. The priority order did not change when analysing subgroups, with the same order shown for people living with MS and people affected by MS. Additionally, these results were consistent across different MS types, disease severity and disease duration.

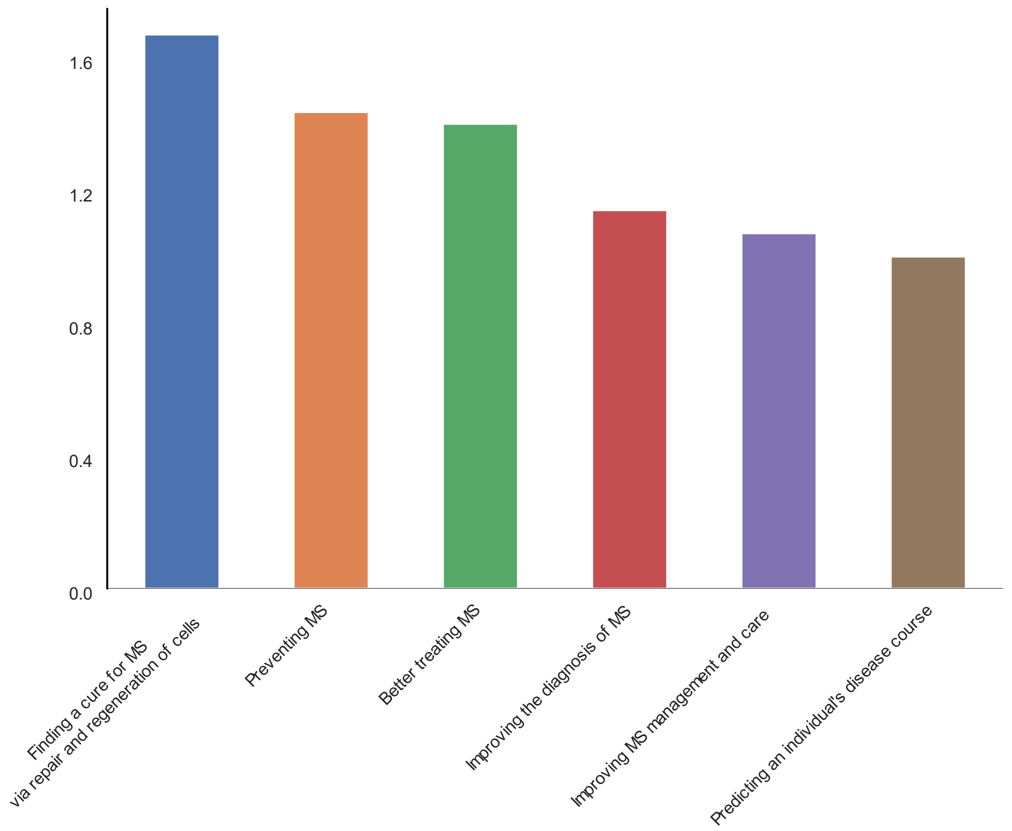


Figure 2 Research Priorities: All the ranks from 1 to 6 were combined and an average taken and normalised to generate a weighted average. This graph shows the weighted average of all the participants.

Taken together the results show there is a strong preference for the top three priorities, with support for the improving the diagnosis of MS, improving MS management and care, and predicting an individual's disease course as well.

The top priority is unchanged since 2016. However, the 2nd and 3rd priorities have changed order compared to the 2016 analysis. In 2016 the 2nd priority was “better treating MS” and “preventing MS” was priority number 3; in this survey they were the other way around. One possibility to explain this change, may be that given the rapidly advancing battery of treatments available?, people have altered their priorities around prevention and treatments.

Research Streams

The next section of the survey dealt with the broad streams of research. The importance placed on the broad streams, or fields, of research, also reflects the prioritisation of the research priorities. Neurobiology (research to understand the nervous system and mechanisms of nerve damage and repair) was rated as the most important stream of research, this was closely followed by clinical trials and immunology and virology, which were both ranked similarly. Genetics and epidemiology was slightly lower again, and the lowest ranked by quite a margin was social and applied research (e.g. research into the social and economic impact of MS, rehabilitation and symptom management).

Types of Research

The third question of the survey was the priority put on the different types of research; each option was prefaced with the timeframe in which benefit would likely to be realised by people with MS. The three options were:

- **Basic** laboratory-based research to understand the cause and biology of MS – likely to have an impact on people with MS in the longer term (10 years or more)
- **Translational** research that may develop into a clinical application within 5 years or less
- **Clinical studies and clinical trials** that are likely to have an immediate impact once the study is completed

Top priority was given to clinical studies and clinical trials which are likely to have immediate impact. This was the highest priority in each of the sub-analyses, regardless of the various connections to MS, or the different types of MS. Both laboratory-based research and translational research, were ranked similarly when comparing people's first preference (very high priority). When people's first (very high priority) and second preferences (high priority) were analysed, translational research ranked only very slightly higher than laboratory-based research .

Research Priorities – A closer look

Each of the top research priorities was then split into specific research questions to gain a more granular insight into what is important to the Australian MS community.

Within the research area of **preventing MS**, the broad question of *How can MS be prevented?* was rated most highly with 61.6% of people rating it a very high priority. This was followed by research into *preventing MS in relatives of people with MS* and research into the *environmental or lifestyle risk factors that can be modified to prevent MS*. A lower level of importance was placed on some of the specific areas of research into prevention, such as investigating EBV and vitamin D.

Within the field of **diagnosing MS**, *How can we diagnose MS earlier?* was the most highly ranked question. This was followed by *how to accurately diagnose primary progressive MS* and *detecting the change from relapsing remitting MS to progressive MS*, highlighting these as areas of importance for people with MS.

Within specific questions in the field of **prognosis for MS**, there was quite an even spread when it came to very high priority rankings. *Is it possible to predict whether a person will respond to a particular MS medication?* was the highest ranked question. Questions covering disease progression, and transitioning to progressive forms of the disease were also highly ranked, reinforcing the theme coming through in the previous question.

Within the research area of **better treating MS (relapses and progression)** the question of W*hich medications are effective to slow, stop or reverse progression?* was seen as the highest priority. This was followed by *Which treatments are effective to prevent or delay the transition from relapsing remitting to secondary progressive MS?* and *Which interventions are most effective to prevent relapses in MS?* Autologous haematopoietic stem cell transplantation (AHSCT) which has garnered a lot of interest in traditional and social media came in the fifth position. This represents a drop of one place from the 2016 survey, only a slight difference, as there continues to be interest in the community regarding AHSCT.

Within the area of **finding a cure for MS via repair and regeneration**, all research questions were equally a very high priority for all groups of people, representing the huge interest in this area both from the MS community and scientifically. All of the questions in this section were ranked as a very high priority 69% of the time and this was the highest of all sections. Within the categories, *myelin repair and nerve repair* were seen as marginally more important than *nerve protection and re-wiring the brain via neuronal plasticity*.

Lower support overall was given to the questions in the area of **improving MS management and care (symptoms, rehabilitation and support)**. The highest ranked question in this field was *What impact does stress have on MS?* with 43.5% of respondents ranking this a very high priority. Questions regarding lifestyle modification also ranked relatively highly in this section. There was an overall low level of priority placed on research into the effect that MS has on families and children of those living with MS. These results are all consistent with the results of the 2016 survey.

MS Symptoms

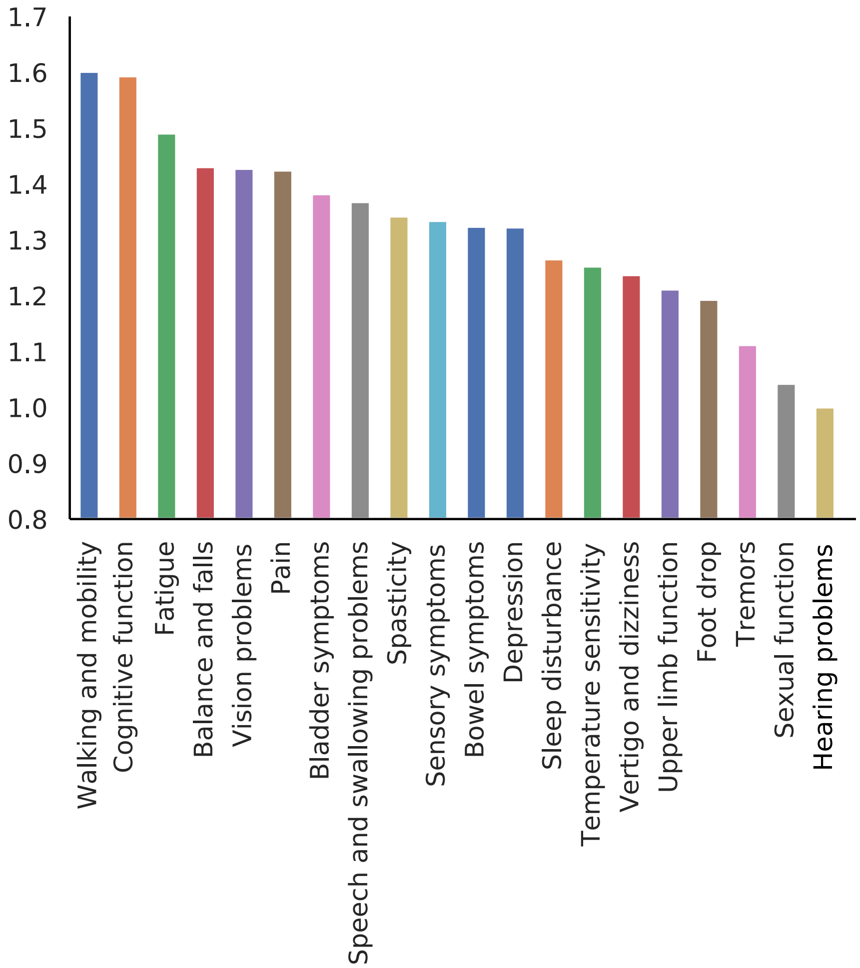


Figure 3 Symptoms: Survey Participants were asked to indicate the priority that should be placed on research into treating and managing each symptom. Each symptom was then rated as one of the following; Very High Priority, High Priority, Medium Priority, Low Priority or Not a Priority. Each ranking was given a score from 6 to 1 in order of importance to the respondent. The average for each symptom was calculated and normalised to 1.

The final section of research questions was the priority of research to be placed on a list of 20 symptoms, ranging from cognitive function, pain, to sexual function, foot drop and hearing problems. Respondents were asked to give each symptom a priority of either very high, high, medium, low, not a priority or don't know. When looking at results from all of the respondents, *walking and mobility* and *cognitive function* were ranked as very high priority by 66.4% and 65.2% of respondents respectively. Fatigue was the third ranked symptom, followed by *balance and falls*, *vision problems* and *pain* all scoring a similar level of support. The top six were relatively consistent when comparing across the subgroups in the survey (people living with MS and those affected by MS), with some changes to the order. To take into consideration the other rankings a weighted average was applied to this data (see Figure 3).

Respondents were also able to add any further symptoms or research questions to an open text box to ensure we had covered all possible priorities. There was an array of answers in these sections, but they often reinforced areas of particular concern for the individual which were already captured in the previous sections (e.g. fatigue as a symptom of MS, research into lifestyle factors or AHSCT).

Clinical Trials

The survey also covered clinical trials and results from this section will form the basis of a separate report to inform our new Adaptive Clinical Trials platform. Overall, the results demonstrated that there is significant interest in clinical trial participation and a knowledge gap in the Australian MS community, indicating a number of ways that the new platform could be used to enhance clinical trial experiences and further enhance the pool of potential trial participants here in Australia.

Advocacy

The highest priority for advocacy was *additional funding for research* with 66% of respondents ranking this priority as very high. This was followed by *approval of new MS medications and their inclusion on the Pharmaceutical Benefits Scheme,* and *meeting the needs of people with MS who don't meet the NDIS criteria* coming in third, and in fourth place, *better access to treatments*.

Overall Strategy

There was strong support for MS Australia's strategy focusing on MS research, advocacy for MS and the provision of evidence-based information and resources with over 95% of people either agreeing or strongly agreeing with that statement.

Terminology for people with MS

Language usage is very important to ensure people with MS are comfortable and feel connected. Surveys have been carried out overseas on small numbers of people with MS to seek their preferences on terminology. These studies concluded "MSers" was the preferred term for people with MS.

To ensure that was the consensus of our community, we added this question to the survey asking people with MS to rank a number of terms. Interestingly MSers was one of the lowest ranked terms in our community. The term that received the most support was *person living with MS*, and a close second was *person with MS*. However, when combining people's first and second choices the term - **person with MS** was the highest ranked.

Conclusion

This survey explored the views of the MS community , and the large number of people with MS that participated gives us a representative sample of the whole Australian MS population. Additionally, conducting this survey in both 2016 and 2021 has provided longitudinal data on the changing preferences and priorities of the community. The 2021 results add weight and largely reiterate our earlier findings from the community.

The 2021 survey has identified a slight change in overall priorities potentially due to the rapidly changing treatment landscape, whilst many of the other priorities remain important. The top line results suggest the MS community is most interested in finding a cure(s), with strong support for clinical research and neurobiology.

There is strong support for research into preventing MS. This is an area where Australian researchers have traditionally excelled, and is an area of significant investment by MS Australia, including funding of the world first clinical trial into the vitamin D as a preventative measure for MS.

With the very high level of engagement of the MS community in research and the strong desire for clinical research, it is important to note our new clinical trials platform which is designed to help accelerate this area and is due to be announced in 2022. Additionally, to help accelerate research into cures by repair and regeneration, specific targeted calls for research in this area have been included in the 2021 research funding rounds.

The importance of this survey is to ensure ongoing research investment is in line with the priorities of the MS community. While some areas of research were given a higher priority, there wasstrong support for most areas of research and data gathered here will continue to inform the research strategy of MS Australia.

This study also provides a number of insights that extend beyond research priorities, including areas of advocacy that the Australian MS community would like us to continue to pursue. The top priority in advocacy was additional funding for MS research, once again highlighting the engagement of the MS community in the research activities of MS Australia. Better treatments were also in the top three research priorities and also featured as the second highest priority for advocacy, reiterating the importance of this goal.

These results will be used to help shape and guide MS Australia’s research and advocacy strategy over the coming years.

MS Australia

MS Community Consultation on Priorities for MS Research

DETAILED REPORT

SURVEY METHOD AND DISSEMINATION

To gain feedback on our future strategy, MS Australia designed and implemented a survey with questions about research priorities, areas of advocacy and overall strategy. The core questions of the survey were derived from our Research Priorities Survey that was carried out in 2016. The consistent nature of this survey allowed us to detect changes in opinions since 2016.

The 2016 survey design utilised questions from a survey conducted by the UK MS Society in 2012, which was developed using the robust James Lind Alliance process, which works with health professionals and health consumers to prioritise the unanswered research questions in a particular disease field.

In 2016, 1058 people completed the survey of whom 774 were people with MS. This provided useful consumer testing, and data on time of completion. Prior to implementation of the 2021 survey the draft questions were also trialled by a small group of 9 people with MS.

The survey was built and completed online using the Survey Monkey tool. People who wished to participate but were unable to do so online were provided with a paper copy of the survey and returned survey responses were manually entered into Survey Monkey by MS Australia.

The survey opened 5th July 2021 and a coordinated media campaign was carried out by the MS Australia communications team. The survey was promoted using a wide range of communication channels and stakeholder groups, including direct electronic mail (EDM), with posts on Facebook, Twitter and LinkedIn. Social media posts were also shared with the other Australian MS organisations and groups. The link to the survey was also shared to the Australia and New Zealand Association of Neurologists MS Interest Group email list, as well as the MS Nurses Australasia mailing list.

Participants were advised that the survey was anonymous, however there was the option to include contact details at the end of the survey. State and approximate location were derived from participant's IP addresses, but no personal identifiable information was collected if contact details were not provided. Generic demographic details were collected to assist in determining whether a broad spectrum of the MS community had participated and to analyse any differences in priorities based on the type of connection a person had to MS.

Statistical analysis was carried out by using Python and associated data and graphing packages, primarily Pandas and Matplotlib. Natural language processing was carried out on open text fields using the packages Spacy and the Natural language tool kit (NLTK), all widely available Python libraries.

Who took part?

The 2021 survey closed with 3000 respondents, which is more than twice the number of the 2016 survey (1254). Of those 3000 people, 1544 were living with MS (Figure 5), close to double that of the 2016 survey (774). Out of the remaining participants, 464 were affected by MS, for example a family member of a person with MS, or a carer of a person with MS, and 72 had a professional connection to MS, whether it be as a neurologist, nurse, allied health professional or a researcher/scientist. 178 had some other connection to or interest in MS (see Table 1).

The geographical distribution of participants was broad with people from all states taking part in the survey, and more respondents from the more heavily populated states as expected (Figure 4). The demographic details of the people with MS who responded were in keeping with a representative sample of the whole Australian MS population. There was a slight over-representation of females with MS. The gender ratio was 4:1 female to male, which was slightly higher than expected given that MS is diagnosed three times more frequently in women than men. Further demographic details are shown in Figures 5-7 below. The survey captured the views of a very broad spectrum of the MS community including across ages, disease duration, disease severity and disease type.

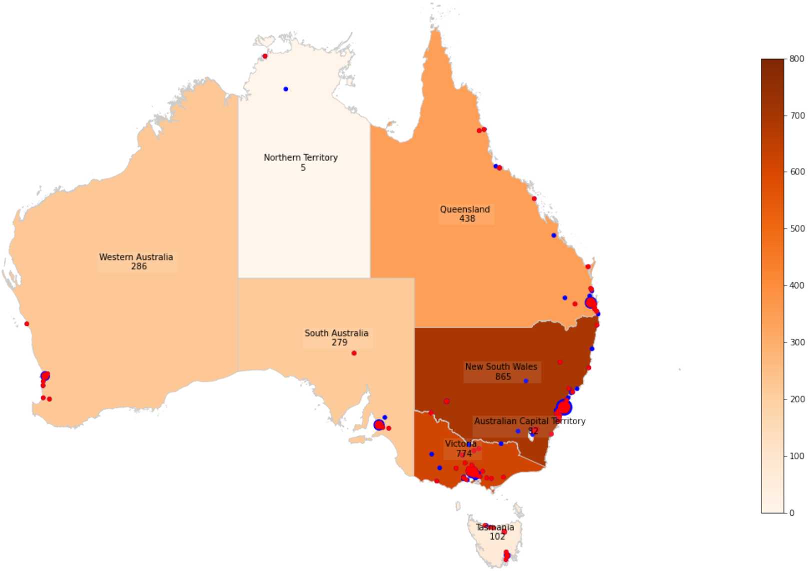


Figure 4: Location of the participants. The number of participants per state is shown as a "heat map" with darkest representing the largest number per state. Blue dots represent those without MS and red dots those with MS.

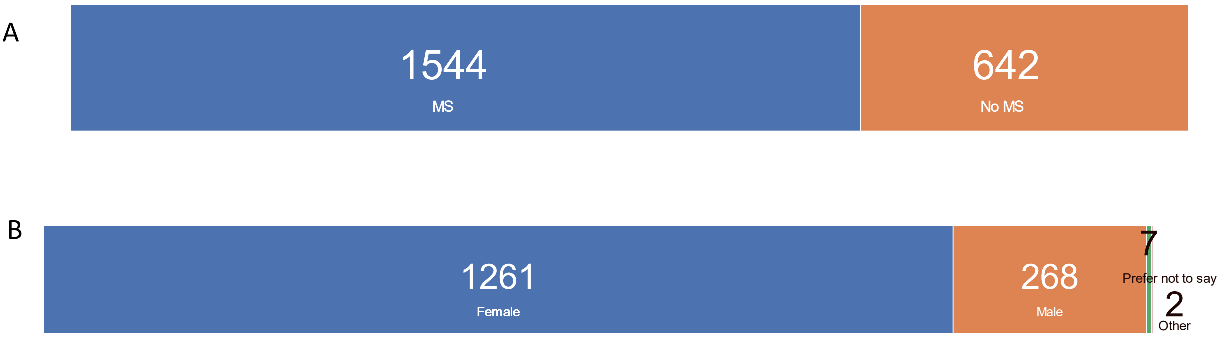


Figure 5A The breakdown of those with and with MS who took part in the survey. (B) The gender split of the survey participants. This ratio is slightly higher proportion female compared to the Australian MS population.

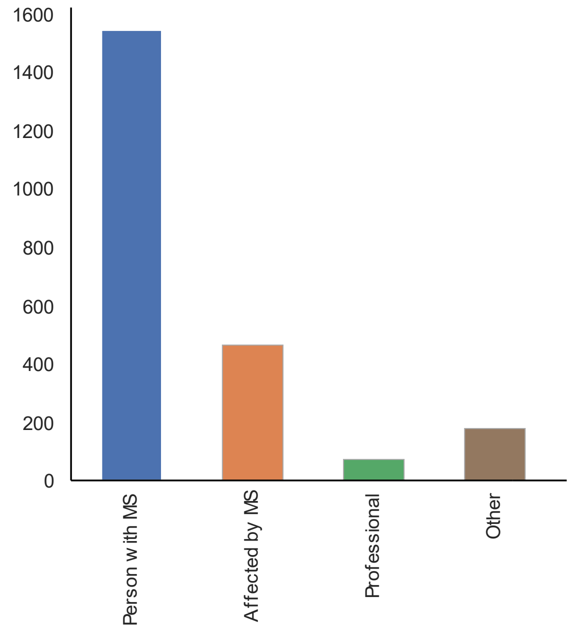
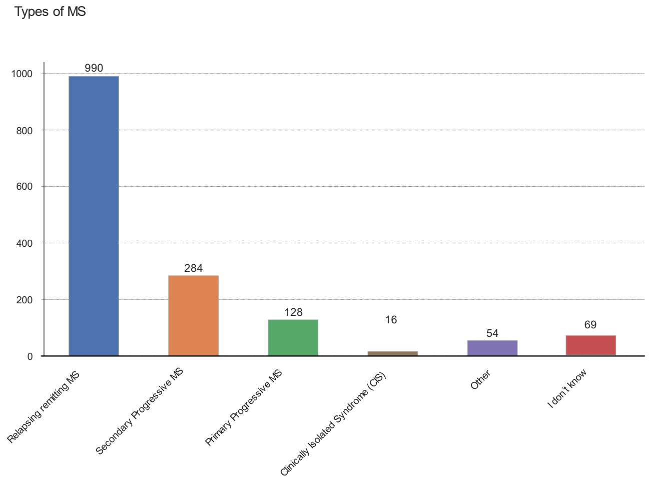
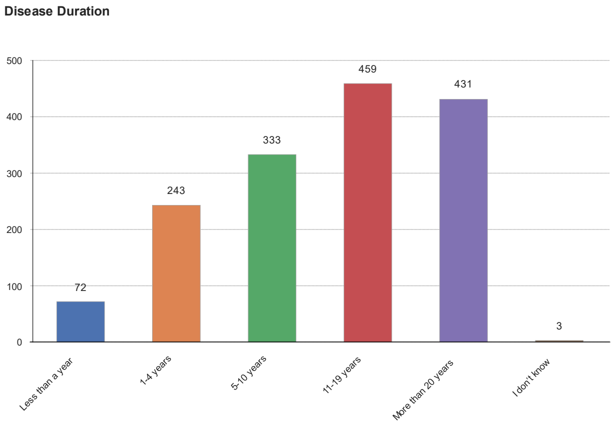


Figure 6 (left): Participant's connection with MS, whether it be living with MS, affected by MS, professional connection or other.





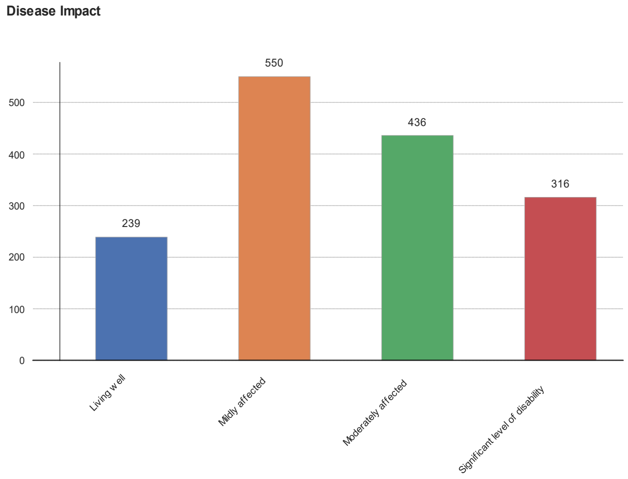


Figure 7 (top left) Participants who indicated that they live with MS were then asked about what type of MS they live with. (Above) is the length of time since they were diagnosed (left) and to what extend their lives are impacted by their MS.

RESULTS

OVERALL RESEARCH PRIORITIES

Respondents to the survey were first asked to rank from 1 to 6 the priority they placed on the overall goals for MS research. The results are shown in Figures 1 and 2.

We found that the support for the top priority *Finding a Cure* was very high which is consistent with the 2016 findings. A much higher percentage of people ranked those research questions as a very high priority than the questions in the other fields of research. While the top three priorities remained the same, there has been a slight change in order of the priorities in 2021 compared with 2016, with *Preventing MS* becoming the second priority and *Better treatments* the third priority. This may be partially explained by the fact that since 2016 a number of new highly effective medications have been made available in Australia. It is important to note however, that while there has been a number of new medications approved for relapsing forms of MS, there is still a great unmet need for additional treatments for progressive forms of the disease.

As this is a ranking question, a weighted average was also calculated to ensure all rankings were taken into consideration, but given the robustness of the scoring, this did not change overall priorities. The ranking nature of this question may have diluted extreme preferences, however when we analysed the follow up questions in the latter parts of the survey, looking at individual research questions within each goal area, the enthusiasm for the top priority remains.

RESEARCH FIELDS OR ‘STREAMS’

In order to work towards achieving our research goals, MS Australia allocates funding to a range of research fields or ‘streams’. The survey respondents were asked to indicate the priority they placed on each stream of research using a 5 step scale ranging from very important to not important at all. Each research question was rated independently, rather than being ranked against each other.

When a weighted average was applied to all responses the order of priority was as follows:

1. Neurobiology
2. Immunology and virology
3. Clinical Trials
4. Genetics and Epidemiology
5. Social and Applied research

The streams were rated slightly differently by people who had different types of MS, as seen in Figure 8. Generally, *neurobiology* received the highest number of ‘very important’ votes. The level of support was similar for *clinical trials* and *immunology & virology*. *Genetics and epidemiology* was usually the fourth priority and the stream that was consistently ranked lowest? was *social and applied research.*

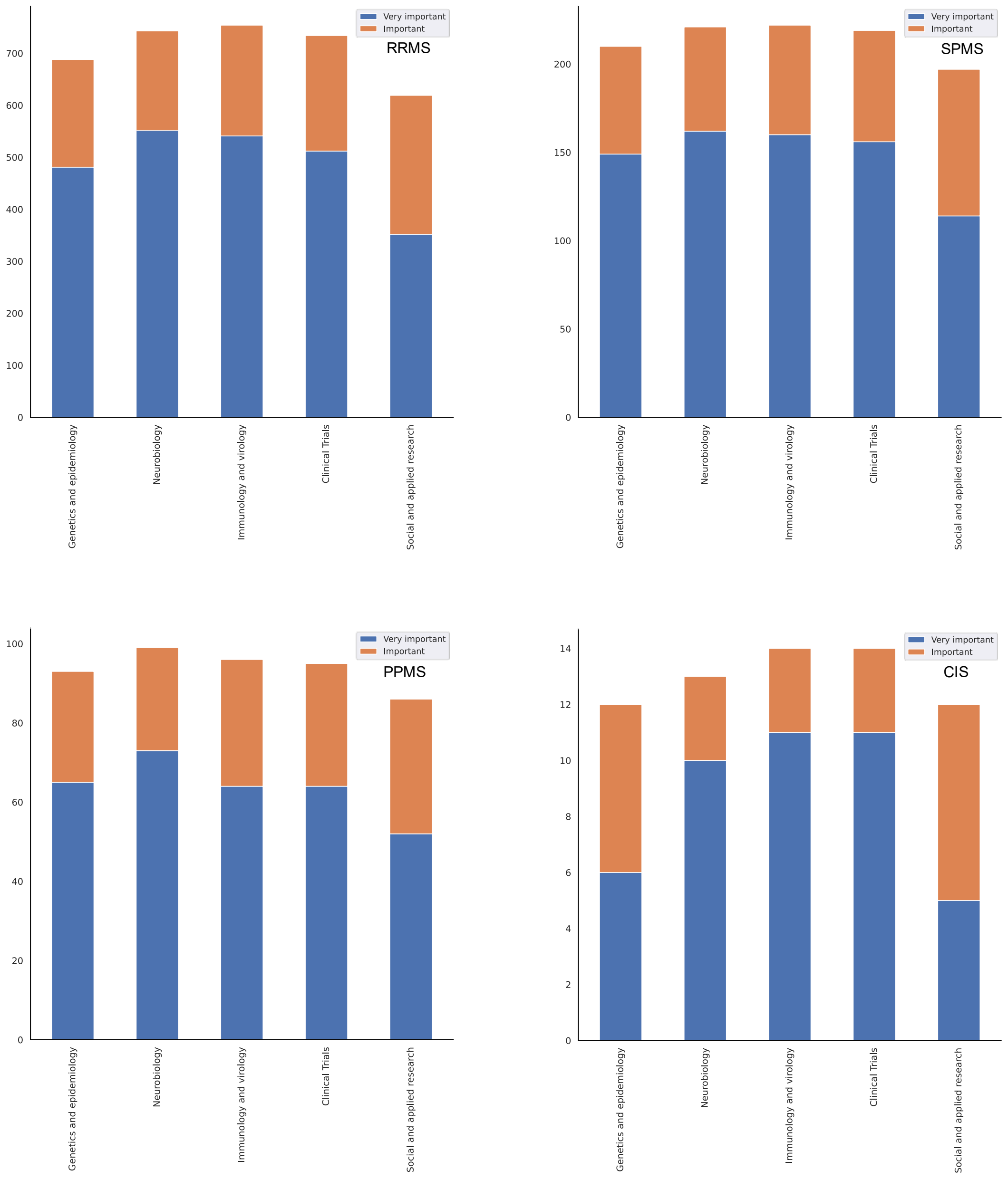


Figure 8 Participants were asked to indicate how important each of the research streams are, they did not need to rank them relative to each other. The results from people who had each of the different subtypes of MS (clockwise from top left RRMS -Relapsing Remitting MS, SPMS -Secondary Progressive MS, CIS – Clinically Isolated Syndrome, PPMS -Primary Progressive MS. The top two rankings are represented here in the graphs (very high priority and high priority).

THE RESEARCH SPECTRUM – FUNDAMENTAL RESEARCH THROUGH TO THE CLINIC

Survey respondents were asked what priority should be placed on the different types of research within the spectrum of research stages. Each option presented to the survey participants had an approximate time in which the research is likely to have an impact.

- **Basic** laboratory-based research to understand the cause and biology of MS – likely to have an impact on people with MS in the longer term (10 years or more)
- **Translational** research that may develop into a clinical application within 5 years or less
- **Clinical studies and clinical trials** that are likely to have an immediate impact once the study is completed

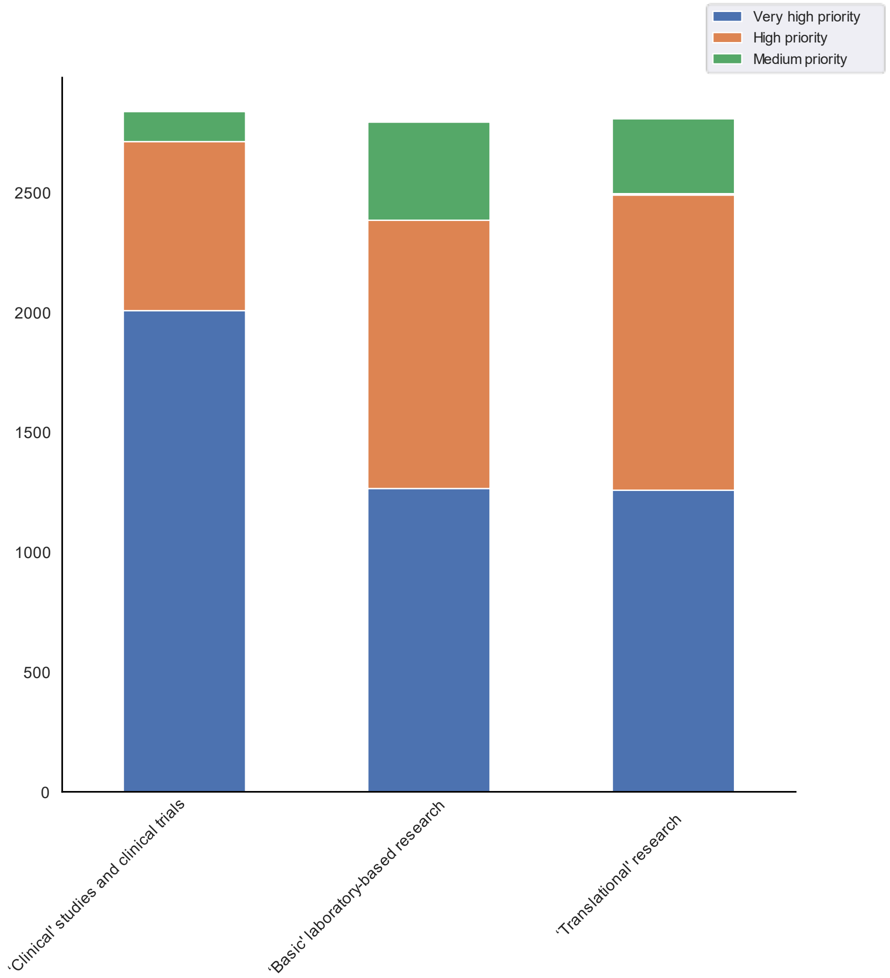


Figure 9. Type of research. Research can be simplified into three types, each has a different timeframe until it reaches a stage where it can have an impact on the lives of people with MS. Participants were asked what priority should be placed on each type of research. The graph above represents, very high priority, high priority or medium priority from the whole community.

The results show that *Clinical research* had the most support from all respondents, being rated as 'very high priority' by greater than 70% of respondents. *Translational research* and *Fundamental research* received an equal number of 'very high priority' rankings by respondents. Translational research received more 'high priority' and 'medium priority' rankings that fundamental research but not to a significant level. When a weighted average was applied, *Clinical research* remained the top priority, and there was very little difference between the two other types of research. This was consistent across the different subgroups in the survey, including those with different types of MS and different disease durations. These results are consistent with the results obtained in the 2016 survey.

RESEARCH TOPICS WITHIN “PREVENTING MS”

The most supported research topic within the field of preventing MS was the broadly phrased question of *How can MS be prevented?* (Figure 10)This was the consistent across all subgroups of respondents.

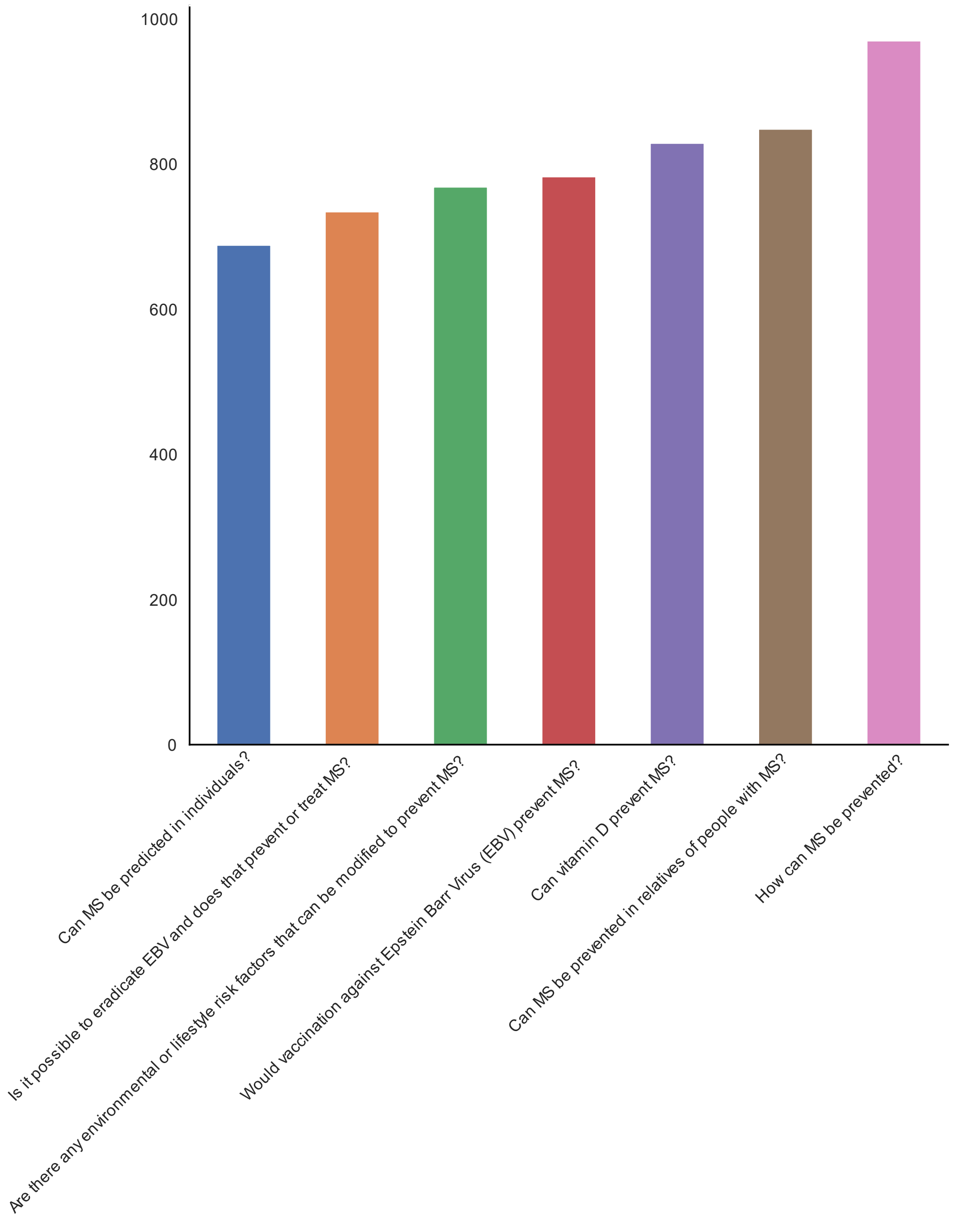


Figure 10 Support for research topics within the field of preventing MS (weighted average from all respondents)

Following this in priority, were the research questions *Can MS be prevented in relatives of people with MS?* and *Can vitamin D prevent MS?* This is a slight change in order compared to the 2016 results, with slightly more interest in vitamin D, and a decrease in interest in lifestyle factors for prevention. During the intervening period, MS Australia has released extensive documentation on modifiable lifestyle factors and has facilitated much discussion around this topic. Additionally, the effect of the COVID-19 pandemic on people's preference is unknown.

The lowest support from all respondents was for research aimed at *predicting MS in individuals*. This was consistent with the results from 2016.

RESEARCH TOPICS WITHIN "DIAGNOSING MS"

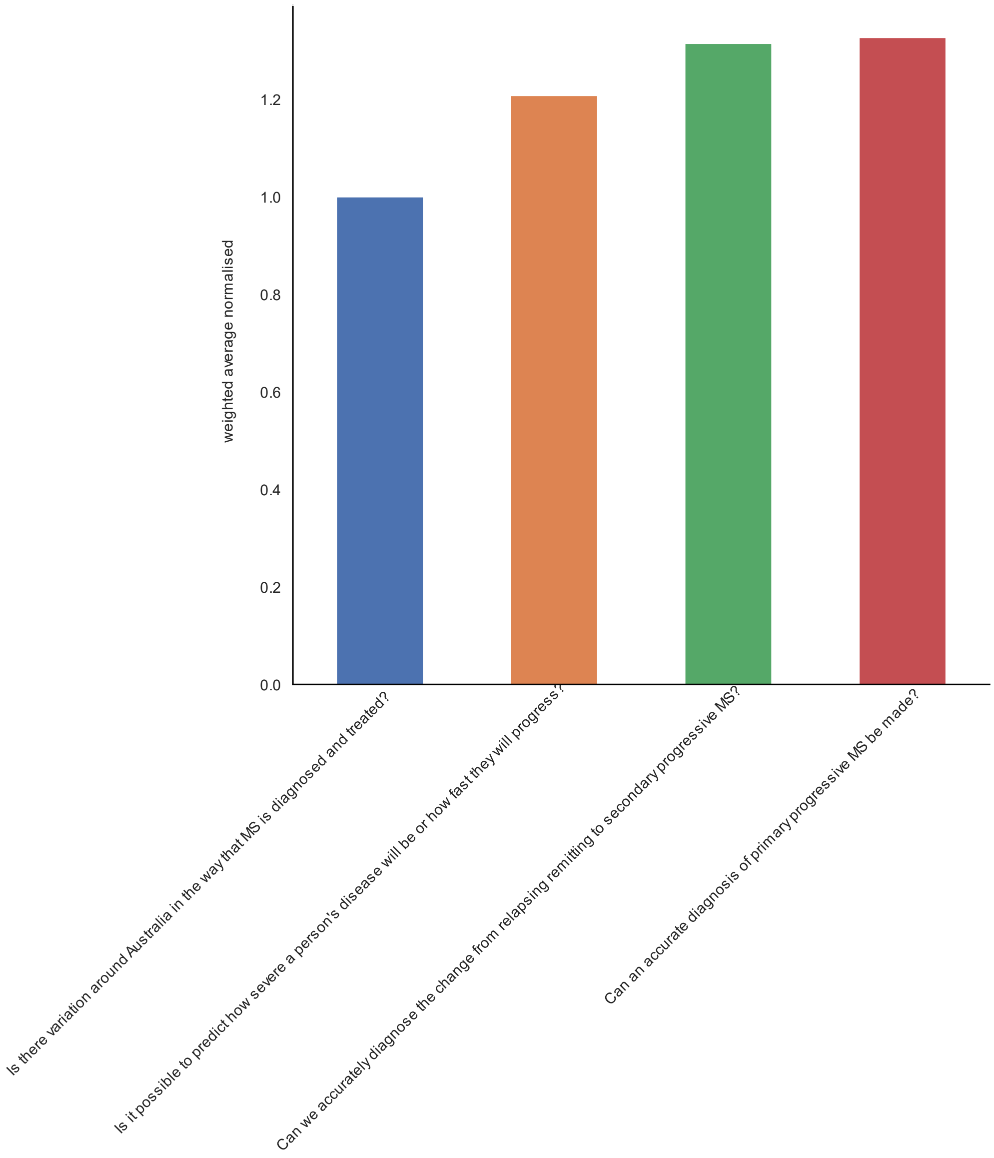


Figure 11, *The most supported research topic within the field of diagnosing MS. The weighted average from all the respondents normalised.*

Compared to other fields of research, there was not a great spread of opinions when it came to questions into the field of diagnosing MS (Figure 11). The raw number of questions ranked as a very high priority were lower in this section compared to questions relating other areas (such as repair). Figure 11 shows a fairly even priority for two of the four questions, with less support for research into potential *variation in how MS is diagnosed and treated around Australia*. The top two options for this question both relate to differentiating between different types of MS, and together this may form a very important area of research.

RESEARCH TOPICS WITHIN "PROGNOSIS FOR MS"

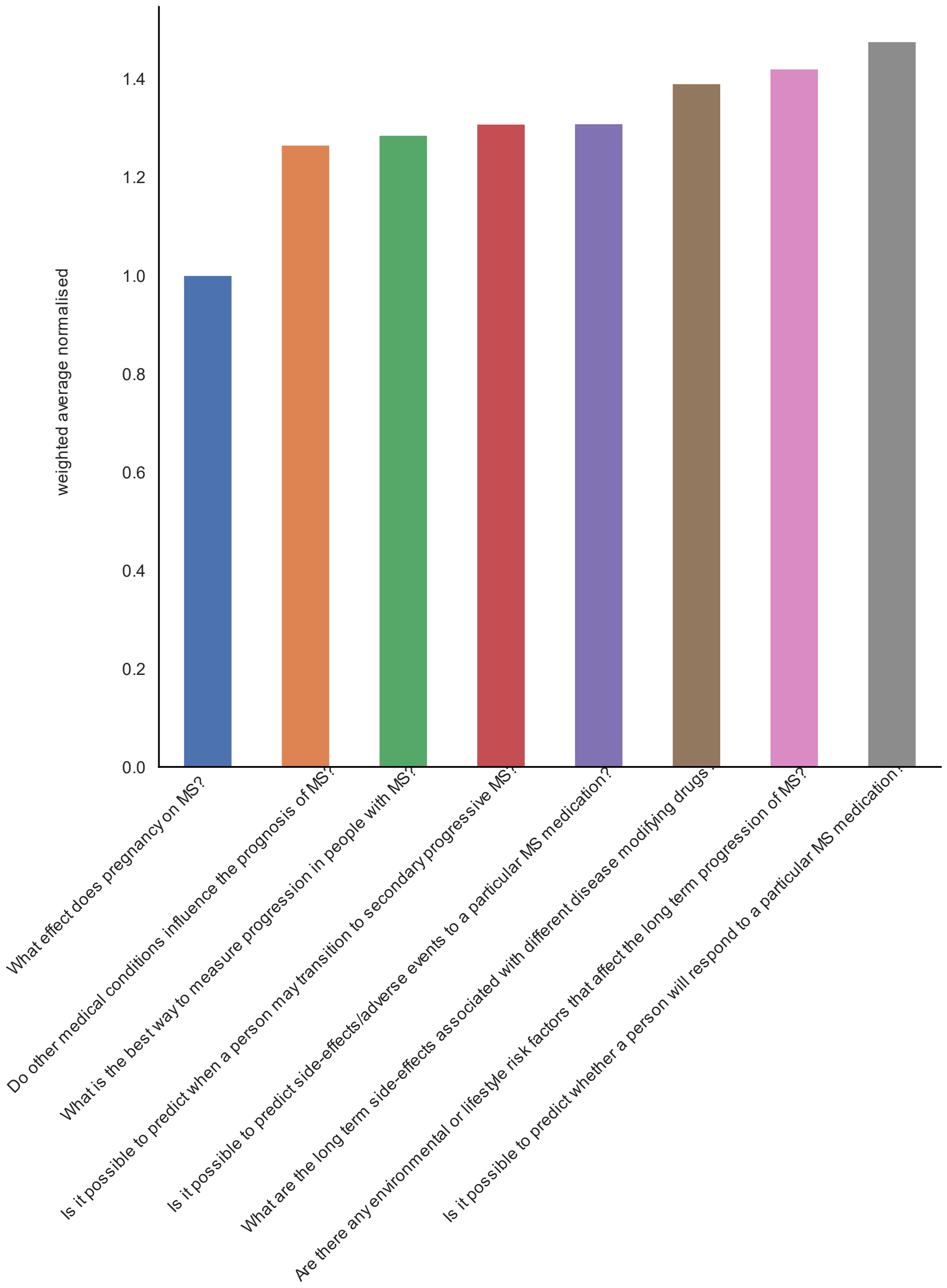


Figure 12 Support for research topics within the field of prognosis of MS (normalised weighted average from all respondentsrespondents normalised

In this section, there was again not one single question which was ranked far higher than the others. The top ranked question (albeit by a small margin) was whether it is possible to predict whether a person would response to a particular medication, followed by whether there any environmental risk factors that affect the long-term prognosis of MS (Figure 12).

There was a lower prior given to effects of pregnancy on the long-term effects of MS, which is consistent with findings from the 2016 survey. This may be a high priority for select groups within the cohort, but the wide demographic spread of the participants may have resulted in a lower overall rating for this question as less personally impactful for a significant proportion of people.

RESEARCH TOPICS WITHIN "BETTER TREATING MS (RELAPSES AND PROGRESSION)”

The research question most commonly ranked as a very high priority in this field was *Which MS medications are effective to slow, stop or reverse the accumulation of disability associated with progressive MS?*. There were three other questions that ranked higher than the rest: *Are there effective treatments that promote myelin repair?, Which interventions are most effective at preventing a relapse?* and *Which medications were effective in preventing the transition to secondary progressive MS?* (Figure 13)

This is a slight reordering of priorities since 2016, where treatments which *delay or prevent the transition to secondary progressive MS* was the second highest priority. Once again this might reflect the difference in the treatment landscape. Interestingly, the question related to AHSCT, did not rank very highly, which due to traditional and social media interest it was expected to rank highly. The lowest priority is in hormonal treatment for people with MS.

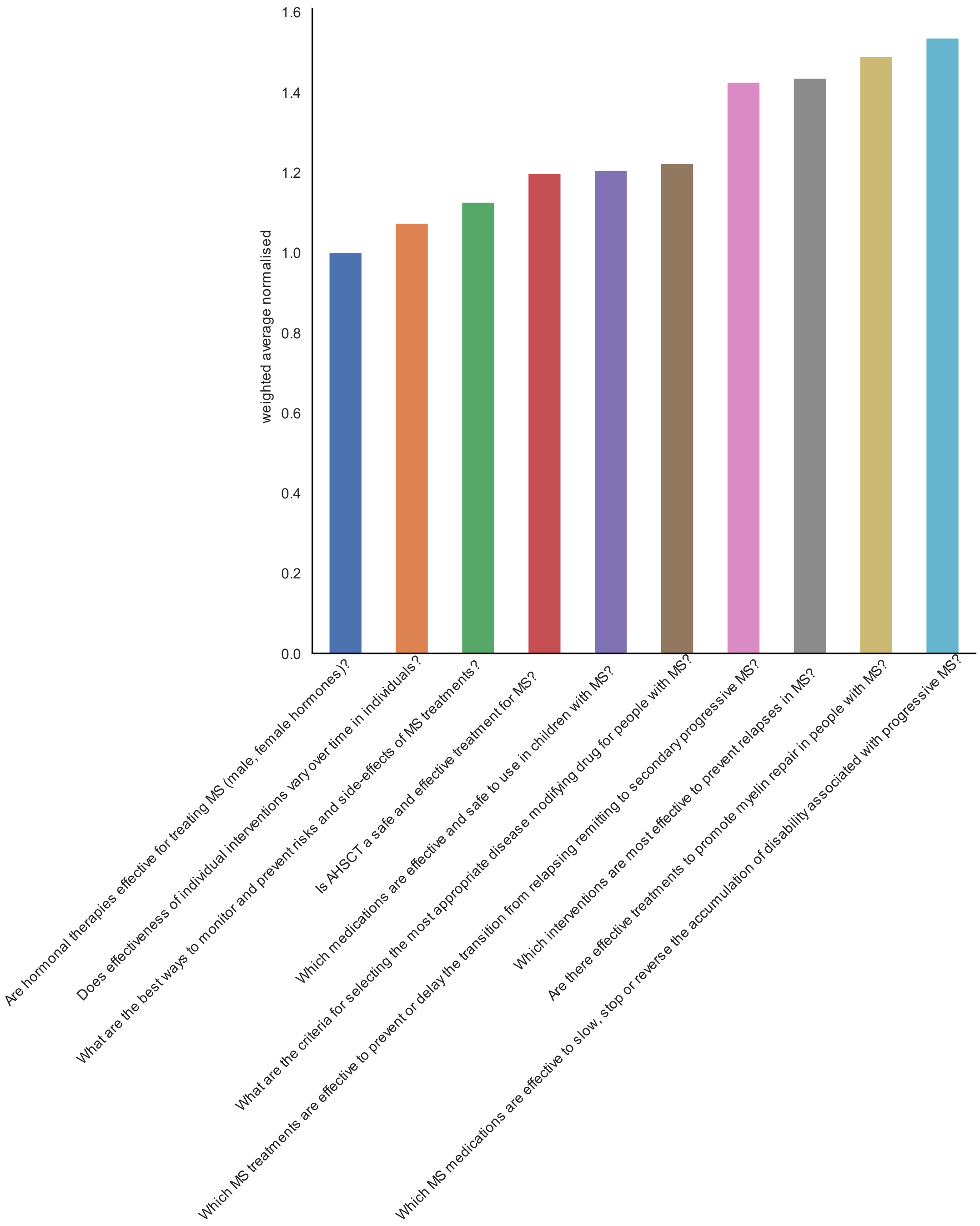


Figure 13 "Support for research topics within the field of Better Treating MS (normalised weighted average from all respondents)"

RESEARCH TOPICS WITHIN "FINDING A CURE FOR MS VIA REPAIR AND REGENERATION"

The specific research questions within the field of finding a cure for MS via repair and regeneration were all rated as a very high priority by more than half of the survey respondents (Figure 14). This demonstrates a high level of interest in this area which is consistent with responses in other parts of the 2021 survey.

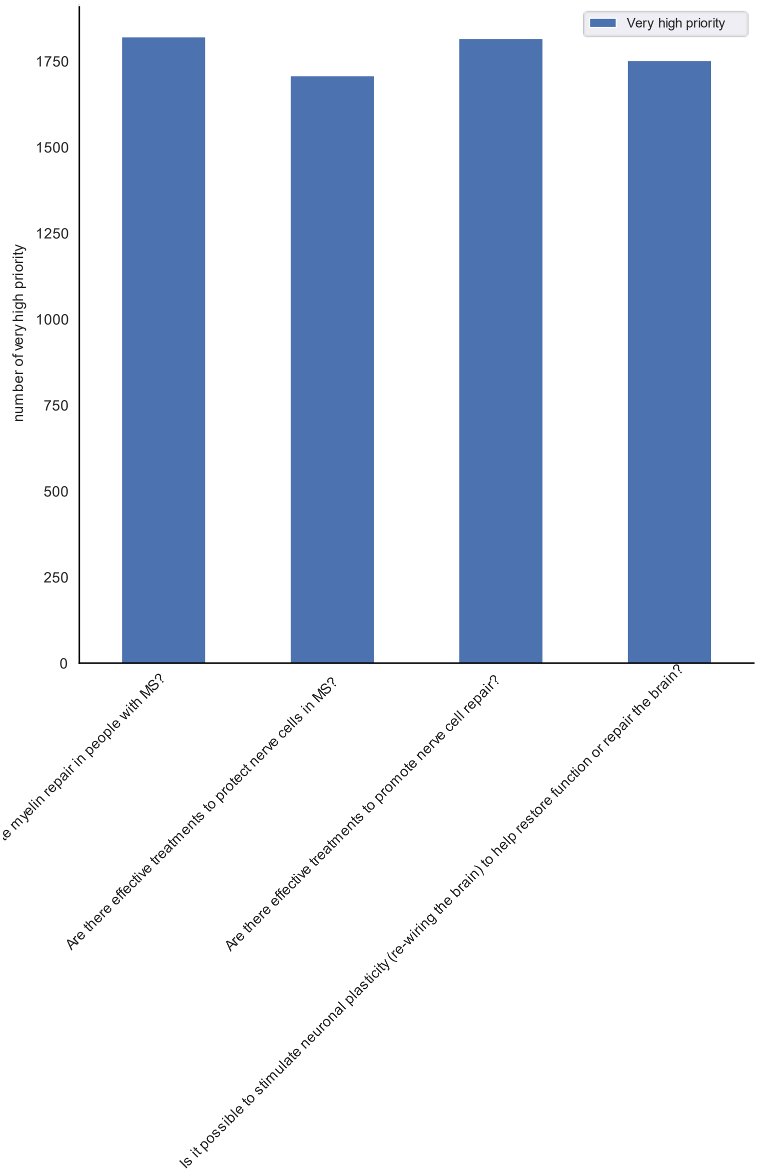


Figure 14 Support for research topics within the field of A cure for MS via repair and regeneration *(number of participants that ranked each question as a "Very High Priority").*

All of the questions in this section were rated as a very high priority. The two highest rated questions, with no statistically significant difference between them were *Are there effective treatments to promote myelin repair in people with MS?* and *Are there effective treatments to promote nerve cell repair?.* These were followed by *Are there effective treatments to protect nerve cells in MS?* and *Is it possible to stimulate neuronal plasticity (re-wiring the brain) to help restore function or repair the brain?*

This is consistent with the results from the 2016 survey showing that this remains a very important priority for the community, that MS Australia is addressing through targeted funding for remyelination and repair.

RESEARCH TOPICS WITHIN "MS MANAGEMENT AND CARE (SYMPTOMS, REHABILITATION, SUPPORT)"

While this field of research was rated as a lower priority overall than the other fields of research, it is important to determine which aspects of MS management and care and which symptoms are seen as the highest priorities for research.

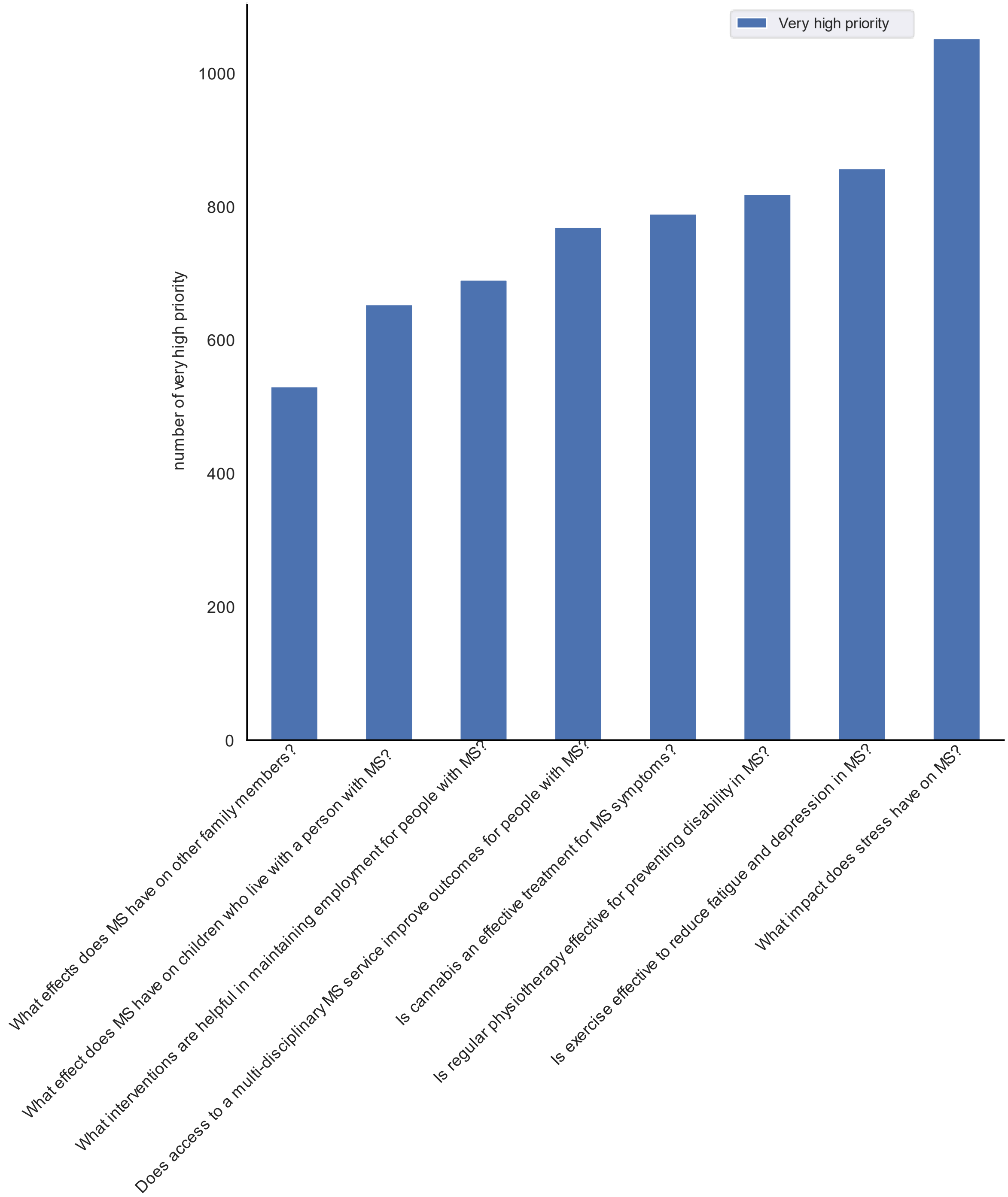


Figure 15 Support for research topics *within the field of MS management and care (number of participants that ranked each question "very high priority")*

Stress and the impact of stress is the highest priority for this section, and the lowest priority is the *effects on the family and the effects on family life*. This finding also holds true when a weighted average analysis is carried out. It is important to note while some priorities may have lower support from the community as a whole, they are of very high importance to a significant proportion of individuals within the population.

SYMPTOMS

We also asked the survey respondents what priority should be placed on research into *treating or managing the specific symptoms of MS*.

When a weighted average was applied to the symptoms, the top six rated symptoms seen as the highest priority for research across the whole cohort in descending order of importance?? were:

1. Walking and mobility
2. Cognitive function
3. Fatigue
4. Balance and falls
5. Vision problems
6. Pain

The priorities changed slightly depending on the different types of MS. People with clinically isolated syndrome (CIS) ranked cognitive function, pain, walking and mobility, vision problems and speech and swallowing as their top five priorities (in descending order of importance), but it is important to note that this was a small sample. For those with RRMS the top five were cognitive function, walking and mobility, fatigue, vision problems and pain. For those with SPMS the top five were walking and mobility, balance and falls, fatigue, cognitive function and pain. For those with PPMS the top five were spasticity, cognitive function, fatigue, balance and falls and walking and mobility (Figure 16)

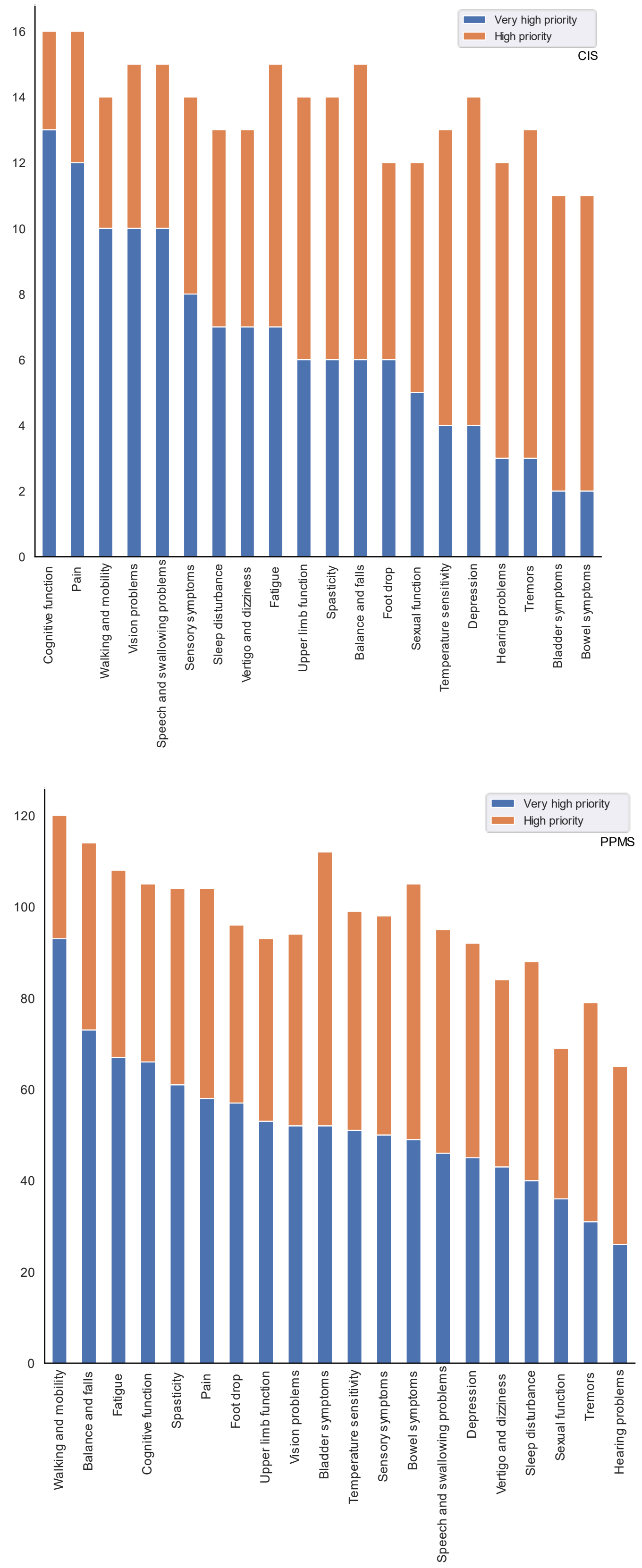
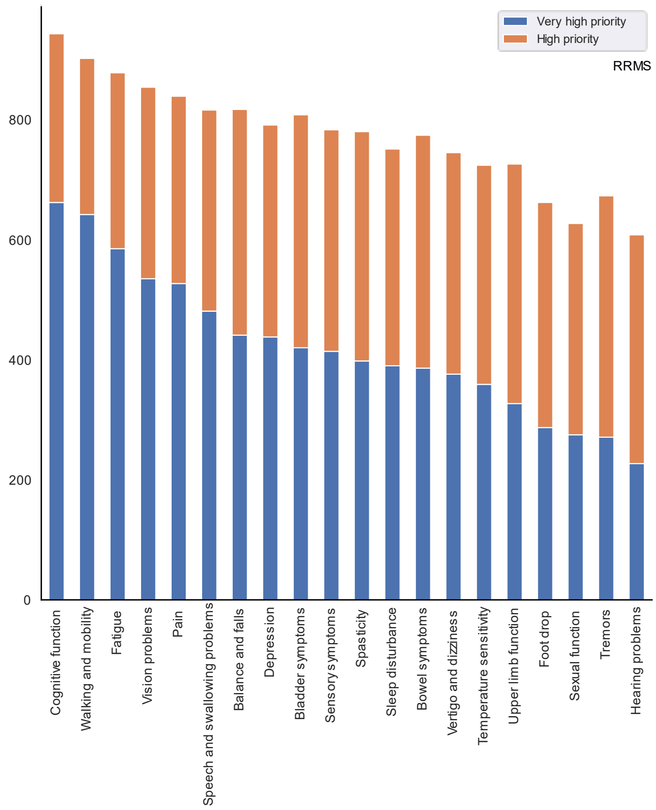
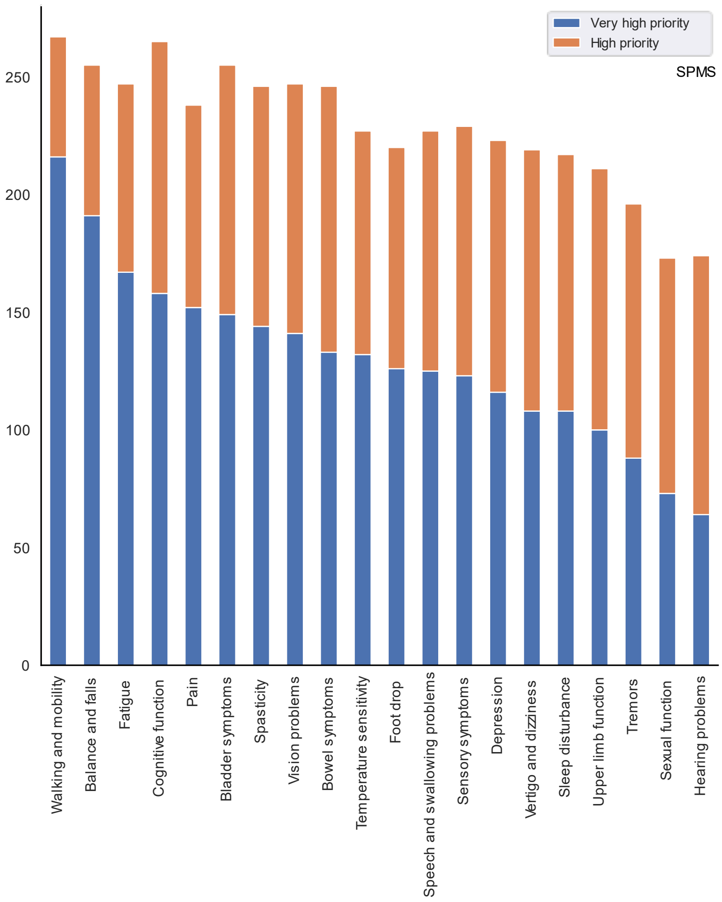


Figure 16. Support for research topics within the field of Specific Symptoms of MS for each subtype of MS: (A) CIS, (B) PPMS, (C) RRMS, (D) SPMS. *(number of participants that ranked each question as a "Very High Priority" and "High Priority").* .


Very high priority
High priority
RRMS
0
200
400
600
800
Cognitive function
Walking and mobility
Fatigue
Vision problems
Pain
Speech and swallowing problems
Balance and falls
Depression
Bladder symptoms
Sensory symptoms
Spasticity
Sleep disturbance
Bowel symptoms
Vertigo and dizziness
Temperature sensitivity
Upper limb function
Foot drop
Sexual function
Tremors
Hearing problems


Very high priority
High priority
SPMS
0
50
100
150
200
250
Walking and mobility
Balance and falls
Fatigue
Cognitive function
Pain
Bladder symptoms
Spasticity
Vision problems
Bowel symptoms
Temperature sensitivity
Foot drop
Speech and swallowing problems
Sensory symptoms
Depression
Vertigo and dizziness
Sleep disturbance
Upper limb function
Tremors
Sexual function
Hearing problems

While there is variation in highest priority for different types of MS, there was a broad consensus on the top priorities across the all the different types of MS. *Walking and mobility* and *cognition* are the symptoms with the highest rankings generally. The other most important four symptoms were *fatigue*, *balance and falls*, *vision problems* and *pain*. The remaining symptoms which can been seen in Figure 16 were prioritised by a lesser proportion of people; however, this still represented hundreds of respondents for whom these symptoms were a high or very high priority for research.

Natural language processing was carried out on the open text fields, which allowed people to enter symptoms which they identified as not included in the original list. Of those entered, some (eg pain, fatigue) were in the original list, the majority highlighted specific symptoms that fell within original categories (eg “MS Hug” is a specific symptom that would fall within “Sensory Symptoms”), and the remaining words were general (“impact”, “research”, “changes”, “nerve”).

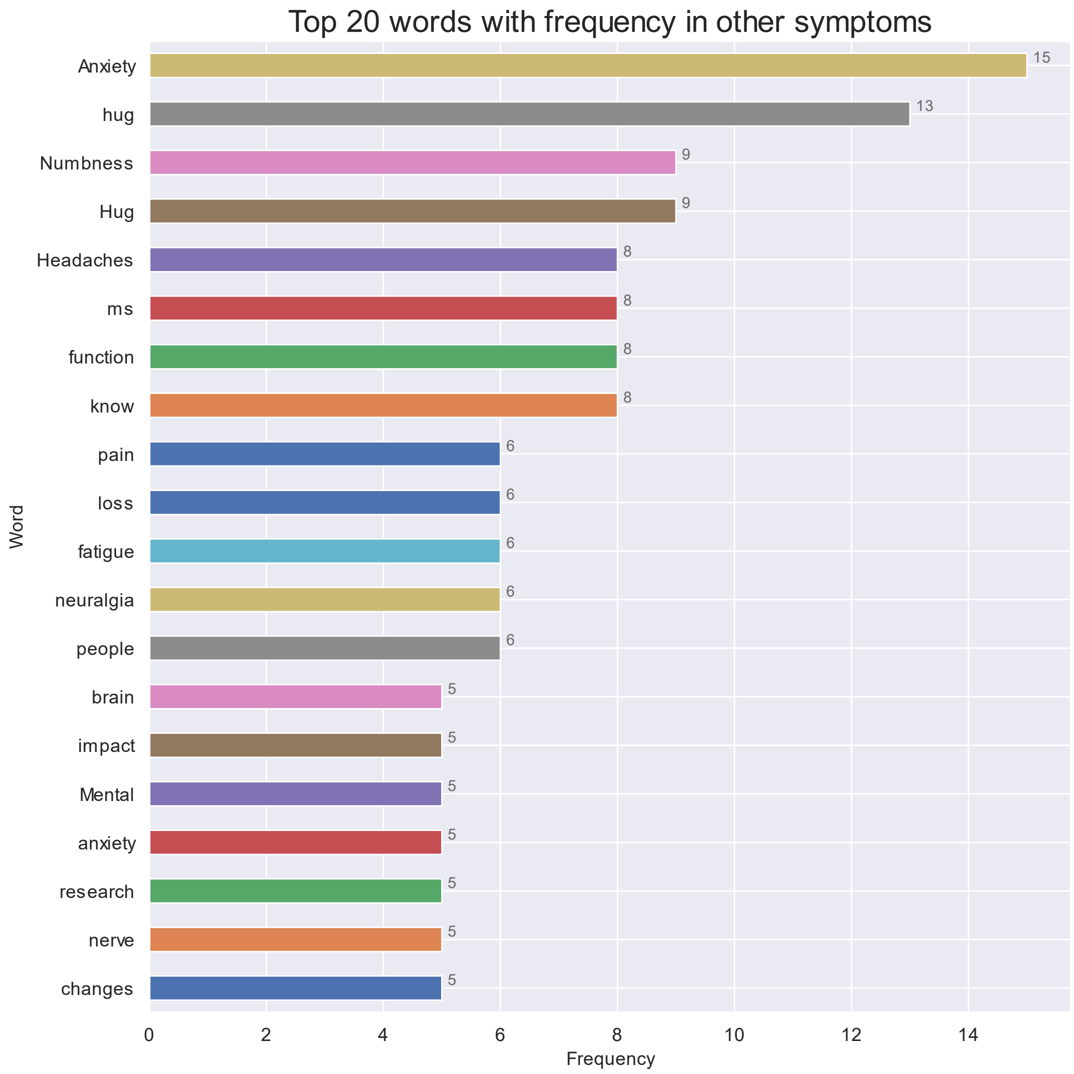


Figure 17 An analysis of the open text field where participants could enter “Other Symptoms”. Word frequency was determined and filtered to remove “stop words”(definition?) to reveal any common themes. (REMOVE THE “TOP 20” heading from the top of the Figure)

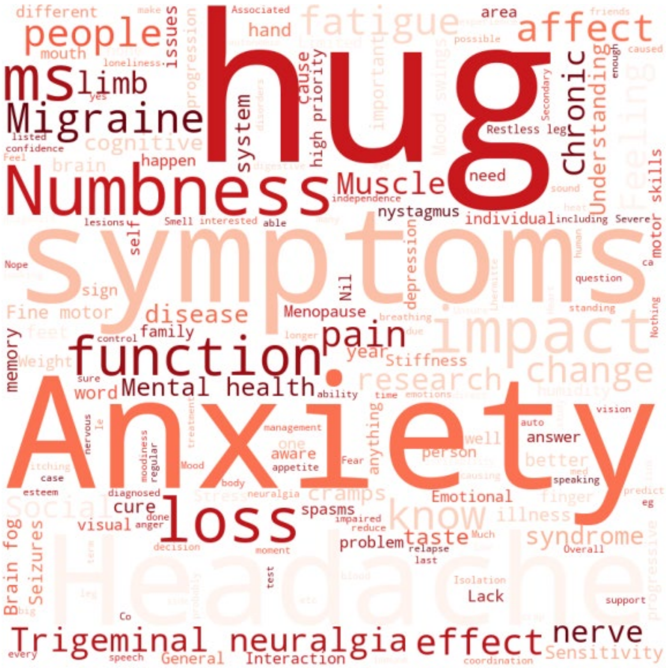


Figure 18 A word cloud representing other symptoms identified by respondents as not already covered in the survey.

CLINICAL TRIALS

The next section of the survey dealt with clinical trials, and assessed the number of people who have participated in the trials, the barriers and the motivations. This series of five questions will form the basis of a separate report which will be prepared as part of the MS Australia clinical trials platform. Results from this section demonstrate that there is a large appetite for clinical trials amongst the MS community, with 748 of the survey participants with MS having taken part in a clinical trial (close to 50% surveyed) and 1047 people with MS being interested taking part in a clinical trial in the future. A large percentage of participants indicated that they were interested in clinical trials but were unsure of whether they would like to take part in future. Overall this represents a high number of Australians with MS with a demonstrated interest in clinical trials and may be able to further enhance the pool of potential trial participants here in Australia.

ADVOCACY

The advocacy section was new to the survey in 2021 and was included to match the wider remit for MS Australia, as it was important to determine the areas of concern and identify priority areas for the MS community for the advocacy activities of MS Australia. Focus groups have previously been carried out, but the advantage of asking these questions within the survey allowed the organisation to assess the needs of the whole community with an unprecedented level of statistical power.

Respondents were asked to indicate the priority that they felt should be placed on a range of areas for advocacy. Areas were not ranked relative to each other (Figure 19)

The highest priority area was *additional funding for MS research*, with over 65% people ranking this as a very high priority. Just over 63% of people ranked *approval of new MS medications both for the use in Australia and inclusion on the PBS* as the second highest priority. The third priority differed depending on the group. For those with MS the third priority was *meeting the disability needs of people who are not eligible for the NDIS* (for those with MS). When all respondents were considered together, the third priority for Advocacy was *better access to treatment, including disease modifying therapies and treatments for symptoms*. However, the difference between ranks for these two priorities is very small, and both should be considered to be at a similar level. There were also slight differences in priorities depending on the type of MS.

Overall, the highest priority themes were advocacy for more research funding and more treatments for MS.

The next question was an open text field for any crucial advocacy issues that should be prioritised that had not been covered. The NDIS was listed 71 times, highlighting this as an issue of particular importance despite its inclusion in the previous list, however there may have been specific aspects of the NDIS addressed in the open text field. Nevertheless, advocacy on NDIS issues, including these responses, does not displace additional funding for MS research or treatments as top priorities for advocacy for the MS community.

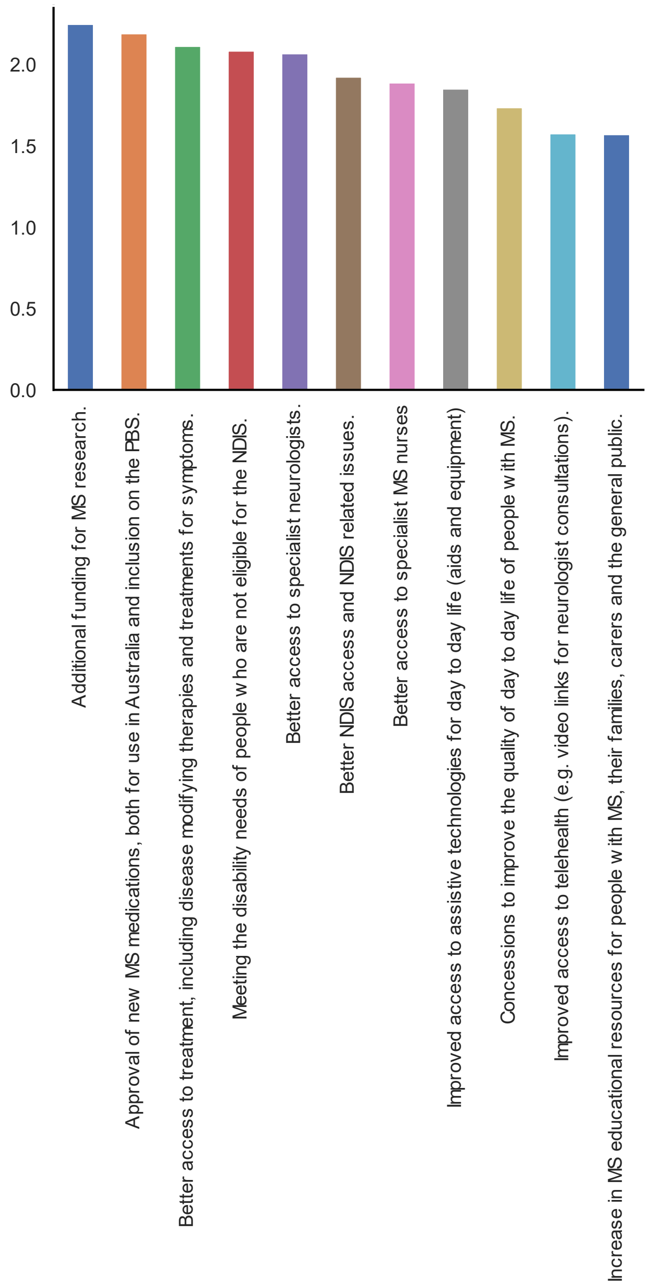


Figure 19 Priority Areas for Advocacy for all participants Participants were asked to indicate the priority that should be placed on advocacy for each of the different areas.They did not need to rank them relative to each other. The graph represents the weighted averages of all participants normalised.

OVERALL STRATEGY

Participants were asked in this section what they think MS Australia's strategy should focus on, and whether they agreed that MS Australia should focus on MS research, advocacy for MS and the provision of evidence-based information and resources. The response to this was overwhelmingly positive with over 94% people responding that they strongly agree or agree, with the majority of the remainder being neither positive or negative.

TERMINOLOGY

The final question asked people with MS about their preferences for the term used when referring to someone with MS. This question was modelled on a similar questionnaire carried out in the United Kingdom. The participants were asked to give the following terms a ranking: Client, Patient, MSer, Person with MS, or Person living with MS.

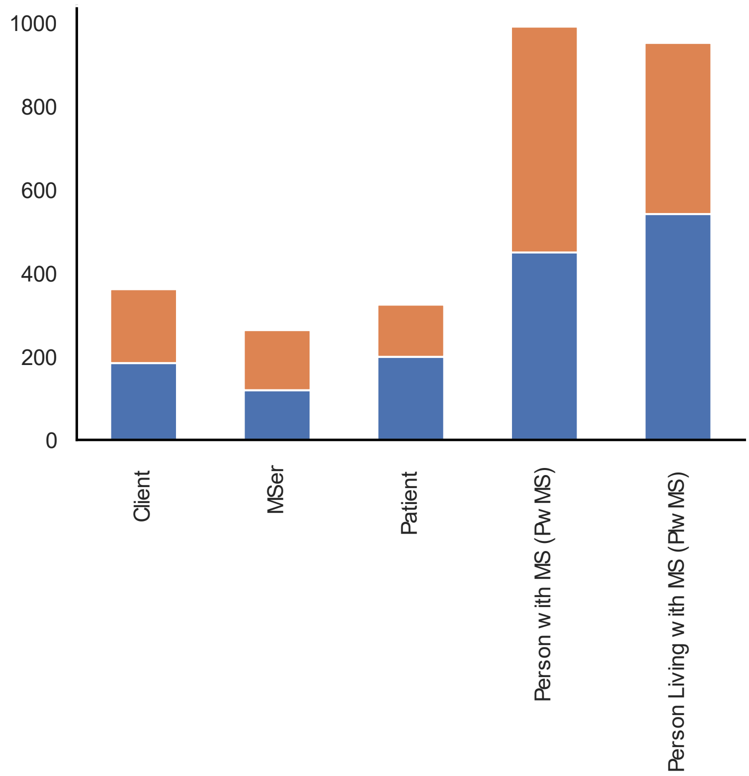


Figure 20 The terminology preference of those with MS for a person with MS. People with MS were asked to rank the 5 terms from 1 to 5 according to which term they preferred the most. The graph represents the number of responses for the highest rank in blue, followed by the second highest in orange.

Both *person with MS* and *person living with MS* were ranked well above the other terms. *Person living with MS* was ranked the highest, but when first and second preferences were taking into consideration *person with MS* was the highest scoring option. This was consistent across all subtypes of MS.

MSer, a term which has been shown to be popular in other albeit smaller surveys overseas, was ranked in last place. Whether this reflects a difference in Australian preferences, or whether preferences have changed since the previous international studies were carried out is unknown. Language usages is an important question as the role of language is important to help build an inclusive community, empower people with MS and prevent in-built biases or connotations that may evolve (?) for certain terms.

The results show that the community has a strong preference for specific terminology, and it is important that this is recognised not just by the MS community but more widely by the general public.

CONCLUSIONS, REFLECTIONS AND NEXT STEPS

This survey is ofthe largest of its type in Australia, giving us unprecedented insights into the priorities of the Australian MS community. The results show that the research strategy of MS Australia is in line with the priorities of the community and responsive to their priorities. The results of this survey, building on our 2016 results, will inform the research and advocacy strategy and priorities over the next five years.

MS Australia maintains a broad funding approach to MS research with a strong emphasis on areas where we can make a difference linked with building research capacity within Australia. A strong emphasis has been on areas where research is competitive at a global level, enhancing collaboration and ensuring that duplication both within the Australian research community and the worldwide MS community is minimised. Maintaining a competitive broad focus is important since MS is a complex disease arising from both genetic and environmental factors and involves a number of different systems in the body. All areas of biomedical and social and applied research need to be supported if we are to find the cures for MS and manage it optimally.

The survey results have indicated a strong priority of the community is research in to *repair and regeneration*, followed by *prevention* and *better treatments*. There is strong preference for *clinical research* which is likely to have an immediate impact, but the community appreciates that a more look term approach is needed with *translational research* and *fundamental research* also being well prioritised. With regard to the streams of research, *neurobiology* and *clinical trials* were favoured with strong support for *immunology and virology* and *genetics and epidemiology*, and less support for *social and applied research*.

MS Australia's research funding is distributed in two ways, through our national collaborative platforms and our investigator-led funding rounds. The research that is funded and coordinated in each of these ways aligns with the priorities identified in this survey.

How are we supporting research into a cure for MS via repair or regeneration of cells?

The first way funding is distributed is via investigator-driven grants. Each year MS Australia offers a number of grant programs and accepts research proposals from scientists all around Australia. The research is then peer-reviewed and awarded on scientific merit and significance to MS. In 2019 the research arm of MS Australia launched a targeted call for research projects on repair and regeneration, through which three projects directly targeting repair (not remyelination?) in MS were funded. In 2020 there was a decrease in the number of projects focusing on repair and remyelination in MS; purely/primarily(?) an artefact of project “reshuffling” amongst partner organisations during our organisational restructure. To realign project allocation with ours and the community's priorities in 2021, MS Australia launched a significant targeted call, which has attracted a number of applications currently under independent peer review. These projects are scheduled to begin in 2022.

The types of research funded each year fluctuates, but areas of epidemiology, genetics, vitamin D, EBV, immunology, neurobiology and myelin repair are strong within the Australian MS research community and as such, a significant investment has been made in these areas historically. Over a quarter of the grant funding awarded in 2021 was in the field of *neurobiology*. This field of research is looking at understanding the brain, and how the nervous system is affected by MS. This is fundamental research that is vital to build a framework from which further research can be developed. *Neurobiology* research seeds/is a springboard for a number of areas including research into the MS community's top priority, *a cure for MS via repair or regeneration of cells*.

Additionally, the national collaborative platform of the MS Australia Brain Bank provides tissue for research directly into the *neurobiology* of MS (the top research stream identified) and has far reaching aims including determining the causes of MS, changes at the neurobiological level and molecular mechanisms of progressive MS. These research topics all align with the *cure for MS via repair or regeneration of cells*.

How are we supporting research into the prevention of MS?

The next highest priority was *prevention* and this is a clear strength of the Australia MS research community. One of the largest single investments in research has been in the vitamin D prevention clinical trial (PrevANZ). This is a world first gold standard clinical trial looking at oral supplementation of vitamin D as preventative measure for MS. There is a lot of circumstantial evidence suggesting vitamin D is important in the prevention of MS, but this trial will provide clinical data to answer this question. This investment is also good example of *clinical studies* funded by MS Australia, one of the top research streams identified.

The Australia and New Zealand MS Genetics Consortium (ANZgene) looks at the genetic factors that underpin risk of MS and likelihood of progression. An important goal of this work is to ultimately assist with prevention of MS.

There is a number of different areas of research at an investigator-led level that feed into the goal of prevention, including genetics studies and research into EBV which are ongoing.

Modifiable lifestyle factors also featured as important priorities in both prevention of MS and management of MS. While there are differences in the factors preventing MS onset and those reducing disease progression (primary and secondary prevention), there may be overlap in these areas. This has been another area of significant investment by MS Australia, with the production of evidence-based guidelines in 2021 for diet, exercise and other modifiable lifestyle factors like smoking cessation that can impact risk of MS onset or progression.

How are we supporting research into better treatments?

The third priority was the category *developing better treatments for MS* incorporating both treating relapses and progression, and improving MS management and care (symptoms, rehabilitation, support). Research into this priority is distributed across different areas of MS research, including social and applied research. A number of the national collaborative platforms fit into this space. The AHSCT Registry tracks people that have undergone this type of therapy for MS. The Clinical Trials Network connects researchers, clinicians and people with MS to boost clinical trial participation and to get more off the ground. The Australian MS Longitudinal Study (AMSLS) tracks people with MS using surveys and gathers data about quality of life and management of the disease over years. More recently an extra layer has been added to the AMSLS, called InforMS, which will provide a patient centred portal looking to use digital means to gain an in-depth view of thousands of people's MS journey, symptoms and response to treatment. All of these platforms are part of MS Australia's research strategy to find better treatments for people living with MS.

Looking at the breakdown of the research themes, there has been a slightly higher percentage of funding spent on research into better treatments than what might be in line with the priorities of the community, however this might reflect changing opinions and priorities given the success of new treatments in the last 5-10 years for relapsing forms of MS. There is still a great unmet need for better treatments for progressive forms of the disease. To advance this, MS Australia continues to invest significant funding in Australian research in this area. In parallel, we are working closely and investing heavily in the International Progressive MS Alliance to focus the international community on better treating this stage of the disease that is relatively less well understood.

In the 2016 survey AHSCT was identified as a relatively high priority within the field of *Developing better treatments for MS*. Since then, MS Australia has made significant efforts to communicate data on the uses and effects of AHSCT. In the intervening period the results of several international studies of AHSCT in MS have been published, and perhaps interest in this treatment option has waned a little due to the other highly effective medications that have come into use since 2016. However, we are committed to furthering our research into AHSCT and are currently funding a clinical registry and centre of excellence to gather evidence on the safety and efficacy of this treatment for different types of MS.

How are we supporting priority research streams – neurobiology and clinical trials?

Within the research streams, *neurobiology* and *clinical trials* were rated as important priorities. In addition, clinical studies and clinical trials were considered the most important of the research stages. The MS Australia Brain Bank provides tissue for research directly into the *neurobiology* of MS as discussed above and supports a range of projects in this area. In addition to the long-standing Clinical Trials platform and PrevANZ discussed above, we have embarked on a new platform that aims to improve clinical trial readiness and participation in Australia and ultimately reimagine the landscape of clinical trials for people living with MS in Australia.

How are we supporting research into priority MS symptoms?

The top ranked priorities placed on research into treating and managing symptoms were *Walking and mobility* closely followed by *cognitive function*. These are two areas in which MS Australia continues to invest. Over the last decade MS Australia has funded trials to assist those with mobility issues to retain function, including physiotherapeutic interventions to prevent falls, as well as electronic stimulation of muscles to restore function in advanced MS. Likewise an array of innovative research into cognitive function has been undertaken, including research into implementing web-based tests to detect subtle changes in cognitive functions of people with MS. Research into these symptoms will continue to be a priority for MS Australia.

Conclusion

Overall, the survey has been very strongly supported by the MS community, and it shows the strength of support for research here in Australia by the MS community and for MS Australia. The high level of support has meant that this survey is representative of the whole Australian MS community and provides unique and robust insights into the priorities of the MS community. These insights allow MS Australia’s research and advocacy strategy to continue to evolve to ensure it meets the needs and desires of the MS community.