JPND Online Stakeholder Consultation

Introduction

Aim of the consultation

The EU Joint Programme - Neurodegenerative Disease Research (JPND) is a member state-led initiative involving 23 European Union Member and Associated States that aims to tackle the medical and societal challenges posed by the increasing burden of age-related neurodegenerative diseases (NDD) as effectively as possible. The JPND initiative seeks to accelerate progress in the search for solutions through coordinated action and stimulation of innovative research. The objectives of JPND are to align and build upon national programmes to increase the impact and effectiveness of research undertaken within the participating countries, and to identify common goals that would benefit from joint actions between these countries and the Community. Ultimately JPND seeks to improve the scientific understanding of NDD, provide new approaches for their prevention, diagnosis and treatment, and ensure effective provision of healthcare, social care and support so that individuals receive optimum care and quality of life at all stages of their illness.

The development of a Strategic Research Agenda (SRA) is central to the JPND initiative and will be used as a platform for future European-wide activity and a reference point for developing national and organisational strategic plans. To develop the SRA, thematic workshops were held with key opinion leaders in neurodegeneration (ND) research, alongside focussed meetings and discussions with a number of stakeholder groups. More information on JPND, including reports from the workshops and stakeholder interaction, can be found on the JPND website at: http://www.jpnd.eu/.

The purpose of the consultation exercise outlined in this report was to canvas opinion on the recommendations that emerged from the workshops before developing the final version of the SRA prior to consideration of feasibility and prioritisation by the Scientific Advisory Board (SAB) and Management Board (MB). Responses were used to determine whether there was broad support or otherwise for the recommendations, to understand which topics were of most importance to stakeholders, and to find out if there were any major differences in stakeholder views.

Process and future steps

The consultation took the form of an open-access web-based survey that was conducted from 4th of August to 18th September 2011.

Individuals and organisations likely to have an interest in the JPND initiative were identified by member state representatives on the JPND Management Board and invited to respond; additionally, invitees were encouraged to circulate the consultation link to other potential participants as appropriate.

In addition to inputting contact details, respondents were asked to indicate which stakeholder category they most identified with, if they were completing the survey on behalf of an organisation, and if their response could be published (either attributed or anonymously).

It is clear that respondents are interested to know more about the initiative as it unfolds. Around 85% of respondents have signed up to be included in the JPND stakeholder database and to be kept updated throughout the lifetime of the initiative. A key goal of JPND is to support and engage stakeholders with appropriate information at relevant times. The initiative will offer two-way opportunities for communication, dissemination, knowledge transfer, networking and consultation on plans and initiatives. In keeping with these aims, stakeholders will be notified when this report is published on the JPND website, when the SRA is launched, and at other key milestones or consultation points.

Structure of the survey

The survey was broken down into nine sections each representing a broad theme:

- Section 1 - Education, training and collaboration
- Section 2 - Health and social care issues
- Section 3 - Prevention/treatment strategies and trials
- Section 4 - Disease cause, mechanisms and models
- Section 5 - Diagnosis, disease definitions and outcome measures
- Section 6 - Data, registries, repositories and centres
- Section 7 - Policy, regulation and legislation
- Section 8 - Funding and funding mechanisms
- Section 9 - Other issues [‘Concluding questions’ in the survey]

Within each section respondents were asked to:

- Indicate their level of support for between four and eight statements using a five-point rating system to identify whether they strongly agreed, agreed, were neutral, disagreed or strongly disagreed with each statement.
- Identify which of the statements they considered to be the most important, selecting up to three in rank order. For the purposes of analysis, a statement received three points each time it was indicated as a first priority, two points when indicated as a second priority and one point when indicated as a third priority; in sections 1 and 5 respondents were only asked to indicate one priority.
- Respond to specific follow-up questions using free text answers.

Questions were not compulsory and it was highlighted that certain sections might be of more interest to some stakeholder categories than others.

The full list of survey questions can be found on the JPND website (see Annex 1).

Overview of main consultation findings

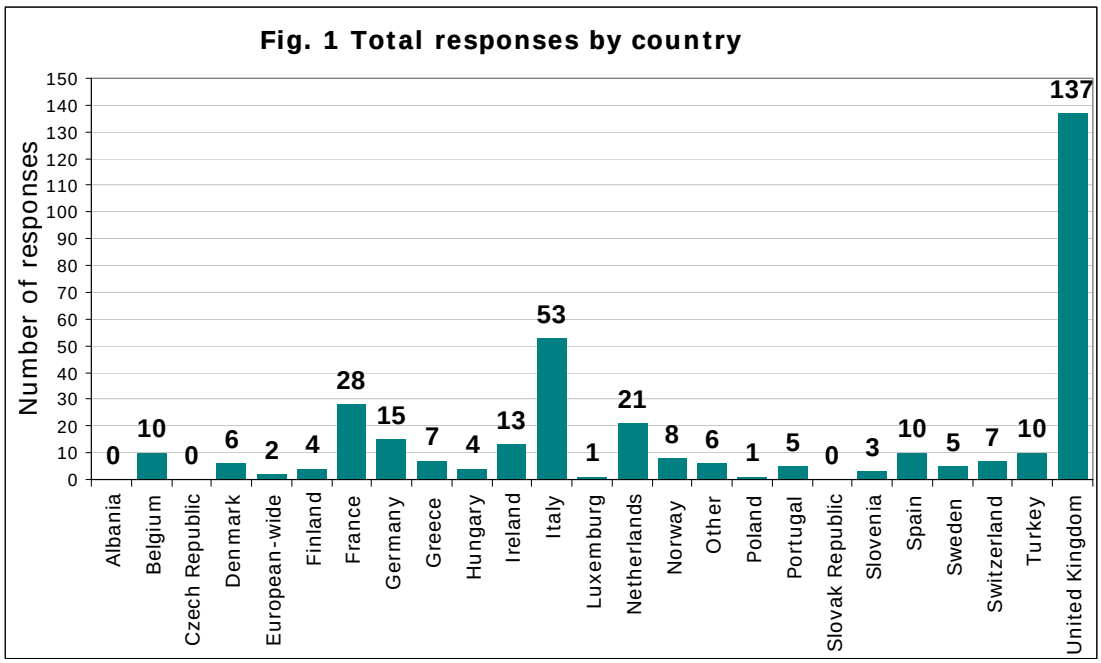
The survey provides a sample of opinions across different stakeholder categories and was not intended to be used for a more rigorous statistical analysis. Responses to all survey sections were received from representatives of each stakeholder category with the main differences of view emerging in the free text answers. The principal finding of the consultation was that there was a high level of agreement with the priorities identified during the JPND thematic workshops and between the various stakeholder categories. Where views diverged, no consistent trends or significant new issues emerged. Collectively, stakeholders expressed strong support for:

- **Increasing the involvement of individuals in research**
- **Improving understanding of disease mechanisms**
- **Improving access to, and sharing of, infrastructure and resources**
- **The need for evidence-based policy**
- **Promoting translational research**

These choices reflect the top ranked priorities from individual sections where there was broad agreement from the majority of respondents. A section-by-section analysis is presented below.

Numbers and categories of responses

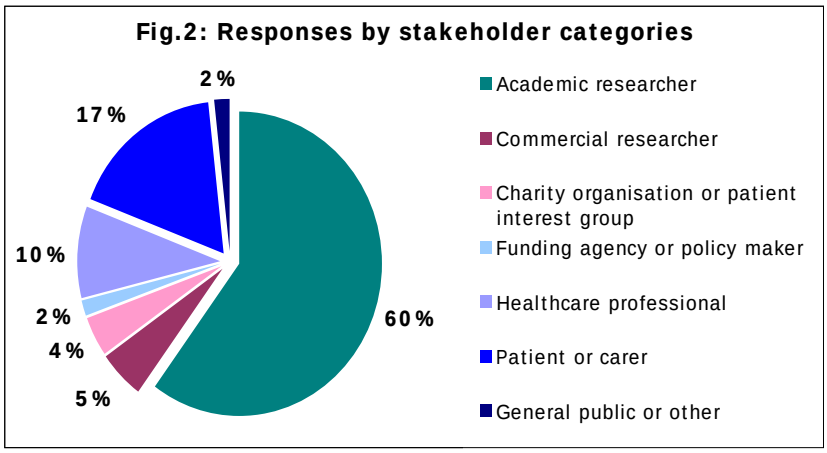
356 responses were received, 39 from organisations and companies and 317 from individuals. In all there were 1646 unique web 'hits' in the period that the survey was open with 163 incomplete responses (which were not included in this analysis). Responses were spread across the JPND member states and beyond (categorised as 'Other') with nearly all countries providing at least one respondent (see below, Fig.1 - Total responses by country). The largest number of responses were from the UK (38% of the total) and Italy (15%), followed by France (8%), the Netherlands (6%) and Germany (4%). Between 0 and 13 responses were received from other countries. Individually, respondents addressed questions from either a national or European perspective.



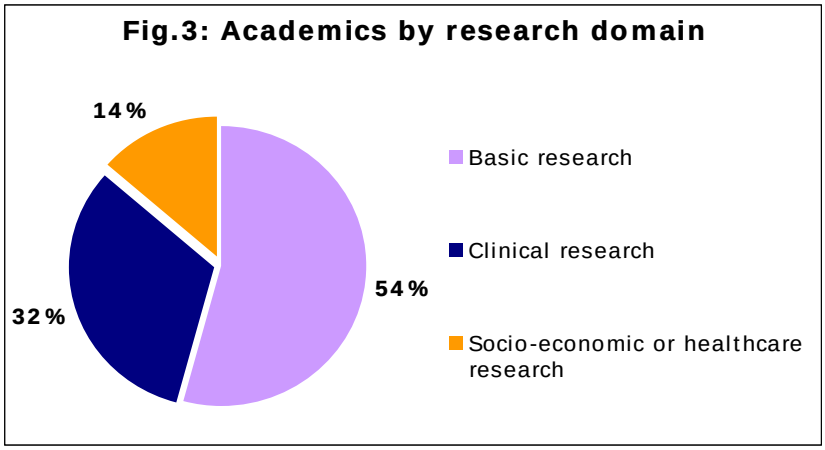
Respondents were asked to indicate which stakeholder category they most closely represented:

- Academic researcher
- Commercial researcher
- Charity organisation or patient interest group
- Funding agency or policy maker
- Healthcare professional
- Patient or carer
- General public or other

Respondents who indicated that they were academic researchers (60%), healthcare professionals (10%) or patients or carers (17%) made up nearly 90% of the total (see Fig.2 below). This had the effect of skewing some of the analyses presented in this report towards the views of these three stakeholder categories.



The largest group of respondents, academic researchers, came from the following research domains: basic 54%, clinical 32% or socio-economic/healthcare 14% (see Fig.3 below):



Where permission for open (60%) or anonymous (26%) publication was given, the full response to the online consultation is published on the JPND website. The remaining 14% of responses were included in the overall analysis but have not been published, as requested. A breakdown of consultation respondents and responses is available in Annex 2.

Respondents were also asked whether they wished to be included in the JPND stakeholder database, so that they could be kept updated throughout the lifetime of the initiative. Of those who responded, 71% wished to be included, 15% declined to be included, and 14% were already in the database.

Analysis by section

The analysis below is divided into nine sections, each corresponding to one of the broad themes of the survey (see Structure of the Survey). Sections contain data on the number of responses received to the structured questions on that theme, followed a commentary on areas identified as important and any observable trends. Where respondents were asked to comment further using free text answers, these responses are also described. At the end of each section is a summary.

The majority of free text responses in sections 8 and 9 of the survey ('funding and funding mechanisms' and 'other issues') were found to address issues relevant to other survey sections and so were redistributed to the appropriate section for the purposes of analysis. For certain free text questions, some responses did not reflect the question asked and so were excluded from analysis; where possible these responses were redistributed.

Section 1 – Education, training and collaboration

Summary

There was clear consensus on the need to improve education, training and collaboration to promote neurodegenerative disease research, with respondents highlighting a number of specialist areas that they thought should be promoted.

Number of responses

- 347 responses (97% of the total) were received on all the questions requiring respondents to indicate their level of agreement for a statement.
- 346 respondents (97%) indicated their top priority.
- 164 respondents (46%) answered the free text question.

Analysis of priorities and free text answers

The rank order of priorities in this section was:

1. **Increase training for translational- and clinician-scientists**
2. **Increase numbers of neurodegenerative disease (NDD) researchers**
3. **Improve education and training of healthcare professionals**
4. **Increase numbers of post-doctoral level researchers**
5. **Improve dialogue between researchers and wider population**

The overall top ranked priority, '*Increase training for translational- and clinician-scientists*', was the second ranked priority for both academic researchers and healthcare professionals. In contrast, this was the fifth rank priority for patients; however, when asked to indicate their level of agreement with this statement, 0% of patients disagreed or strongly disagreed. For other priorities, views diverged, for example healthcare professionals ranked the need for more training for healthcare professionals as the highest priority, but academic researchers ranked this as their lowest priority. Conversely, academic researchers identified the training of post-doctoral researchers as their top priority, whereas this was the lowest priority for respondents who were healthcare professionals (see Table 1 below - *Education, training and collaboration*).

Table 1: Education, training and collaboration

Priorities	**Overall rank** (346)	**Academic researchers** 61%(210)	**Patients or carers** 18%(61)	**Healthcare professionals** 10%(34)
Increase training for translational and clinician-scientists	**1**	2	5	2
Increase numbers of NDD researchers	**2**	3	2	3
Improve education and training of healthcare professionals	**3**	5	1	1
Increase numbers of post-doctoral level researchers	**4**	1	4	5
Improve dialogue between researchers and the wider population	**5**	4	3	3

The free text question in this section asked: '[Within the context of education, training and collaboration] are there any other specialist areas which you think need promoting or should be given greater emphasis?'

Many of the answers provided, simply specified a discipline that the respondent considered to be particularly important, for example: biostatistics, bioinformatics, bioengineering, physiology and pathophysiology, epidemiology, health economics, neurology, neuroimaging, nanomedicine, psychiatry, psychology, geriatrics, gerontology, internal medicine and nursing. Respondents also suggested that health services and social care research, and mathematical modelling should be given more prominence in ND research.

Within individual stakeholder categories, comments centred mainly on activities relating to that particular area, for example, patients and carers tended to express the view that general practitioners are often not aware of all the symptoms of ND and expressed a wish for access to specialist expertise (consultants); one carer said that the community needed knowledge, particularly, about orphan diseases.

In addition to suggesting areas that need promoting, a common viewpoint (across all seven stakeholder categories) was that communication and information exchange, multidisciplinary approaches and joint working are necessary and important. A quotation from a healthcare professional was: *"Key to success will be encouraging communication between the disparate groups involved in this research (neurologists, geriatricians, psychiatrists, neuroradiologists, basic scientists, epidemiologists etc), both in the research and clinical environments…"*.

Similarly, a respondent from a charity asked for better co-ordination on ND matters with healthcare systems, caregivers and the government. Regarding joint working, several respondents from the commercial sector indicated they were in favour of increasing industry-academic partnerships with one respondent further suggesting that these partnerships should also involve not-for-profit organisations. A respondent answering on behalf of a pharmaceutical company felt that more direct interaction with patients was required in order to better understand their needs.

Cutting across education and collaboration, the view was expressed that there is a need to learn from other disciplines and fields and work with experts in those areas:

> *"… Look at and build on relevant research from non-NDD fields that may be translatable."* (Academic researcher)

Section 2 – Health care and social care issues

Summary

The overarching message from this section was that we need to rethink approaches to care. Some of the ideas suggested by respondents relate to procedures or practical implementation while others relate to research that needs to be conducted.

Number of responses

- 313 responses (88% of the total) were received on all the questions requiring respondents to indicate their level of agreement for a statement.
- 253 respondents (71%) indicated their top three priorities with 298 (84%) indicating at least their top priority.
- 122 respondents (34%) answered all the free text questions with 181 (51%) answering at least one free text question.

Analysis of priorities and free text answers

The rank order of priorities in this section was:

1. **Rethink approaches to care**
2. **Understand and investigate influence of co-morbidities**
3. **Research into the needs of carers**
4. **Conduct research into effects of nutrition and frailty**
5. **Determine cost-effectiveness of healthcare pathways**
6. **Survey long-term care standards and provision across Europe**
7. **Research into care approaches including end of life decision-making**
8. **Define the term 'care'**

As with several other sections of the survey, differences between the stakeholder categories largely reflected the particular interests of their area (see Table 2 below – Health care and social care issues). Points of interest were:

- The need to '*rethink approaches to care'* was the top priority for the academic researcher and patient or carer groups, whereas healthcare professionals did not rank this statement as highly. However, when asked to indicate their level of agreement with it, 0% of healthcare professionals disagreed or strongly disagreed.
- Healthcare professionals and academic researchers gave more importance to '*understanding the influence of co-morbidities'* than did patients and carers. Relevant comments included:

  "… Ensure that the impact on patients at all stages in their clinical care, including the risk of delirium when admitted to hospital and the risk of attendant functional decline, is recognised, as well as the progress of the disease itself." (Healthcare professional)

  "*… Co-morbidity with mental disease and substance use/abuse should be researched more, given the widespread and high levels of use of alcohol in all parts of the populations, the impact of smoking, and the long-term effects of cannabis and other illicit drugs*" (Academic researcher).
- Healthcare professionals identified '*survey long-term care standards and provision across Europe'* as their second priority, but this was considered less important by the other two stakeholder categories.

Table 2 : Health care and social care issues

Priorities	**Overall rank** 253-298[1]	**Academic researchers** 146-179	**Patients or carers** 43-50	**Healthcare professionals** 31-34
Rethink approaches to care	**1**	1	1	5
Understand and investigate influence of comorbidities	**2**	2	=4	1
Research into the needs of carers	**3**	4	2	3
Conduct research into effects of nutrition and frailty	**4**	3	3	7
Determine cost-effectiveness of healthcare pathways	**5**	4	=7	4
Survey long-term care standards and provision across Europe	**6**	6	=4	2
Research into care approaches including end of life decision-making	**7**	7	=4	6
Define the term "care"	**8**	8	=7	8

The first free text question in this section asked respondents to define the term 'care'. From the rank order of priorities and response to the agreement scale it was clear that respondents did not regard this as important as other issues.

[1]The highest number equates to the number of respondents selecting their top priority with the lowest number equivalent to the number of respondents selecting all three priorities; respondents could select up to three priorities but often selected fewer.

These findings were consistent with the overall view of the JPND Scientific Advisory Board (SAB) and this issue was not included in the SRA.

The second of the three free text questions in this section asked for views on the improvement of current healthcare systems. Suggestions included evaluation of efficiency and cost-effectiveness, integrating assessment of health and social services, and the promotion of person-centred approaches that take account of changing patient need through the disease course. Support was also expressed for: greater involvement of the wider community, reducing social stigma and generating a better understanding of the cultural and socio-economic environment and its impact on the incidence of neurodegenerative diseases. Other areas identified for action included: the development and dissemination of best practice guidelines for care in hospitals (both short and long term); development of centralised systems to reduce the need for patients to describe their case history to a succession of different healthcare professionals; promotion of links between healthcare professionals and family caregivers, doctors and patients; better support for care home systems, self medication and out-patient services.

The third free text question in this section specifically asked how society could promote the advantages of care at home. Respondents recognised the need for: research to develop interventions (including assisted-living technologies) to enable people with NDD to remain in their own homes for longer; professionally trained formal and informal carers; financial support for patients and carers/formalisation of support for carers; and the creation of good support networks. Responses included:

> *"… [Care at home] needs to be recognised in the tax, pension and social security systems. Where individuals have no family to care for them, they should be able to amass 'caring credits' by looking after others when they are fit enough to do this..."* (Academic researcher)

> *"… Provide special incentives for patients in the form of tax relief, special subsidies for long term care in homes if required. State subsidy to care home insurance premiums or add[i]tional tax relief for patients who participate, or healthy subjects who volunteer to participate in case they need such care in old age."* (Commercial researcher)

A subset of respondents highlighted the requirement to clearly define decision-making processes in relation to determining if home care is appropriate:

> "*… clear demar[c]ation of what can be done at home and what cannot and put in place the resources to promote appro[p]riate care whether at home or in a hospital."* (Academic researcher)

> "*Agreed definition of assessment, gerontological attuning of health-care system, rights-based approach prioritizing the needs and wish of the person affected."* (Healthcare professional).

Section 3 – Prevention/treatment strategies and trials

Summary

There was clear agreement between stakeholder groups that the top priority in terms of prevention/treatment strategies and clinical trials is to increase participation in research. There was also strong support for promoting the development of non-pharmacological interventions, and amongst healthcare professionals and patients, for rethinking what we consider important in terms of therapeutic effect and outcome.

Number of responses

- 339 responses (95% of the total) were received on all the questions requiring respondents to indicate their level of agreement for a statement.
- 273 respondents (77%) indicated their top three priorities with 327 (92%) indicating at least their top priority.
- 136 respondents (38%) answered both free text questions with 207 (58%) answering at one free text question.

Analysis of priorities and free text answers

The rank order of priorities in this section was:

1. Increase involvement of individuals in research
2. Promote development of non-pharmacological interventions
3. Rethink approach to therapeutics
4. Conduct multi-centre primary prevention studies
5. Ensure better patient selection / stratification
6. Support for high-risk projects

All respondents agreed that the top priority was to '*increase involvement of individuals in research*' (see Table 3 below). Interestingly, '*support for high-risk projects*' (with the emphasis on personal risk rather than scientific risk) was ranked as the lowest priority by all groups. However, 78% of patients or carers (and 70% of all respondents), did agree with this statement (with only 1.6% disagreeing) which seems to validate the views expressed during the Final JPND SRA workshop that patient and carer groups would support high-risk projects with potential benefits for the individual[2].

Table 3 : Prevention / treatment strategies and trials

Priorities	Overall rank 273-303	Academic researchers 159-195	Patients or carers 51-60	Healthcare professionals 29-32
Increase involvement of individuals in research	**1**	1	1	1
Promote development of non-pharmacological interventions	**2**	2	2	3
Rethink approach to therapeutics	**3**	4	3	2
Conduct multi-centre primary prevention studies	**4**	3	5	4
Ensure better patient selection/stratification	**5**	5	4	5
Support for high-risk projects	**6**	6	6	6

[2] JPND Final SRA Workshop Report, *Funding and funding mechanisms* (pg. 5).

The first free text question in this section asked how best to encourage more people to take part in research and/or register to donate brain material. The solutions proposed reflected a common understanding of this key need:

- improved advertising of research/donor programmes and education through "*marketing campaigns…"* (Individual from a Charity organisation); "*education from early age…" (*Commercial researcher); "*…Researchers and Patients speak to school pupils and undergraduate[s]"* (Patient);
- better engagement between scientists and patients supported by healthcare professionals, "*allow clinic time to explain and give [patients] literature and the chance to reconsult"* (Patient); "*… person to person conversation…" (*Healthcare professional);
- increasing the opportunities available for people (to express their willingness) to take part in research "*… I would welcome some sort of filtration process when I am notified of opportunities to participate in research…"*– Patient).

The second free text question asked respondents whether they thought that in Europe we are ready to begin multi-centre primary prevention trials, and if so, which measures should be trialled. The majority[3] who provided a definitive answer agreed we were ready to begin such studies. Suggested examples of potential measures/therapeutics that could be addressed or trialled included:

- [reducing] blood pressure; alcohol intake; exposure to environmental pollution; stress
- [increasing/improving] physical activity; social engagement; cognitive training; diet
- effect of anti-hypertensive, anti-inflammatory and anti-depressant agents;

It was also suggested that some of these proposals could potentially be addressed through current mechanisms "*existing trials (for example for cardiovascular disease) should include measures of neurodegeneration (dementia, cognitive assessments) as secondary outcomes.*" (Academic researcher)

Among the reasons given by respondents for not establishing prevention trials was the need to first understand the molecular basis of pathologies, biomarkers and carry out basic epidemiology. The high costs of these trials were also suggested as a potential issue:

> *"Long-term monitoring of biom[a]rkers affected by neurodegenerative diseases would be costly and difficult in clinical studies trying preventive measures. Such studies should start with healthy people and last for years. It seems feasible only in the case of specific population of subjects with strong genetic load. Therefore pre-selection of the subjects would be very important…"* (A pharmaceutical company)
>
> *"There is a large consensus among researchers on NDDs that the biggest reason for numerous failed recent clinical trials is that the intervention started too late. A prevention study will be very costly because it needs to involve repeated imaging (such as amyloid-PET, MRI volumetry) to provide the identification of individuals at high risk of the disease and to provide necessary surrog[ate] markers. Such trials should be based on the best available therapeutic agents and not the interest of a sponsoring*

[3] Just under half the respondents thought that prevention trials could be started now; however, only a minority actively disagreed with this position. The remaining respondents either provided unrelated answers or said they did not understand the question.

pharmaceutical company. Therefore [it] can only be conducted with public support by [the] European Community." (Academic researcher)

Section 4 – Disease cause, mechanisms and models

Summary

There was clear consensus about the need to further investigate disease mechanisms, particularly to understand the mechanisms of neuronal death and dysfunction. Those who responded were divided about progressing research from cell-based models straight to humans, missing out animal models, although patients were marginally more supportive of the idea. There were views that this might be acceptable in certain, carefully controlled circumstances. It seemed that some patients may be prepared to accept responsibility for taking part in such studies, even with the potential risks involved.

Number of responses

- 333 responses (94% of the total) were received on all the questions requiring respondents to indicate their level of agreement for a statement.
- 294 respondents (83%) indicated their top three priorities with 319 (90%) indicating at least their top priority.
- 168 respondents (47%) answered the free text question.

Analysis of priorities and free text answers

The rank order of priorities in this section was:

1. **Improve understanding of disease mechanisms**
2. **Understand relationship between NDD and ageing**
3. **Improve understanding of disease stages**
4. **Develop more representative animal and cell-based models of disease**
5. **Determine the importance of genetic and environmental risk factors**
6. **Establish pan-European population-based studies including year-on-year (longitudinal) studies in high risk groups**
7. **Develop an improved understanding of the genetic basis**
8. **Focus research on rare hereditary forms of disease**

Between stakeholder categories there were minor differences in the individual rankings but broad agreement on the overall order of priorities (see Table 4 below – Disease cause, mechanisms and models). One area of disagreement related to '*improve understanding of disease stages*' which patients indicated was the top priority. In contrast, healthcare professionals and academic researchers both ranked this much lower, perhaps because they reasoned that this would naturally follow from investigation of disease mechanisms and the relationship between neurodegenerative diseases and ageing (which they ranked more highly).

The statement '*focus research on rare hereditary forms of disease*' was ranked as the lowest priority by all three groups, with only 42% of respondents agreeing with this recommendation, 25% disagreeing and 33% neutral. This proposal remains included in the SRA because of strong views expressed during the workshops[4] and by the SAB that understanding the genetic basis of hereditary disease can be a successful starting point for studies of related sporadic disease.

Table 4: Disease cause, mechanisms and models

Priorities	**Overall rank** 294-319	**Academic researchers** 186-201	**Patients or carers** 42-47	**Healthcare professionals** 28-31
Improve understanding of disease mechanisms	**1**	1	2	1
Understand relationship between NDD and ageing	**2**	2	3	2
Improve understanding of disease stages	**3**	5	1	4
Develop more representative animal and cell-based models of disease	**4**	3	6	7
Determine the importance of genetic and environmental risk factors	**5**	4	4	5
Establish pan-European population-based studies including year-on-year (longitudinal) studies in high risk groups	**6**	6	5	3
Develop an improved understanding of the genetic basis for NDD	**7**	7	6	6
Focus research on rare hereditary forms of disease	**8**	8	8	8

Question 3 of this section asked respondents to indicate which of the listed aspects of disease mechanisms should be investigated first. 296 responses were received producing the following rank order:

1. Mechanisms of neuronal death and dysfunction 45% (133 responses)
2. Interactions between cells and their surrounding intra- and extracellular environment 21% (63 responses)
3. The biological basis of behavioural and psychological symptoms 20% (60 responses)
4. Neuronal inflammation 14% (40 responses).

Academic researchers and patients or carers expressed a strong preference for investigating '*mechanisms of neuronal death and dysfunction*'. In contrast, healthcare professionals were more polarised in their viewpoint, ranking the overall 1st, 3rd and 4th priorities more or less equally.

[4] JPND Final SRA Workshop Report, *Disease mechanisms and models* (pg. 2) and JPND Basic Workshop – Interim report, *Approaches to achieve progress in ND research* (pg. 2).

The free text question in section 4 was relatively controversial, asking whether respondents saw any justification for progressing research from cell-based models straight into clinical studies in humans (i.e. missing out animal models). Among the 167 responses received, 7 respondents said that it was not their expertise area, 1 was neutral and 1 did not clearly state any preference. The remaining 158 responses were split broadly down the middle: 44% of respondents thought that missing out animal models was reasonable; 48% thought it was unacceptable; 6% were not sure; 1% thought it would become acceptable in the future. An analysis by stakeholder category is shown in the table below (Table 5). Again, stakeholder views were broadly split down the middle, with patients marginally being the most receptive.

Table 5: Progressing research from cell-based models straight to humans

Stakeholder category	Acceptable	Unacceptable	Not-sure	In future
Academic researchers	43%(44)	52%(54)	3%(3)	2%(2)
Healthcare professionals	43%(6)	50%(7)	7%(1)	0%(-)
Patients or carers	55%(12)	36%(8)	9%(2)	0%(-)

Many respondents qualified their reply, saying that studies in humans would be acceptable in certain circumstances, for example: in rapidly progressive neurodegenerative diseases; where there is a plausible biological basis for effect; for high risk-diseases with a high social burden; when the results from cell-based models are particularly positive and consistent. Interestingly, five stakeholders from the patient and carer category said that the key determinant should be whether patients were willing to take part in such studies.

Respondents who disagreed provided the following reasons why omission of animal studies would be unacceptable:

- too risky; unknown basic biology and genetics of NDD; side effects, cell models are inferior to animal models; cell models do not reproduce the cell-cell interactions seen *in vivo* in patients.

Other respondents suggested mechanisms or models that need to be in place before research could be progressed straight from cell-based models into humans:

- establish full decision-making capacity and advanced directives before seeking patient consent for studies that bypass animal models;
- generate three-dimensional *in vitro* models using human-derived brain cells that mimic *in vivo* structures as far as possible.

Section 5 – Diagnosis, disease definitions and outcome measures

Summary

There was a clear consensus about the need to develop new biomarkers in order to provide indicators of, and sensitivity to, disease progression and to link the mechanism of disease to functional endpoints. Redefining and harmonising both disease definitions and clinical endpoints were also considered important but respondents were less certain that regulatory approaches needed to be changed.

Number of responses

- 300 responses (84% of the total) were received on all the questions requiring respondents to indicate their level of agreement for a statement.
- 305 respondents (86%) indicated which of the listed options relating to biomarkers they thought was most important.
- There was no free text question in this part of the survey.

Analysis of responses

In this section respondents were asked to indicate their level of agreement with a series of statements but were not asked to rank their priorities. High levels of agreement[5] were noted for the need to: develop new biomarkers (90%); re-define and harmonise clinical endpoints and outcomes (88%); redefine and standardise disease definitions and diagnosis (83%). In contrast, only 51% of respondents agreed that researchers need to take greater account of regulatory approaches.

Secondly, respondents were asked to indicate which, of four options, was most important in terms of biomarkers:

1. Providing an indicator of, and sensitivity to, disease progression 38% (117 responses)
2. Linking to the mechanism of disease and functional endpoints 34% (103 responses)
3. Linking to treatment responses 23% (71 responses)
4. Facilitating back-translation to models of disease 5% (14 responses)

Section 6 – Data, registries, repositories and centres

Summary

There was a clear consensus about the need to improve access to, and sharing of, infrastructure and resources. Different solutions were proposed to overcome difficulties related to open-access. Most of respondents agreed that there is the need to develop centres of excellence (CoE), but some dissented. Some ideas were presented to help to optimise the CoE model.

Number of responses to different parts of this section

- 313 responses (88% of the total) were received on all the questions requiring respondents to indicate their level of agreement for a statement.
- 234 respondents (66%) indicated their top three priorities with 298 (84%) indicating at least their top priority.
- 143 respondents (40%) answered all the free text questions with 179 (50%) answering at least one free text question.

Analysis of priorities and free text answers

The rank order of priorities in this section was:

[5] Combined ‘strongly agree’ and ‘agree’

1. Improve access to, and sharing of, infrastructure and resources

2. Develop centres of excellence

3. Improve access to patient groups, samples and data

4. Improve data and sample collection

5. Develop a register of persons with cognitive impairment

In this section there were no substantial differences in response between the stakeholder categories (see Table 6 below).

Table 6: Data, registries, repositories and centres

Priorities	**Overall rank** 234-298	**Academic researchers** 150-192	**Patients or carers** 28-37	**Healthcare professionals** 25-31
Improve access to, and sharing of, infrastructure and resources	**1**	1	2	1
Develop centres of excellence	**2**	2	1	3
Improve access to patient groups, samples and data	**3**	3	3	2
Improve data and sample collection	**4**	4	4	4
Develop a register of persons with cognitive impairment	**5**	5	5	5

The first free text question asked for 'suggestions to facilitate the increased sharing of data'. Collectively, the proposals included: support for existing and new networks; information and communication technology (ICT) infrastructures; new methods to facilitate data collection; providing incentives for data sharing through ad hoc funding and regulation; standardisation of data collection, protocols and outcome measures.

The second free text question was on the related issue of open-access data. The survey asked for the respondent's views on making data open-access, if they foresaw any difficulties with making data open-access, and if so how these could be overcome.

Respondents indicated that there might be potential difficulties associated with open-access relating to: Intellectual Property (IP) rights; quality control of the data shared; standardisation of protocols, regulation and data collection; competition between researchers; data protection (including concerns about hacking); and commercial sponsors. Among the solutions suggested, respondents proposed: a delay before open access to allow the protection of IP rights or publication; development of a common registry for collection and coordination of data; publication of progress reports and final reports of clinical trials; establishment of guidelines for data collection and protocols; data sharing as a condition of grant awards; filtered access to databases; generation of summary statistics rather than full open access; establishment of common law across

Europe concerning privacy; tax relief or special market access to incentivise commercial sponsors to share their results; include industries in funding models.

The last free text question (Question 5) asked respondents if they perceived any risk(s) in developing centres of excellence (CoE). Based on the rank order of priorities and the level of agreement[6] (82%), respondents were predominantly in favour of CoEs and perceived more advantages than disadvantages.

The following major risks associated with setting up CoEs were identified: difficulties associated with studying patient populations who are distant from the research CoE; fewer opportunities and less funding for research outside the CoE; a perceived lack of objective criteria for excellence; significant political risks (creation of CoEs in each country even when scientifically inappropriate); conflicts of interests.

Examples of how to overcome some of the issues highlighted above were: centers of excellence must have thematic networks with the surrounding community; knowledge from labs not included in CoEs could be shared with better communication and data exchange systems; CoEs could be the central point for well established networks of multidisciplinary care.

Section 7 – Policy, regulation and legislation

Summary

There was clear consensus about the importance of evidence-based policy. In the free text question, respondents, including commercial researchers, made suggestions as to how the commercial development of treatments could be facilitated.

Number of responses

- 259 responses (73% of the total) were received on all the questions requiring respondents to indicate their level of agreement for a statement.
- 177 respondents (50%) indicated their top three priorities with 222 (62%) indicating at least their top priority.
- 60 respondents (17%) answered the free text question.

Analysis of priorities and free text answers

The rank order of priorities in this section was:

1. **Need for evidence-based policy**
2. **Facilitate research in areas outside university and hospital sectors such as care homes and within the wider community**
3. **Encourage industry to adopt pre-competitive approach**
4. **Ensure greater engagement with regulators**
5. **Rethink patent lifetime and conduct public-private clinical trials**
6. **Review and update legislation on privacy and data disclosure**
7. **Review and update legislation on treatment**

[6] Using combined responses of 'agree' and 'strongly agree'

There was a consensus across all stakeholder groups on the need for evidence-based policy as the top priority. Aside from this, there were differences between each stakeholder category that in general appear to reflect the relative importance to each area (see Table 7 below). For example, academic researchers and healthcare professionals highlighted the need to facilitate research outside universities and hospitals while patients or carers showed far greater interest in patent lifetime and the need for public-private clinical trials.

Table 7: Policy, regulation and legislation

Priorities	**Overall rank** 177-222	**Academics** 113-143	**Patients** 21-25	**Healthcare professionals** 22-25
Need for evidence-based policy	**1**	1	1	=1
Facilitate research in areas outside university and hospital sectors such as care homes and within the wider community	**2**	3	4	=1
Encourage industry to adopt pre-competitive approach	**3**	2	=5	4
Ensure greater engagement with regulators	**4**	4	3	7
Rethink patent lifetime and conduct public-private clinical trials	**5**	6	2	6
Review and update legislation on privacy and data disclosure	**6**	7	=5	3
Review and update legislation on treatment	**7**	5	7	5

The free text question for this section asked for suggestions relating to policy or regulatory approaches that might encourage or promote the development of new treatments. Respondents suggested:

> "*Mutual recognition of other regulatory bodies' decisions (approvals).*" (Academic researcher);
>
> "*… light-touch regulation so that consent is not always required. The consenting process is often far more intrusive to patients than very short testing or examination of medical records. This would greatly facilitate the development of, for example, psychometric tools for diagnosis and monitoring of NDD conditions.*" (Academic researcher);
>
> "*Automatic enrolment of newly diagnosed patients on a register of potential trial participants (unless they opt out).*" (Academic researcher);
>
> "*-Expand IP capabilities for the protection of research data- Promote risk-sharing agreements and other new approaches to fair-pricing of medicines to encourage innovation - Promote NGO partnerships - Encourage global collaboration with the US and China.*"– (Pharmaceutical company);

"Make negative results from clinical trials public?" (funding agency, policy-maker or regulator)

A longer response from a commercial researcher was that:

"Regulatory framework needs to be fundamentally re-worked to allow novel treatments to reach patients on[c]e safety has been established and early evidence of efficacy has been established; i.e. before definitive evidence of efficacy has been established. The duration of trials in many age-related NDDs is such that waiting for the final answer to fully establish the label will mean that most patients who have an established NDD will not benefit from any of the therapies that are in development today. Rather, if there is a reasonable possibility that patients would benefit and the risk has been defined, individual patients and their physicians should have the ability to use that treatment. Compassionate use and other early access mechanisms are inadequate because if companies are not allowed to truly sell the product (and recoup their costs to manufacture at commercial scale) they cannot make the drug available." (Commercial researcher)

Section 8 – Funding and funding mechanisms

Summary

The key points that emerged from this section were the general agreement about the need to promote translational research and to maintain some capacity for bottom-up innovative funding.

Number of responses to different parts of this section

- 282 responses (79% of the total) were received on all the questions requiring respondents to indicate their level of agreement for a statement.
- 209 respondents (59%) indicated their top three priorities with 262 (74%) indicating at least their top priority.
- 51 respondents (14%) answered the free text question.

Analysis of priorities and free text answers

The rank order of priorities in this section was:

1. Translational research needs to be promoted

2. Maintain capacity for 'bottom-up' innovative funding

3. Simplify funding application systems

4. Joint academic-industry funding models

5. Encourage open-access sharing of data and materials

Though it was only selected as the top priority by academic researchers, translational research was seen as a high priority by all respondents (see Table 8 below – Funding and funding mechanisms).

Patients reiterated their support for open-access sharing of data and materials (as expressed in Section 3) by indicating that encouraging open-access sharing by attaching conditions to funding/funding mechanisms was their top priority.

Academics, and to a lesser extent patients/carers and healthcare professionals, highlighted the importance of maintaining the capacity for 'bottom-up' innovative funding (i.e. alongside any strategic funding). This viewpoint is strongly held by the Scientific Advisory Board and has been outlined in the SRA.

Lastly, a number of respondents emphasised that more funding was required for (NDD) research or that NDD research was (comparatively) underfunded. For example:

> *"Funding priorities should be determined to some extent by the health and economic impact of the particular conditions. For example, dementia and delirium together affect 25% of acute hospital inpatients (doubling length of stay, increasing institutionalisation), and yet there is hardly any research focused on this area…"* (Academic researcher)

Table 8: Funding and funding mechanisms

Priorities	**Overall rank** 209-262	**Academic researchers** 104-108	**Patients or carers** 21-27	**Healthcare professionals** 20-27
Translational research needs to be promoted	**1**	1	2	2
Maintain capacity for 'bottom-up' innovative funding	**2**	2	3	=3
Simplify funding application systems	**3**	3	5	1
Joint academic-industry funding models	**4**	4	4	5
Encourage open-access sharing of data and materials	**5**	5	1	=3

The free text question in this section asked for ideas to encourage open-access sharing of data and materials. The responses are included in the discussion of the responses to the 6th section *Data, registries, repositories and centres.*

Section 9 – Other issues

Introduction and number of responses

In this section respondents were asked whether we had overlooked any important ideas or strategies (Question 1); how these should be implemented (Question 2) and whether they had any further suggestions/comments (Question 3).

111 respondents (31%) answered Q1, 78 respondents (22%) Q2, and 61 respondents (17%) Q3.

Analysis

The free text answers provided were mostly related to other sections of the survey and have been redistributed where appropriate. Of the remaining comments, some were from patients or carers expressing their general positivity and support for research, for example:

“Keep up trying to find cures for all these diseases so that the people following us will ben[e]fit from all you have discovered.”

“From the point of view of being a person with Parkinson's' I thank you for the opportunity to take part and believe it is an excellent initiative that will provide invaluable i[n]put from all sectors. Thank You”

Conclusions

The online consultation has been highly valuable in allowing JPND to reach out to key stakeholder groups. The responses and opinions expressed by respondents on the priorities and recommendations that emerged from the strategy workshops are positive overall and in support of the initiative. A high proportion of respondents intend to keep in touch as the inititative unfolds. This level of interest and engagement can be taken as validation both of the process and the goals of the initiative.

Thanks

The JPND WP2 team and Management Board would like thank everyone who took part in the survey.

Annexes

Annex 1 – Survey questions

A PDF of the survey questions can be downloaded from the Online Consultation section of the JPND website.

Annex 2 – Directory of respondents

When completing the survey, respondents were asked to indicate which stakeholder category they most identified with, if they were completing the survey on behalf of an organisation, and if their response could be published (attributed or anonymously).

PDFs of published responses can be downloaded from the Online Consultation section of the JPND website. Responses are organised by stakeholder category; the number in parentheses refers to the number of responses in each category/file.

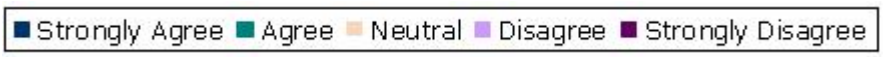
- Academic researchers i - attributed (135)
- Academic researchers ii - anonymous (52)
- Charities and patient groups (14)
- Commercial researchers (12)
- Funding agencies, policy-makers and regulators (5)
- Healthcare professionals (29)
- Patients with a neurodegenerative condition or their carers (55)
- General public or other (4)

Note that respondents are in most cases allocated to the stakeholder category in which they were received.

Annex 3 – Agreement ratings

This annex explains the basis for our comments on the level of stakeholder agreement that we have presented in the main body of this report. The data in the bar charts and tables below detail the degree of agreement to statements for sections 1-8 of the survey. For each question, the rating is based on the combined total of responses across all stakeholder categories.

The following legend applies to each graph:



In the bar charts, statements are listed along the horizontal axis in their rank priority order (as per the table presented at the beginning of each section in the main report) with the number of respondents selecting each rating indicated on the bar for each. In the tables, the percentage of respondents 'agreeing' (combined 'strongly agree' and 'agree'), 'neutral' or 'disagreeing' (combined 'strongly disagree' and 'disagree') with each statement is shown.

Section 1 - Education, training and collaboration: numbers of responses

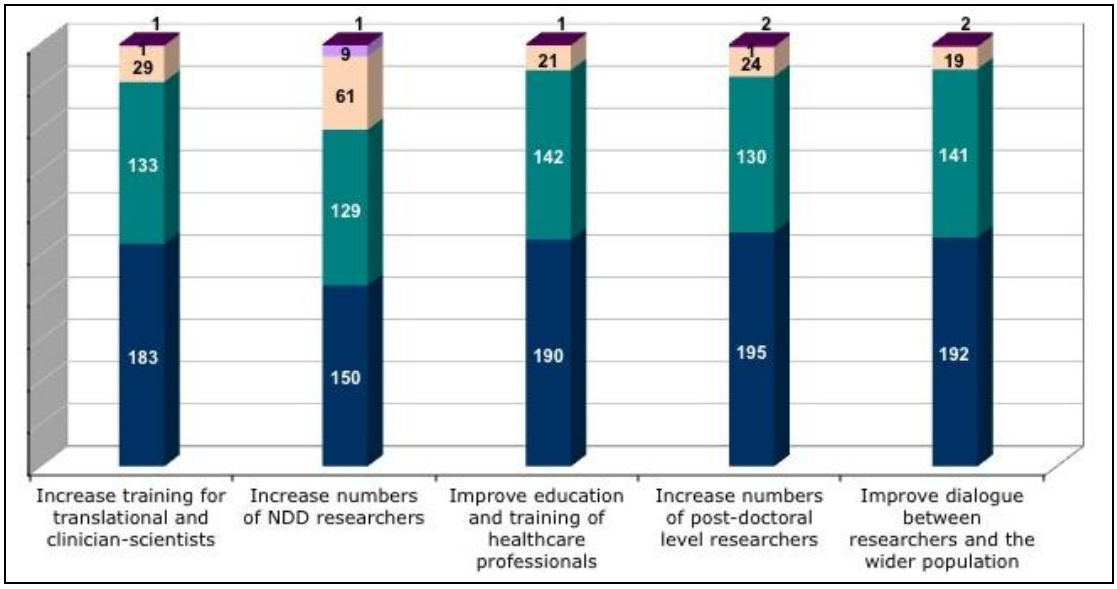


Table 1 – Education, training and collaboration: percentage responses			
Question	**Agree (%)**	**Neutral (%)**	**Disagree (%)**
Increase training for translational- and clinician-scientists	91.1	8.3	0.6
Increase numbers of NDD researchers	79.7	16.4	3.9
Improve education and training of healthcare professionals	93.8	5.9	0.3
Increase numbers of post-doctoral level researchers	92.3	6.8	0.9
Improve dialogue between researchers and the wider population	94.1	5.3	0.6

Section 2 - Healthcare and social care issues: numbers of responses

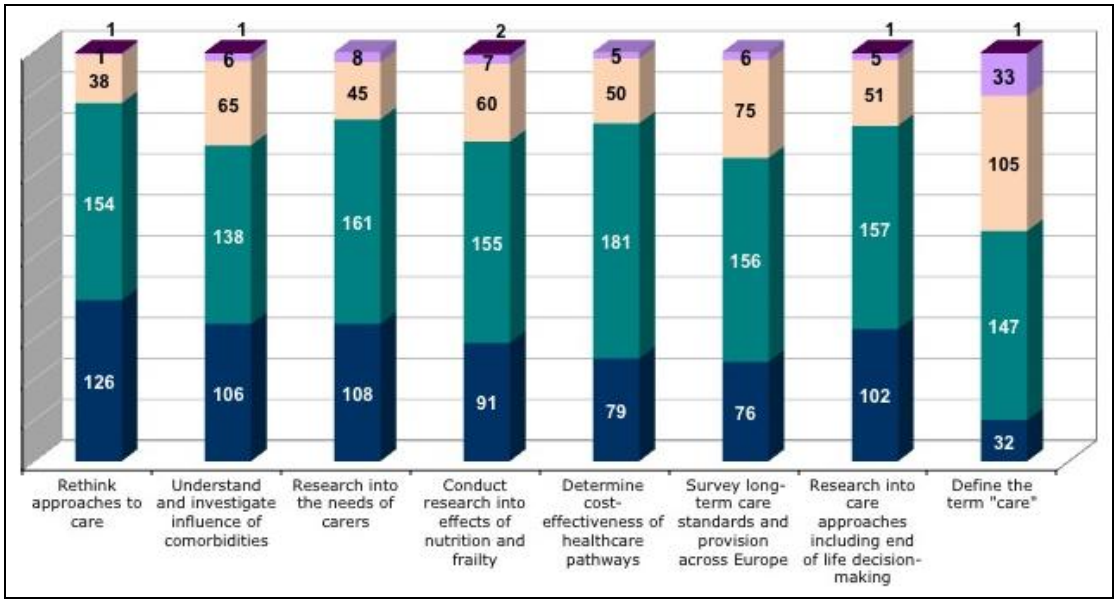


Table 2 – Healthcare and social care issues: percentage responses			
Question	**Agree (%)**	**Neutral (%)**	**Disagree (%)**
Rethink approaches to care	87.5	11.9	0.6
Understand and investigate influence of comorbidities	77.2	20.6	2.2
Research into the needs of carers	83.5	14.0	2.5
Conduct research into effects of nutrition and frailty	78.1	19.0	2.9
Determine cost-effectiveness of healthcare pathways	82.5	15.9	1.6
Survey long-term care standards and provision across Europe	74.1	24.0	1.9
Research into care approaches including end of life decision-making	82.0	16.1	1.9
Define the term ‘care’	56.3	33.0	10.7

Section 3 - Prevention/treatment strategies and trials: numbers of responses

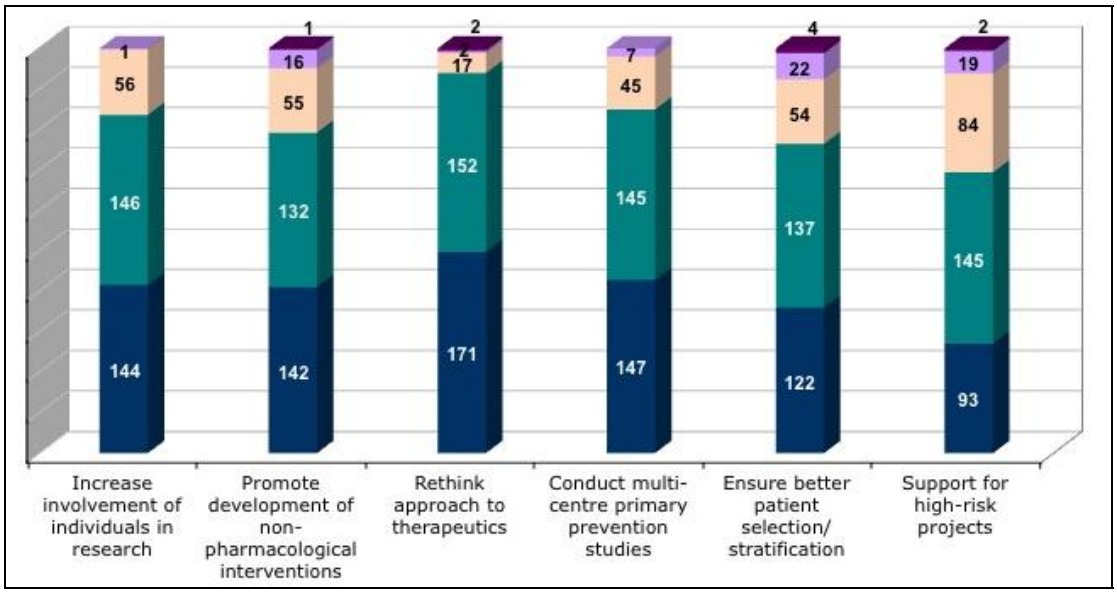


Table 3 – Prevention / treatment strategies and trials: percentage responses			
Question	**Agree (%)**	**Neutral (%)**	**Disagree (%)**
Increase involvement of individuals in research	83.6	16.1	0.3
Promote development of non-pharmacological interventions	79.2	15.9	4.9
Rethink approach to therapeutics	93.9	4.9	1.2
Conduct multi-centre primary prevention studies	84.9	13.1	2.0
Ensure better patient selection/stratification	76.4	15.9	7.7
Support for high-risk projects	69.4	24.5	6.1

Section 4 - Disease cause, mechanisms and models: numbers of responses

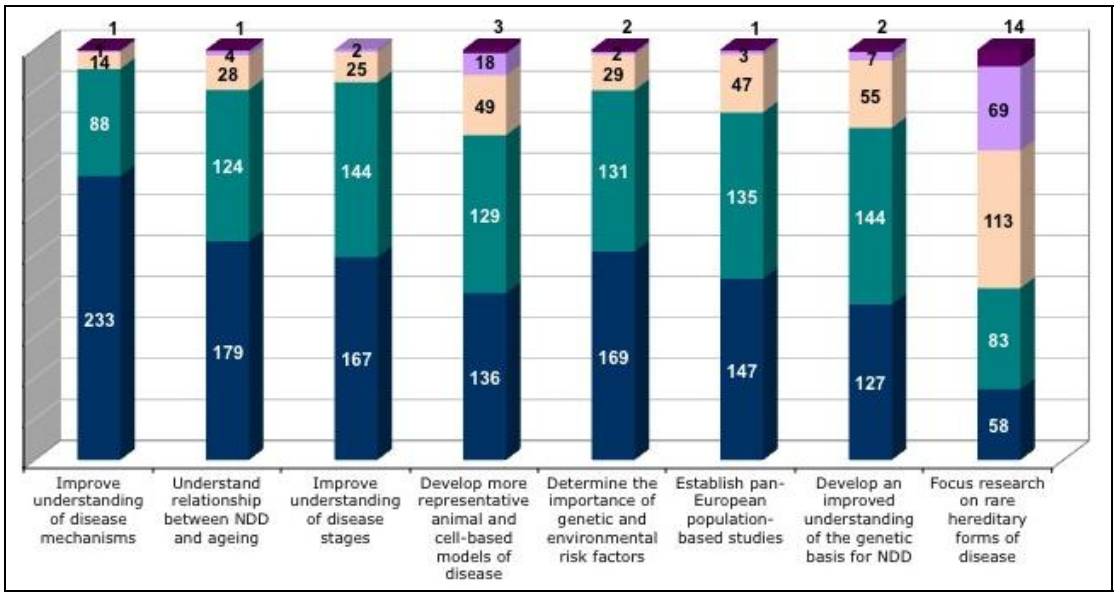


Table 4 – Disease cause, mechanisms and models: percentage responses			
Question	**Agree (%)**	**Neutral (%)**	**Disagree (%)**
Improve understanding of disease mechanisms	95.3	4.1	0.6
Understand relationship between NDD and ageing	90.2	8.3	1.5
Improve understanding of disease stages	92.0	7.4	0.6
Develop more representative animal and cell-based models of disease	79.1	14.6	6.3
Determine the importance of genetic and environmental risk factors	90.1	8.7	1.2
Establish pan-European population-based studies including year-on-year (longitudinal) studies in high risk groups	84.7	14.1	1.2
Develop an improved understanding of the genetic basis for NDD	80.9	16.4	2.7
Focus research on rare hereditary forms of disease	41.8	33.6	24.6

Section 5 - Diagnosis, disease definitions and outcome measures: numbers of responses

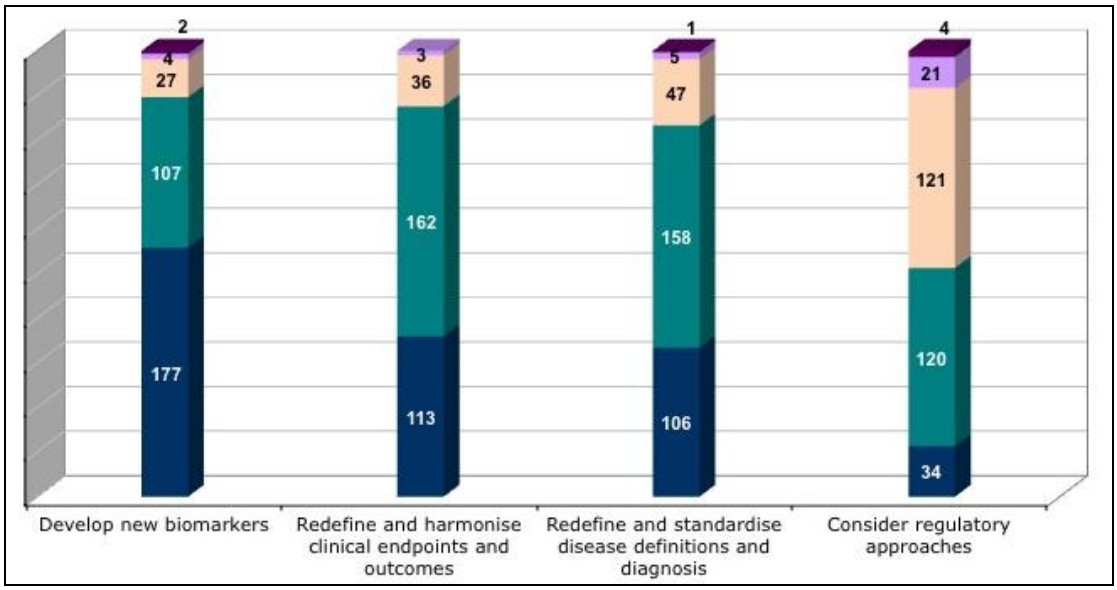


Table 5 – Diagnosis, disease definitions and outcome measures: percentage responses			
Question	**Agree (%)**	**Neutral (%)**	**Disagree (%)**
Develop new biomarkers	89.6	8.5	1.9
Redefine and harmonise clinical endpoints and outcomes	87.6	11.4	1.0
Redefine and standardise disease definitions and diagnosis	83.3	14.8	1.9
Consider regulatory approaches	51.3	40.4	8.3

Section 6 - Data, registries, repositories and centres: numbers of responses

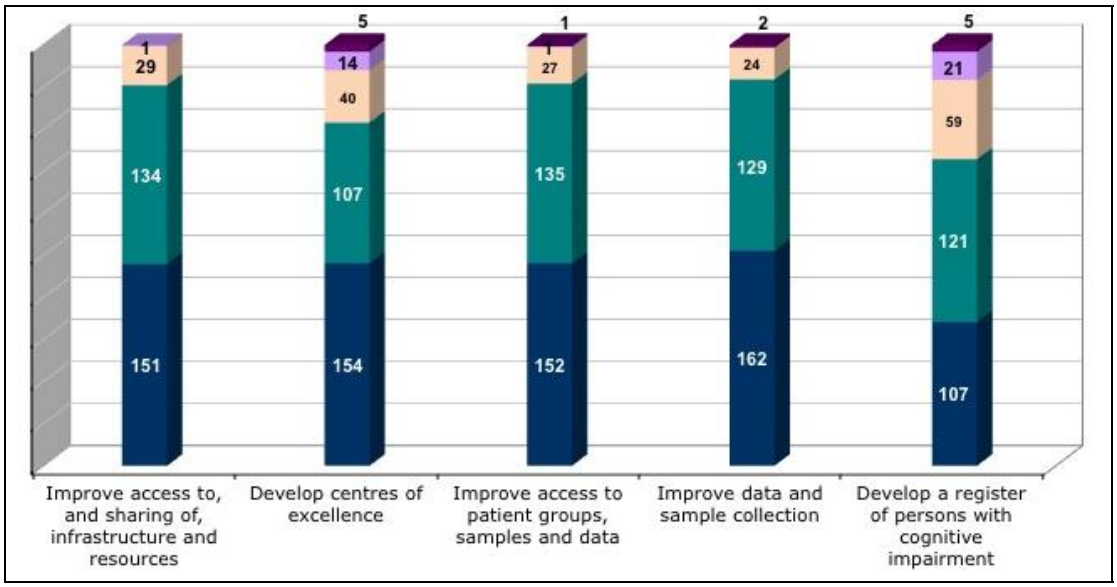


Table 6 - Data, registries, repositories and centres: percentage responses			
Question	**Agree (%)**	**Neutral (%)**	**Disagree (%)**
Improve access to, and sharing of, infrastructure and resources	90.5	9.2	0.3
Develop centres of excellence	81.6	12.5	5.9
Improve access to patient groups, samples and data	90.8	8.6	0.6
Improve data and sample collection	91.8	7.6	0.6
Develop a register of persons with cognitive impairment	72.8	18.9	8.3

Section 7 - Policy, regulation and legislation: numbers of responses

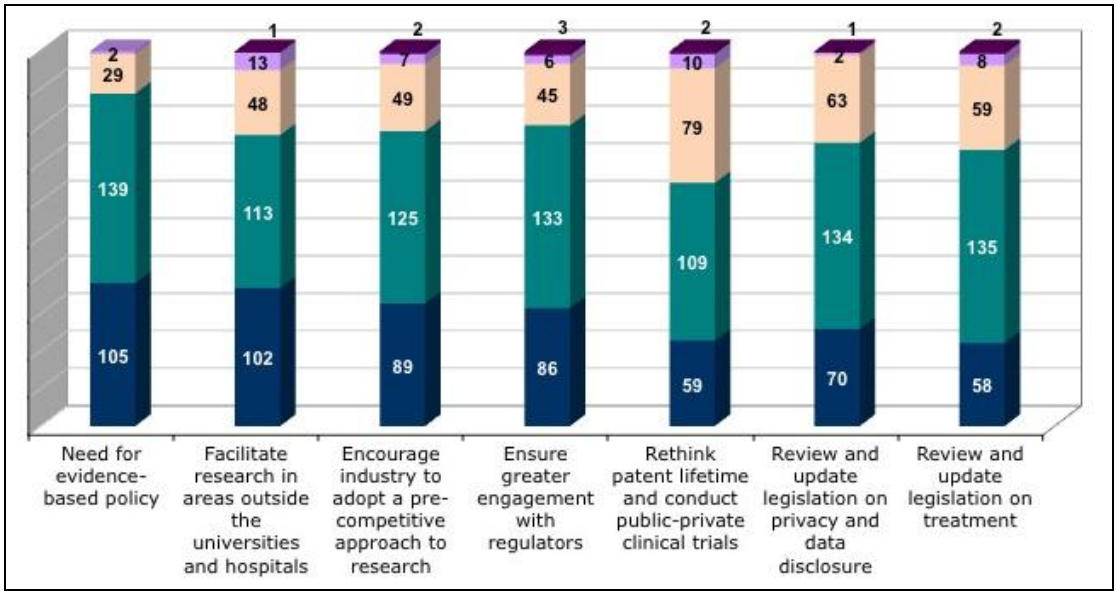


Table 7 - Policy, regulation and legislation: percentage responses			
Question	**Agree (%)**	**Neutral (%)**	**Disagree (%)**
Need for evidence-based policy	88.7	10.6	0.7
Facilitate research in areas outside university and hospital sectors such as care homes and within the wider community	77.6	17.3	5.1
Encourage industry to adopt pre-competitive approach	78.7	18.0	3.3
Ensure greater engagement with regulators	80.2	16.5	3.3
Rethink patent lifetime and conduct public-private clinical trials	64.9	30.5	4.6
Review and update legislation on privacy and data disclosure	75.6	23.3	1.1
Review and update legislation on treatment	73.7	22.5	3.8

Section 8 - Funding and funding mechanisms: numbers of responses

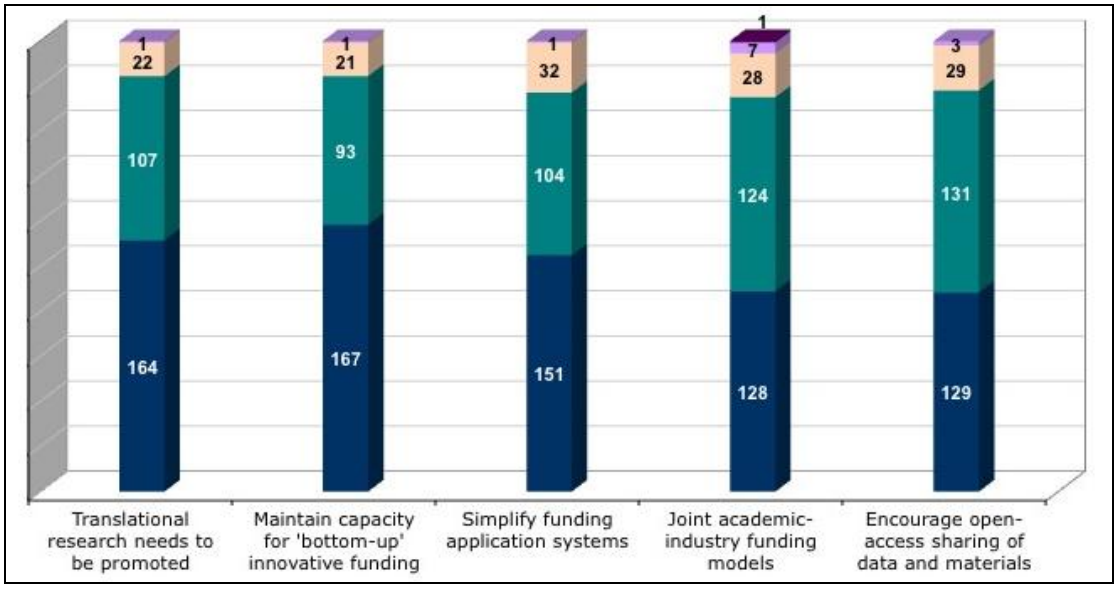


Table 8 - Funding and funding mechanisms: percentage responses			
Question	**Agree (%)**	**Neutral (%)**	**Disagree (%)**
Translational research needs to be promoted	92.2	7.5	0.3
Maintain capacity for 'bottom-up' innovative funding	92.2	7.4	0.4
Simplify funding application systems	88.5	11.2	0.3
Joint academic-industry funding models	87.5	9.7	2.8
Encourage open-access sharing of data and materials	89.0	10	1.0