Brain, Mind, and Pain (BMP) Patient-Centred Innovation Grant

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BMP GRANT Patient Centred Innovation

BACKGROUND

Pain Alliance Europe's activities on advocacy for chronic pain have created strong relationships with peer organisations who actively sustain the cause of the chronic pain patients. Starting with the objectives defined in the development of the MEPs' Interest Group on Brain, Mind, and Pain in the European Parliament, the idea was born to promote further the interests of the patients by creating a grant which addresses their needs. This idea found an echo in the importance that industry partner Grünenthal gives to the assessment of needs and challenges related to care and to patient-centricity.

OBJECTIVES

The Brain, Mind, and Pain (BMP) Patient-Centred Innovation Grant was created - on an initiative of Pain Alliance Europe supported by Grünenthal

- to identify, stimulate and encourage patient-centric and scientifically robust innovation in the area of chronic pain and neurological disorders
- to stimulate research and access to innovative treatments
- to promote prevention and self-management approaches
- to decrease stigma, and
- to work together to improve quality of life for people living with these disabling conditions.

The Brain, Mind, and Pain Patient-Centred Innovation Grant aims to create an environment where patient centricity is the basis for future initiatives. This will implicitly contribute towards creating a sense of innovation, with direct impact on patients' needs, and towards increasing awareness of chronic pain conditions and neurological disorders.

DESCRIPTION

Organised on a biennial basis, BMP Grant focuses its approach on all levels of patient requirements. The BMP Grant project is created by the patients, for the benefit of the patients, it is led and conducted by patients. This patient-driven, patient-centred approach ensures that the solutions proposed by the winning projects are tailored closely to the needs of the patients living with chronic pain or with a neurological pathology. With this in mind, the initiators of the grant made patient representation at every level one of the main criteria of the application process and methodology recommendations.

Besides patient-centric characteristics, the submitted projects must fulfil specific requirements such as being innovative, being scientifically robust, focusing on European countries and being conducted in Europe and also being flexible enough to be adaptable to other countries and/or communities. But most of all, the projects' outcome target will be the improvement of the quality of life for patients with neurological and/or chronic pain disorders.

The BMP Grant encourages partnerships and the multi-stakeholder approach. In order to apply for the grant, it is compulsory for all candidate projects to involve patient organisations in their development.

The BMP Grant is managed by a Steering Committee and a Secretariat. The Steering Committee reunites partner organisations, representatives of healthcare professionals, peer patient organisations and of the scientific community and is led by patients and backed up by industry support. This committee makes sure that each edition of the grant addresses one of the work streams established by the initial objectives of the grant project, and that scientific approach and methodologies are used in the management of the grant and in the evaluations of the candidate projects. The Brain, Mind and Pain Grant jury members – patients themselves - have evaluated the sustainability and the long-term impact of the solutions proposed by applicants and appreciate the overall remarkable quality of the projects.

OUTCOMES

The 2017-2018 edition of the Grant awarded three different projects. The outcome of these is expected by May 2020:

1. Master Your Pain - Improving access to personalised psychosocial treatment of pain due to rheumatic diseases
2. Reduce sensorial pain in Autism Spectrum Disorder - Elaboration a tool allowing paients with ASD to reduce limitations caused by sensory and perceptions difficulties
3. MyBrainNet provides a digital diary for patients to keep track of their daily activities in relation to the disease, a programme destined to improve patient-physician communication by providing accurate and unbiased information about their disease.

Figure 1: BMP Grant focuses on chronic pain and neurological disorders

Figure 2: BMP Grant 2018 in figures

Figure 3: BMP Grant 2018 Winners

ACKNOWLEDGEMENTS

Pain Alliance Europe acknowledges the important financial and logistics support provided by the Grünenthal GmbH and thanks the project partners European Pain Federation EFIC, European Federation of Neurological Associations EFNA and European Academy of Neurology EAN for their contribution and steering support throughout the development of the project.

Burden for Parents of Patients With Schizophrenia:

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A Nationwide Comparative Study of Parents of Offspring With Rheumatoid Arthritis, Multiple Sclerosis, Epilepsy, and Healthy Controls

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BACKGROUND

- Schizophrenia is a **severe psychiatric disorder. Between 8 and 9 patients out of 10** are not able to support themselves economically. The disease also **affects family members**, in particular **the parents**.
- Schizophrenia is known to be a considerable degree **heritable**. The parents themselves might suffer from the same disorder. The burden of parents of patients with schizophrenia may also **intensify with the severity** of the patients' disorder.

OBJECTIVES

- **To assess the risk of health care resource use, adverse health status, and work productivity loss in parents of patients with schizophrenia compared with parents of patients with multiple sclerosis (MS), rheumatoid arthritis (RA), epilepsy, and healthy controls.**
- **To evaluate these outcome measures while taking the disease severity of schizophrenia into account.**

DESCRIPTION

Study design and data sources

Population-based cohort study based on the Insurance-Medicine-All-Sweden study with data derived from **Swedish nationwide registers**.

Registers used:

- Multigeneration register ➜ To link data of the patients and the parents
- LISA register ➜ Demographic characteristics
- Swedish National Patient Register ➜ Diagnoses, in- or specialized outpatient care
- Prescribed drug register
- Cause of death register
- MiDAS register ➜ Data from the National Social Insurance Agency (sickness absence, disability pension)

Inclusion criteria

Patients with schizophrenia	Swedish residents, aged 16 - 45 at year 2006 A diagnosis of schizophrenia (F20 or F25) from July 1, 2006 to December 31, 2013 At least one identifiable parent with information on gender and age
Parents of patients with schizophrenia	Valid cohort entry date for the child and be leaving in Sweden at cohort entry

Outcome measures

Health care
- Number of in- and specialized outpatient visits due to psychiatric and somatic disorders

Health status
- Mortality
- Substance abuse
- Medication use for somatic and psychiatric disorders

Work productivity
- Sickness absence & unemployment
- Annual income, disability pension & social welfare benefit

OUTCOMES/END RESULTS

- **Parents of patients with schizophrenia** have considerably **higher rates of psychiatric health care**, mainly due to anxiety and affective disorders, and social welfare dependence than parents of patients with RA, MS, epilepsy, or healthy controls.
- The burden measured as psychiatric health care use worsens with increasing severity of the disease of the offspring with schizophrenia and over time. Such health care use increased continuously from 4 years before diagnosis of the offspring up to 7 years.

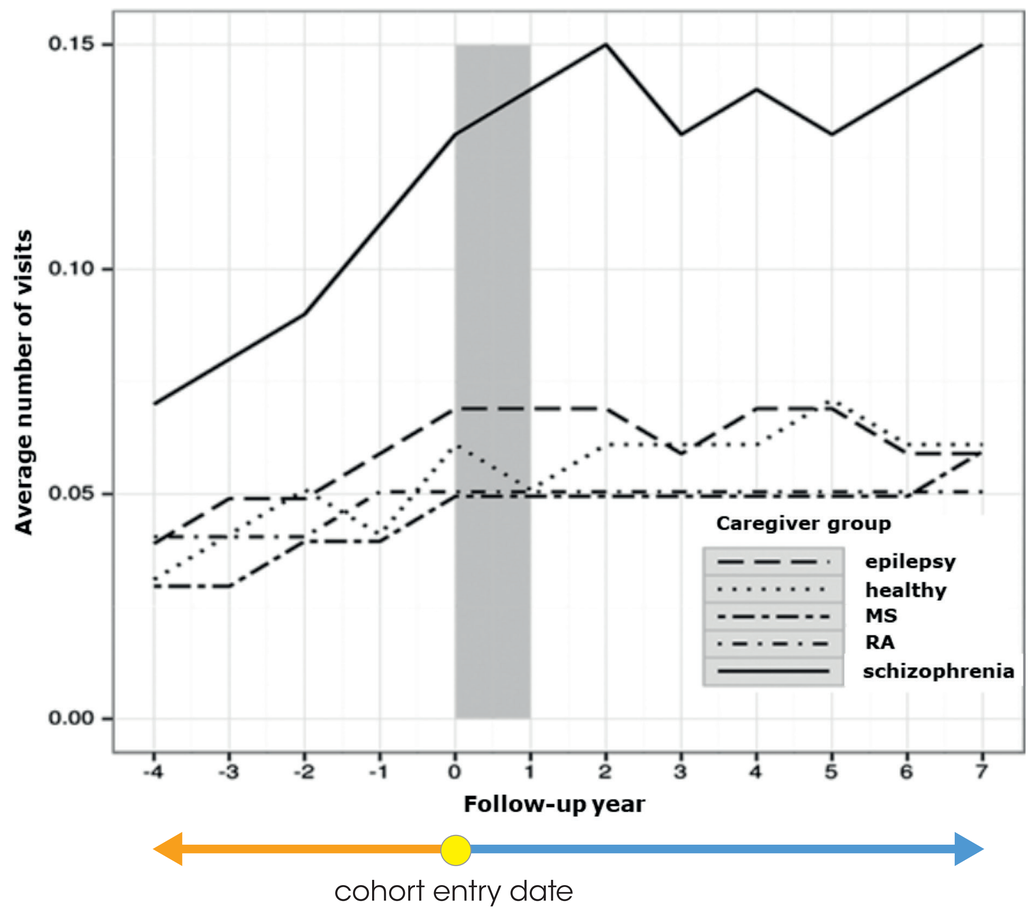
Strengths

- **1st study** based on nationwide registers with **a long observation period**
- Annual and detailed **quality data** for all individuals: parents as well as patients
- Up to **5 groups for comparison** amongst parents of patients with chronic diseases
- **Thorough analysis** on many outcomes

Limits

- The **role of genetic factors** or the environment during upbringing could not be elucidated
- The **care provided by parents** to their offspring could not be measured

Figure 1: Number of specialized psychiatric health care visits during the observation period



Note: observation period from –4 to +7 years after diagnosis of the offspring/cohort entry date, t0. c

	Psychiatric specialized health care use (RR and 95% CI)	Somatic specialized health care use (RR and 95% CI)	Medication use (Odds ratio and 95% CI)
Parents of patients with schizophrenia	-	-	-
Compared with parents of patients with MS	**1.80 (1.73–1.88)**	**0.96 (0.94–0.98)**	**0.84 (0.73–0.97)**
Compared with parents of patients with RA	**1.76 (1.70–1.83)**	**0.93 (0.91–0.95)**	**0.66 (0.58–0.75)**
Compared with parents of patients with epilepsy	**1.71 (1.66–1.75)**	**0.97 (0.96–0.99)**	**0.67 (0.61–0.73)**
Compared with parents of healthy controls	**1.63 (1.58–1.68)**	1.00 (0.98–1.02)	**0.88 (0.79–0.98)**

Table 1: Health care and medication use

	Sickness absence (Odds ratio and 95% CI)	Unemployment (Odds ratio and 95% CI)	Social welfare benefit (Odds ratio and 95% CI)
Parents of patients with schizophrenia	-	-	-
Compared with parents of patients with MS	**0.57 (0.39–0.82)**	1.03 (0.54–1.97)	**2.69 (1.20–6.02)**
Compared with parents of patients with RA	**1.15 (1.15–1.16)**	1.02 (0.52–2.02)	**2.74 (1.30–5.74)**
Compared with parents of patients with epilepsy	**0.68 (0.67–0.68)**	1.59 (0.99–2.55)	1.20 (0.82–1.76)
Compared with parents of healthy controls	**1.62 (1.16–2.26)**	**1.77 (1.06–2.96)**	**2.30 (1.31–4.05)**

Table 2: Work productivity

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CDNF – A Neuroregenerative Therapeutic to Address Motor and Non-motor Symptoms in Parkinson's disease

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BACKGROUND

There is a significant unmet medical need in neurodegenerative diseases, such as Parkinson's disease, to develop disease-modifying therapies. Cerebral Dopamine Neurotrophic Factor (CDNF) is a member of a novel family of unconventional neurotrophic factors. CDNF promotes survival and functionality of midbrain dopaminergic neurons and improves both motor and non-motor symptoms in several animal models of Parkinson's disease (PD). A novel therapy for PD is currently being developed based on intracerebral infusion of recombinant human CDNF protein (rhCDNF). Herantis Pharma Plc, a spin-off company of University of Helsinki, is developing CDNF in close collaboration with a network of academic and industrial partners. A cutting-edge approach based on leading science to develop a disease-modifying therapy for PD has been made possible by the agility and risk-taking ability of a small biotech company.

OBJECTIVES

- To conduct a first-in-human study with a novel disease-modifying therapeutic addressing both motor and non-motor symptoms of Parkinson's disease.
- To translate an academic discovery from the laboratory to the clinic.

DESCRIPTION

CDNF was discovered by a team led by prof. Mart Saarma at the University of Helsinki (Lindholm et al, 2007; Lindahl et al, 2017). In 2008, the acedemic scientists founded a university spin-off company with the aim of commercial development of CDNF and some other neuroscience-based assets. Herantis Pharma took over the preclinical and clinical development of CDNF for Parkinson's disease.

CDNF has unique properties and is both structurally and mechanistically distinct from any other known growth factor-like molecule (**Figure 1**). It targets ER stress-related cellular dysfunction, which lies at the core of pathogenesis of Parkinsons' disease and many other chronic degenerative diseases. Non-human primate study showed that CDNF can improve both motor and non-motor symptoms of Parkinson's disease, and functionally restore dopamine neurons and their axons in the nigrostriatal pathway. As growth factors are small proteins, they have to be delivered directly to the target tissue. Renishaw Plc, a British engineering company, together with the University of Bristol neurosurgeons had developed an optimized drug delivery system for intermittent intracranial delivery of biological drugs (Lewis et al, 2016). The system, consisting of 4 intraputamenal catheters, a transcutaneous skull-attached titanium port and the connecting tubing (**Figure 2**), has been successfully used in a previous 40-patient phase IIa clinical study at the University of Bristol (T.G. Study group, 2017).

A consortium was established by Herantis Pharma to design and conduct a Phase I-II clinical study with intracranial CDNF (**Figure 3**). The consortium consists of a number of public and private organizations in Finland, Sweden, Denmark and United Kingdom (Figure 3). The first-in-human clinical study was initiated in Stockholm in October 2017, with a goal to enroll 18 patients at three sites (Stockholm, Lund and Helsinki). The drug delivery device and the dosing scheme of the clinical study are shown in Figure 2. By November 2018, 10 patients have been recruited to the study. The topline results of this randomized Phase I-II clinical study are estimated in late 2019.

OUTCOMES/END RESULTS

- A dynamic clinical study consortium was built to conduct a Phase I-II randomized, placebo-controlled multicenter clinical study. A Horizon 2020 program funding was granted to support the **TreatER** program (www.treater.eu; Grant agreement No 73238). The clinical study was initiated in October 2017.
- The clinical study is currently on-going and no clinical data is available at this point.
- The public-private partnership has enabled development of a challenging but highly promising novel therapeutic for Parkinson's disease. Large pharmaceutical companies are too risk averse for early development of this type of novel approaches. On the other hand, public organizations such as universities do not have the capabilities or interest in this type of risk-taking.
- All stakeholders are thrilled with the opportunity to work collaboratively on a novel therapeutic with true ground-breaking potential.

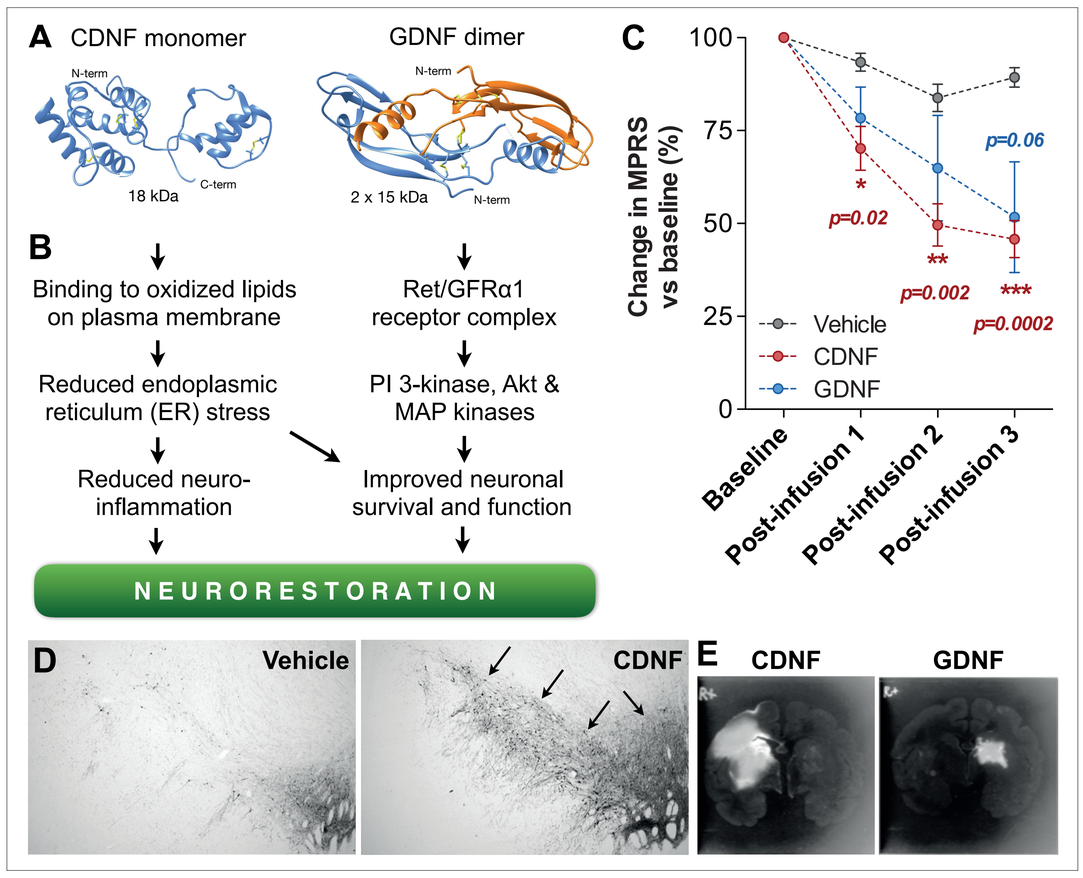

Figure 1: (A-B) Molecular structure and mechanism of action differentiate CDNF and GDNF. (C) Improvement of gross motor function by intra putamenal CDNF infusion in Rhesus macaque MPTP model of Parkinson's disease. (D) Regeneration of TH+ dopamine neurons in the substantia nigra of CDNF-infused macaques. (E) Volume of distribution difference of intra putamenal CDNF and GDNF infusions in Rhesus macaque brain.

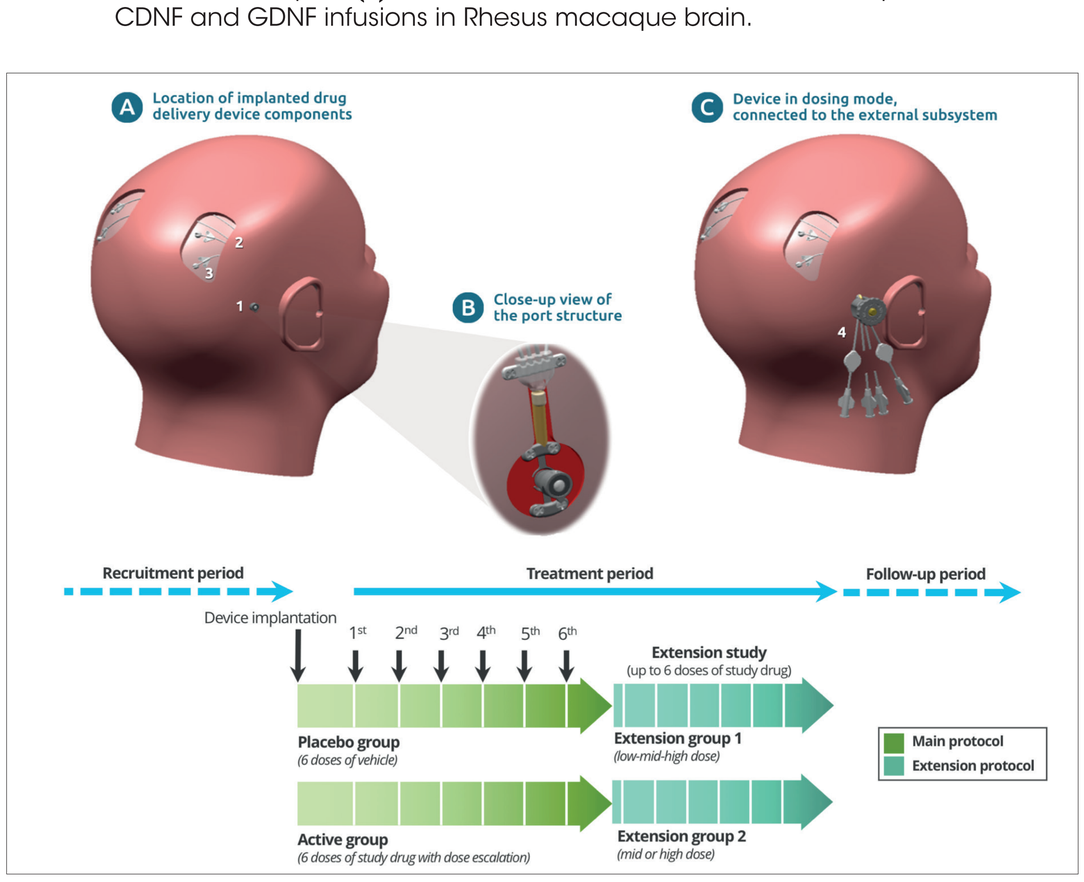

Figure 2: The Drug Delivery System (Renishaw Plc) (top panel) and the CDNF/placebo dosing scheme (bottom panel) of the Phase I-II clinical study.

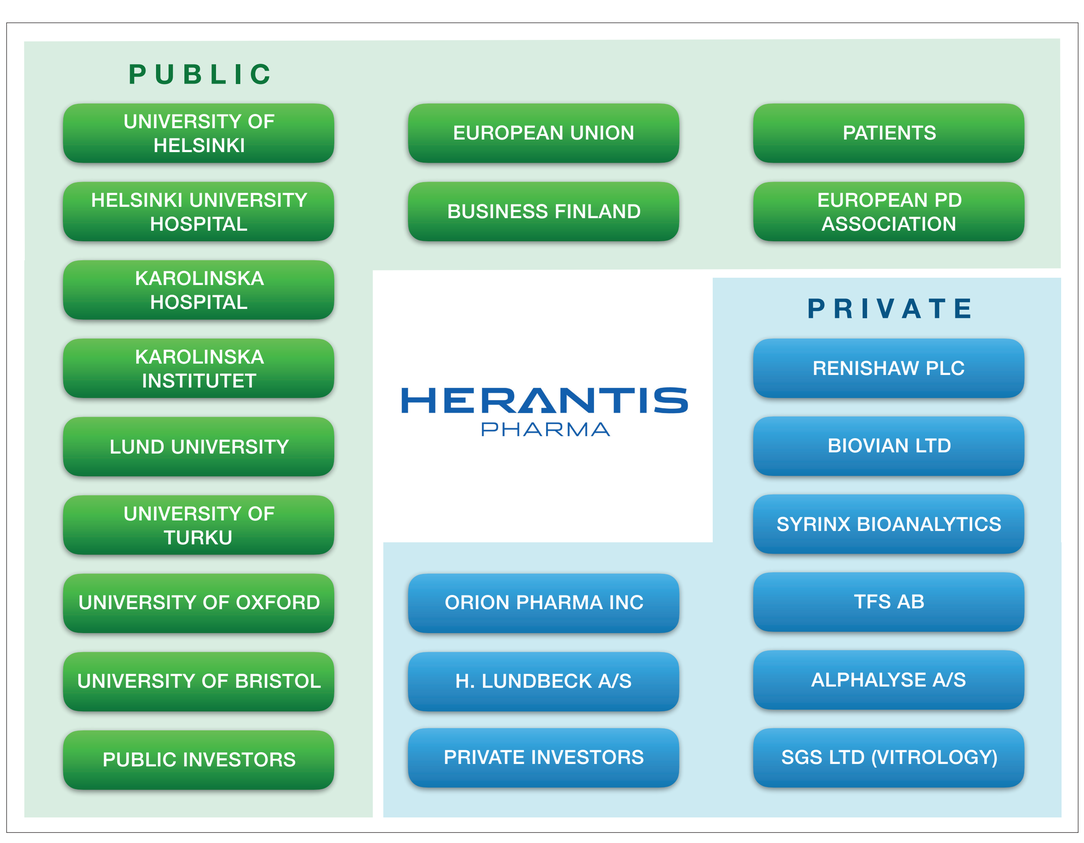

Figure 3: The public-private partner network involved in early clinical development of CDNF.

ACKNOWLEDGEMENTS

- Lewis O, Woolley M, Johnson D, Rosser A, Barua NU, Bienemann AS, Gill SS, Evans S. Chronic, intermittent convection-enhanced delivery devices. J. Neurosci. Meth. 259: 47-56, 2016.
- Lindahl M, Saarma M, Lindholm P. Unconventional neurotrophic factors CDNF and MANF: Structure, physiological functions and therapeutic potential. Neurobiol. Dis. 97: 90-102, 2017.
- Lindholm P, Voutilainen MH, Laurén J, Peränen J et al. Novel neurotrophic factor CDNF protects and rescues midbrain dopamine neurons in vivo. Nature 448: 73-7, 2007.
- T.G. Study Group (Bristol, United Kingdom). Randomized Parkinson's trial of GDNF administered via intermittent intraputamenal convection-enhanced delivery. Movement Disorder Society, 21st International Congress, Poster 1420, June 8, 2017.

HERANTIS PHARMA
TreatER
RENISHAW apply innovation™
EPDA European Parkinson's Disease Association
Horizon 2020 European Union funding for Research & Innovation

Embracing Carers™

Living with Multiple Sclerosis: The Carer's Perspective

Vanessa Pott – Merck KGaA, Darmstadt, Germany

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embracing carers

BACKGROUND

Embracing Carers™ is a global Merck initiative that aims to elevate the often-overlooked needs of carers across all therapeutic areas. Advised by eight independent carer organizations from around the world, Embracing Carers™ is a multi-year initiative to help provide better support and recognition of carers.

Building on this collaboration, Merck partnered with the International Alliance of Carer Organizations (IACO) and Eurocarers to explore how the relapsing and episodic nature of multiple sclerosis (MS) uniquely impacts family carers in MS. The collaboration resulted in the development of the 'Living with Multiple Sclerosis: The Carer's Perspective' report that examines the experiences of 1,050 MS carers across seven countries (US, Canada, UK, France, Germany, Italy and Spain).

OBJECTIVES

1. To better understand the situation of family carers in MS and their unique challenges
2. To explore the impact of caring on their own physical, emotional and financial health
3. To identify where and how they seek support and guidance.

DESCRIPTION

The findings of the report are based on a global survey of 1,050 MS carers, conducted in seven countries (US, Canada, UK, France, Germany, Italy and Spain), during June and July 2018, which explored the challenges and impact of being a carer for someone living with MS.

The survey was developed by Merck in collaboration with IACO and Eurocarers. To ensure its relevance, MS patients, carers and patient organizations were consulted throughout the process to help identify priority areas of unmet needs and to provide their feedback on the suggested questions. The survey was executed by a market research agency with access to MS carers across seven countries. In addition to the survey, the report also includes a number of personal testimonials recorded during qualitative interviews with MS carers.

Key findings from the survey include:

- Almost half (48%) of those surveyed became MS carers when they were below the age of 35, and nearly one in three had been caring for somebody for 11 years or more
- While 51% of carers are looking after a partner with MS, almost a third are looking after either a child or parent with the condition
- 43% and 28% of carers surveyed reported an impact on their emotional/mental health and physical health respectively
- 44% of the carers surveyed reported that their caring responsibilities had negatively impacted on their future plans and life goals
- 34% said being an MS carer impacted their financial situation. More than a third (36%) stated they had to take time off work, and as a result, 84% of those carers reported their work and career being impacted
- Only 15% of carers surveyed connected with other carers or patient organizations to help cope with the challenges of their role
- The majority (82%) of MS carers acknowledged the need for support, with this requirement greater at certain times due to the unpredictable nature of MS and the unique way in which it affects individuals.

OUTCOMES/END RESULTS

The final report was launched during the European Committee for Treatment and Research in Multiple Sclerosis Congress (ECTRIMS) 2018 in Berlin, Germany, at a dedicated event attended by more than 150 patients, patient advocates, carers, healthcare professionals, and media representatives.

Feedback from patient and carer organizations was overwhelmingly positive. Requests for translated versions of the report demonstrate a genuine interest to engage with MS and carer organizations at the national level and to support the report recommendations.

The intention is that the data included in the report provides a starting point for awareness and advocacy programs to better support MS carers through tangible support and resources, as well as being a catalyst to continue the fruitful collaboration between Merck, IACO and Eurocarers.

Figure 1:"Living with MS: The Carer's Perspective" report cover

"MS can be a devastating disease for both patients and carers, with the responsibilities assumed by carers over an extended length of time and intensifying as the disease progresses. Carers can experience a profound impact on their physical and emotional health, finances, and employment." **said [Nadine Henningsen, Board Chair, IACO]**. "Not surprisingly, the survey results reinforced the large number of young people who are becoming carers – often in a formative time of their life."

ACKNOWLEDGEMENTS

Launched in 2017, Embracing Carers™ is a global initiative led by Merck in collaboration with leading carer organizations around the world to increase awareness and discussion about the often-overlooked needs of carers.

The Embracing Carers global advisors include Caregiver Action Network, Carers Australia, Carers Canada, Carers UK, Carers Worldwide, Eurocarers, National Alliance for Caregiving, International Alliance of Carer Organizations (IACO) and Shanghai Roots & Shoots, China.

MERCK
IACO International Alliance of Carer Organizations
Building a global understanding and respect for the vital role of carers
EUROCARERS
EUROPEAN ASSOCIATION WORKING FOR CARERS

Lundbeck's medical education platforms: Lundbeck Institute Campus and Progress in Mind Resource Center

Audrey Dufour, Brian Odlaug, Danilo Pagano and Christoph von der Goltz

All authors employed by H. Lundbeck A/S

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BACKGROUND & OBJECTIVES

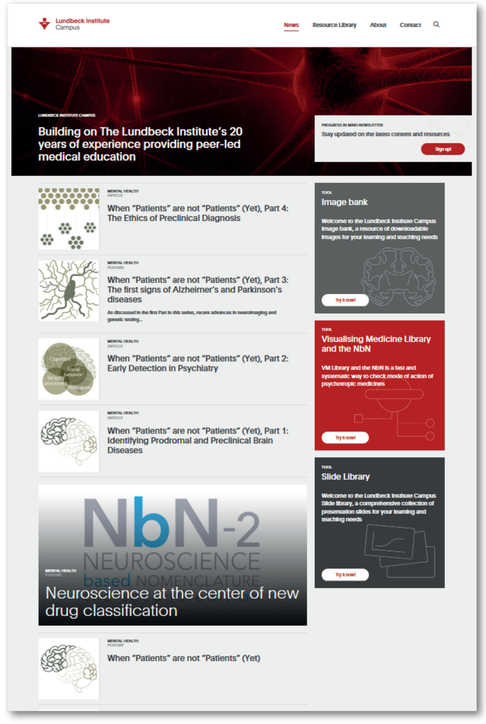
Lundbeck has 2 platforms, the Lundbeck Institute Campus and Progress in Mind Resource Center, which are fully dedicated to medical education for Doctors around Schizophrenia, Depression, Alzheimer's and Parkinson's disease. Its mission is to raise disease awareness, but also to engage with and support Doctors working toward the international agenda and goals for better and broader acceptance of patients and their diagnoses – reducing stigma and helping increase opportunities for better patient care and treatment.

The majority of Doctors are digital natives today so leveraging a multichannel communication strategy in combination with face-to-face interaction is essential.

4 Educational Pillars for Lundbeck's platforms:

- Support Doctors' understanding of the etiology of the disease to aide in the diagnosis of patients suffering from Depression, Schizophrenia, Alzheimer's and Parkinson's Disease
- Increase awareness and improve disease management
- Provide clear, evidence-based medical education supporting early and long-term management of Lundbeck's disease areas without treatment specific guidance
- Health economics and real world evidence data to support Doctors in their understanding of the epidemiology and burden of disease as a means of having a positive impact on their patients

Two platforms, two types of content, same mission



DESCRIPTION

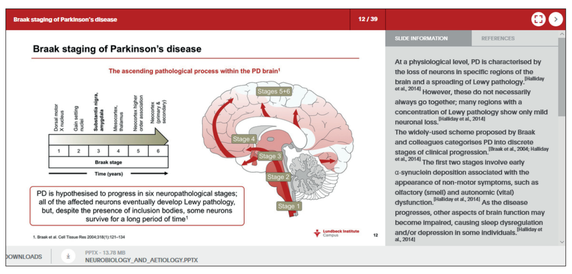
Lundbeck Institute Campus

Platform

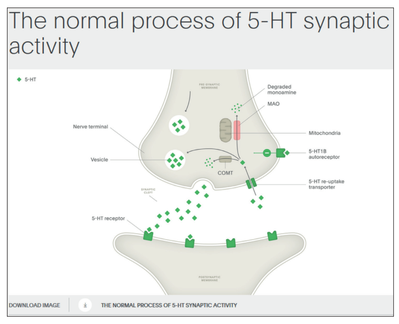
Building on The Lundbeck Institute's 20 years of experience providing peer-led medical education, the Lundbeck Institute Campus offers Doctors the opportunity to engage in a diverse array of educational materials, presented in a variety of formats and detail, in order to provide the busy Doctors with up-to-date scientific information on Lundbeck's disease areas.

Features · Slidedeck · Medicine · Video · Infographic · Image · Podcast · Newsletter

Examples of content:



Slides



Images

World Data

Editorial Board

Experts in Lundbeck's disease areas who support development, approve all Lundbeck Institute Campus content and aide in the ongoing mission of the Lundbeck Institute to increase knowledge surrounding psychiatric and neurological diseases globally.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Progress in Mind Resource Center

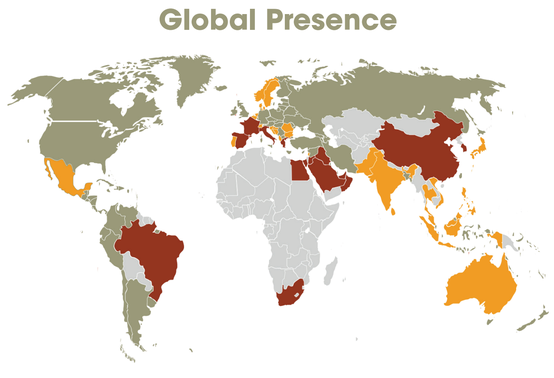
Platform

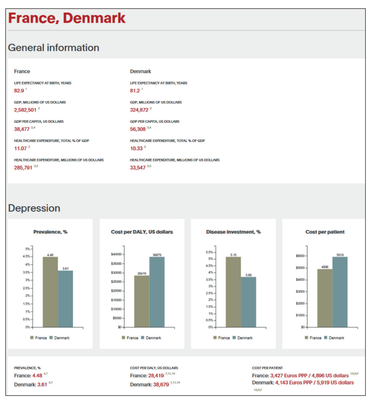
Progress in Mind Resource Center (PiM RC) supports Lundbeck's mission by ensuring reach of unmet needs in disease awareness and education.

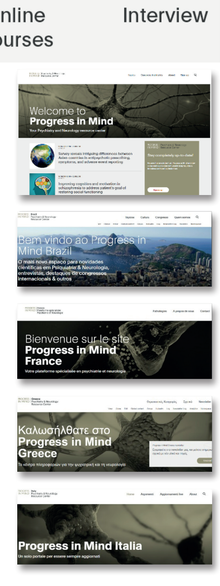
Increasing reach is key to our mission; a mission which is being accomplished through some critical steps:

- Content is generated for the global platform
- Countries select content that meets the Doctors needs
- Content is translated and goes through local compliance evaluation
- Content is shared locally to reach Doctors

Articles · Congress Highlights · Video · Infographic · Newsletter · Online Courses · Interview







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Lundbeck Institute Campus

PROGRESS IN MIND | Psychiatry & Neurology Resource Center

Mapping Brain Myelin

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KING'S College LONDON

BACKGROUND

- Myelin is responsible for fine-tuning the conduction speed of neurons
- De-/dysmyelination is involved in disorders including Multiple Sclerosis[1] and Schizophrenia[2]
- The unique properties of the myelin sheath generate numerous contrast pathways in MR
- Millimeter scale MR is insufficient to visualise neural microstructure directly (figure 1)
- MR can infer tissue properties from quantitative models of the contents of a voxel.

MYELIN WATER IMAGING AND DIFFUSION

- Standard MRI is tuned to detect signal from hydrogen protons in water molecules
- The myelin sheath consists of spiralling layers of proteins & lipids separated by water (figure 1)
- This Myelin Water Fraction (MWF) trapped within the sheath has different relaxation times and can be measured with methods such as Multi-Echo T2[1] or multi-component DESPOT[2].
- Diffusion Tensor Imaging (DTI) is often thought sensitive to myelination. We compared mcDESPOT and DTI using the pre-clinical Cuprizone model[3,4], and found that the MWF and Mean Diffusivity (MD) were sensitive to demyelination but that Fractional Anisotropy was not (figure 2).

HISTOLOGICAL VALIDATION

- We compared our MR results to gold-standard histopathology (figure 3)
- There is no single stain for "myelin", instead stains exist for the lipid component, e.g. Luxol Fast Blue (LFB) and the multiple different proteins, e.g. Myelin Basic Protein (MBP)
- Tissue deformation during processing makes alignment of MR and histopathology difficult
- Quantitative like-for-like comparison between MR and histology is hence complex

MAGNETIZATION TRANSFER IMAGING

- Non-water hydrogen is normally "MR-Invisible", but interacts with water through exchange – either transferring magnetization or saturated protons directly to the water pool
- Magnetization Transfer (MT) can be exploited to change MRI contrast, particularly in white matter because myelin contains large numbers of hydrogen atoms in proteins and lipids
- Although MT imaging has long been shown to be sensitive to myelination[5], it is not specific, as other substances in the brain including blood show the same effect
- Recently, an enhanced MT effect has been detailed that exploits quantum dipolar effects that are specific to the semi-crystalline structure of the myelin sheath[6]. In collaboration with General Electric Healthcare, we have incorporated this method into a silent MR sequence[7] (figure 4)
- This sequence is around 40dB quieter than standard cartesian sequences, and hence will be tolerated far better by patients

CONCLUSIONS

- There are multiple myelin-sensitive quantitative MR methods
- We have developed a new sequence that is both myelin-specific and silent that will enable scanning populations that would not normally tolerate a noisy MR scan, e.g. development in infants or degeneration in the elderly suffering from tinnitus

ACKNOWLEDGEMENTS

These studies represent independent research supported by the NIHR-Wellcome Trust King's Clinical Research Facility and the National Institute for Health Research (NIHR) Biomedical Research Centre (BRC) at South London and Maudsley NHS Foundation Trust and King's College London. EL is part-funded by the NIHR BRC Neuroimaging Theme. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care.

GE Healthcare

Funded and supported by NHS National Institute for Health Research

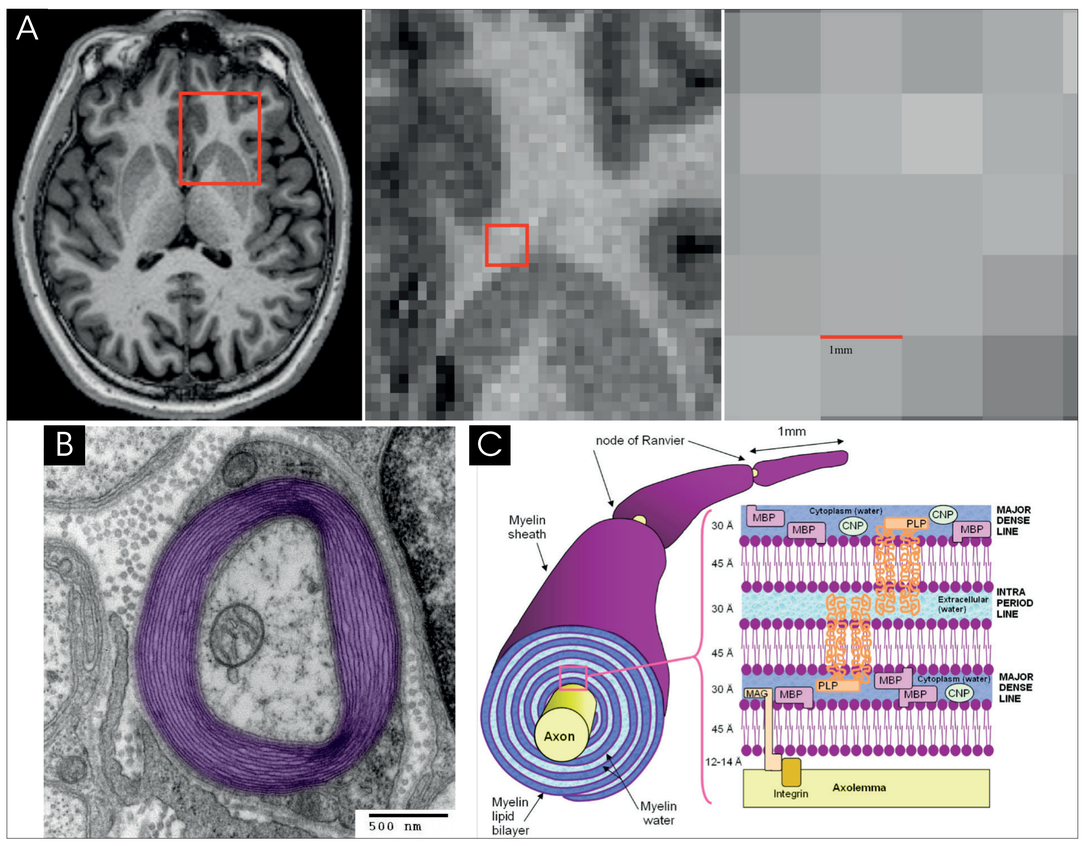

Figure 1: MRI has ever increasing resolution, but is orders of magnitude away from being able to resolve individual cells. (A) A 1mm isotropic T1-weighted image at increasing levels of zoom. (B) Transmission electron micrograph of a myelinated axon. The myelin layer (purple) surrounds the axon of a neurone. Generated and deposited into the public domain by the Electron Microscopy Facility at Trinity College. (C) A schematic of the myelin sheath, showing the highly periodic structure. From Laule et al[1]

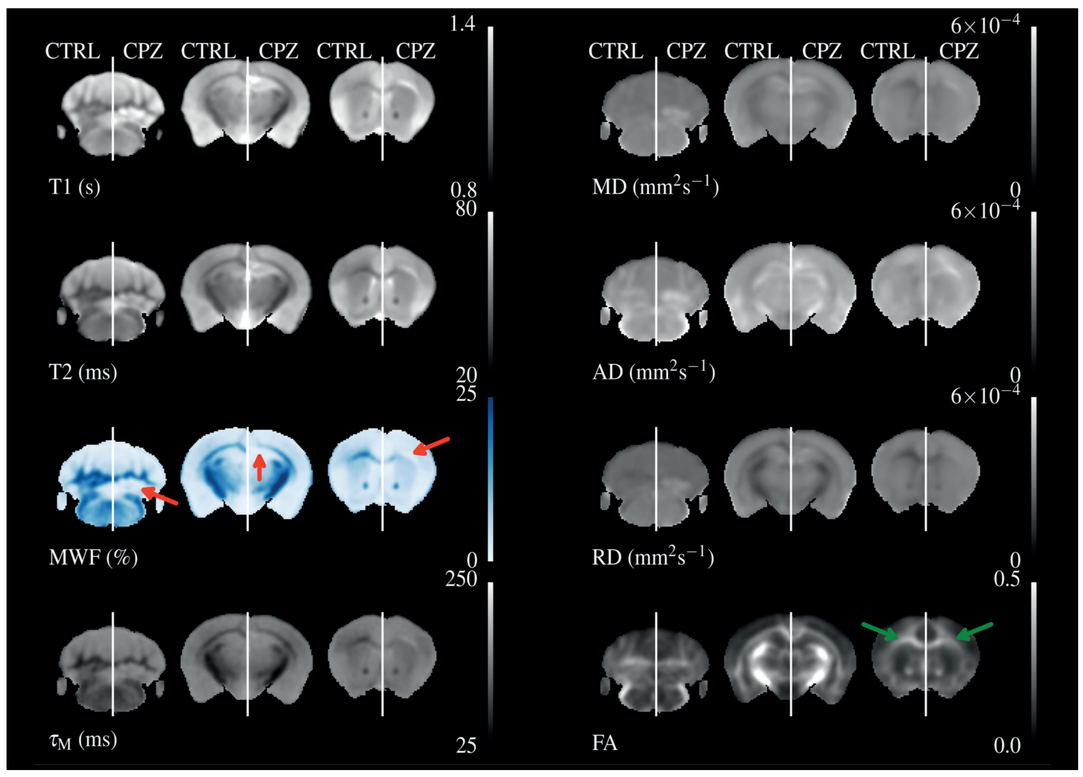

Figure 2: Relaxometry, MWF (left) and Diffusion (right) measures of myelin in the Cuprizone mouse model[4]. On the left of each image a healthy control is shown, on the right a Cuprizone treated mouse. Demyelination is clearly seen in the MWF and (red arrows), but not in the Fractional Anisotropy image (green arrows).

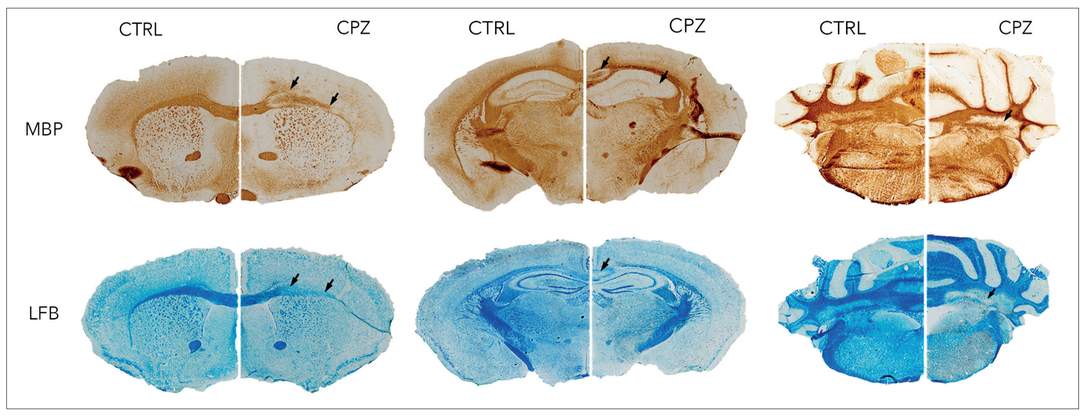

Figure 3: MBP and LFB histology in the Cuprizone mouse model. Demyelination is evident as for the MRI in figure 2, however quantitative comparison is hampered by tissue deformation and selection of myelin stain.

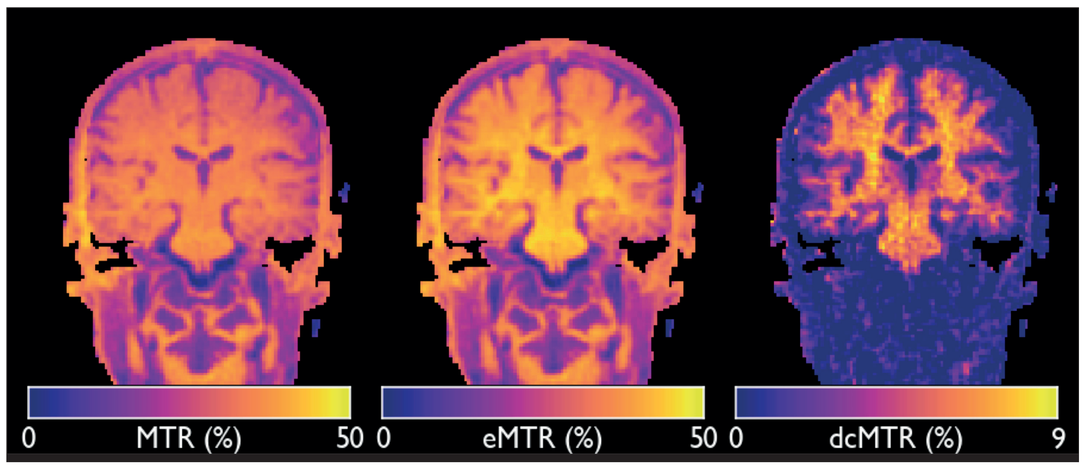

Figure 4: Results from the silent myelin-specific sequence. The standard MT image (left) and enhanced MT image (center) exhibit signal both from grey-matter and outside the brain. The difference of these, called the dipolar-coupled or inhomogeneous MT image (right) is specific to myelin, showing essentially zero signal outside white-matter. Submitted to ISMRM 2019

REFERENCES

1. Laule C et al, "Magnetic Resonance Imaging of Myelin," *Neurotherapeutics: The Journal of the American Society for Experimental NeuroTherapeutics*, vol. 4, pp. 460–484, 2007.
2. Vanes LD et al, "White matter changes in treatment refractory schizophrenia: Does cognitive control and myelination matter?," *NeuroImage*: Clinical, vol. 18, pp. 186–191, 2018.
3. Deoni SC et al, "Gleaning multicomponent T1 and T2 information from steady-state imaging data," *Magnetic Resonance in Medicine*, vol. 60, no. 6, pp. 1372–1387, Dec. 2008.
4. Wood TC et al, "Whole-brain ex-vivo quantitative MRI of the cuprizone mouse model," *PeerJ*, vol.4, p. e2632, 2016.
5. Skripuletz T et al, "De- and remyelination in the CNS white and grey matter induced by cuprizone: the old, the new, and the unexpected.," *Histology and histopathology*, vol. 26, no. 12, pp. 1585–97, 2011.
6. Garcia, M et al, "MTR variations in normal adult brain structures using balanced steady-state free precession," *Neuroradiology*, 2011.
7. Varma G et al, "Magnetization transfer from inhomogeneously broadened lines: A potential marker for myelin," *Magnetic Resonance in Medicine*, vol. 73, no. 2, p. n/a–n/a, Feb. 2014.
8. Solana Sanchez AB et al, "Quiet and distortion-free, whole brain BOLD fMRI using T2-prepared RUFIS," *Magnetic resonance in medicine*, 2015.

MS Inside Out

Building awareness and understanding of MS through experience

Vanessa Pott, Merck KGaA, Darmstadt, Germany

I ♥ MY

The Value of Innovation Series

BACKGROUND

Merck aims to better understand MS and enable others to do the same – through shining a light on real-world experiences of MS patients and investigating the multiple perspectives from people surrounding them.

For the development of the 'MS: Inside Out House' and 'My Other Life VR experience' disease awareness tools, Merck consulted with members of its MS Patient Ambassadors program to gain first-hand insights and further understanding of the often-invisible symptoms and implications of this condition. Additional research underpinned the design and build process to ensure the tools would be authentic and address the core emotional and physical issues faced by MS patients.

OBJECTIVES

1. Articulate the purpose of understanding the emotional as well as physical impact of multiple sclerosis
2. In-built experiential flexibility to suit different locations and situations
3. Be relevant to a wide range of highly-diverse audiences:
    - Patients: Empower to understand more about their MS
    - Friends & Family: Foster empathy for a loved one's experience
    - Public: Raise awareness of a disease not easily understood
    - Health Care Practitioners: Expand expertise to understand patients' life experiences
    - Media: Provide unique perspectives on MS patients and their condition

DESCRIPTION

OMS Inside Out House

An experience-rich physical activation immerses users into a day-in-the-life of a MS patient. The modular design takes users on a journey through familiar and unknown situations in home, travel, and work settings. It educates you through experiences that replicate the symptoms of MS and highlight how the condition affects the human body. The first zone, HOME, introduces visitors to the idea that something as familiar as a chair can pose a significant challenge to a person living with MS. The chair's unique design proves difficult for the visitor to get up from, simulating physical challenges that may be experienced by MS patients.

The TRAVEL zone grants a sense of the anxiety and fatigue people with MS may face when using public transport. Walking on a 'spongy' metro platform simulates mobility difficulties, whilst attempting to concentrate on the randomly-scrambling information board emulates problems with cognition.

The third zone, WORK, places the visitor in an office. They are asked to write emails, but what appears onscreen is entirely different to what is being typed. There are constant distractions from incoming phone calls and chat requests. The resulting anxiety and confusion are a simulation of the challenges faced by many people with MS in the workplace.

My Other Life VR experience

Our 4D virtual reality experience tells a powerful and poignant story which revolves around the lives of two separate MS patients, Tom and Karen. The user will experience the unseen burden that accompanies the disease, feel how it affects everyone in their circle; such as young children seeing their parents unable to do the things they used to do, and show the personal sacrifices made by family members. Above all, it will display the changes everyone makes when the disease appears in their lives.

Figure 1: "HOME" zone of the MS Inside Out House

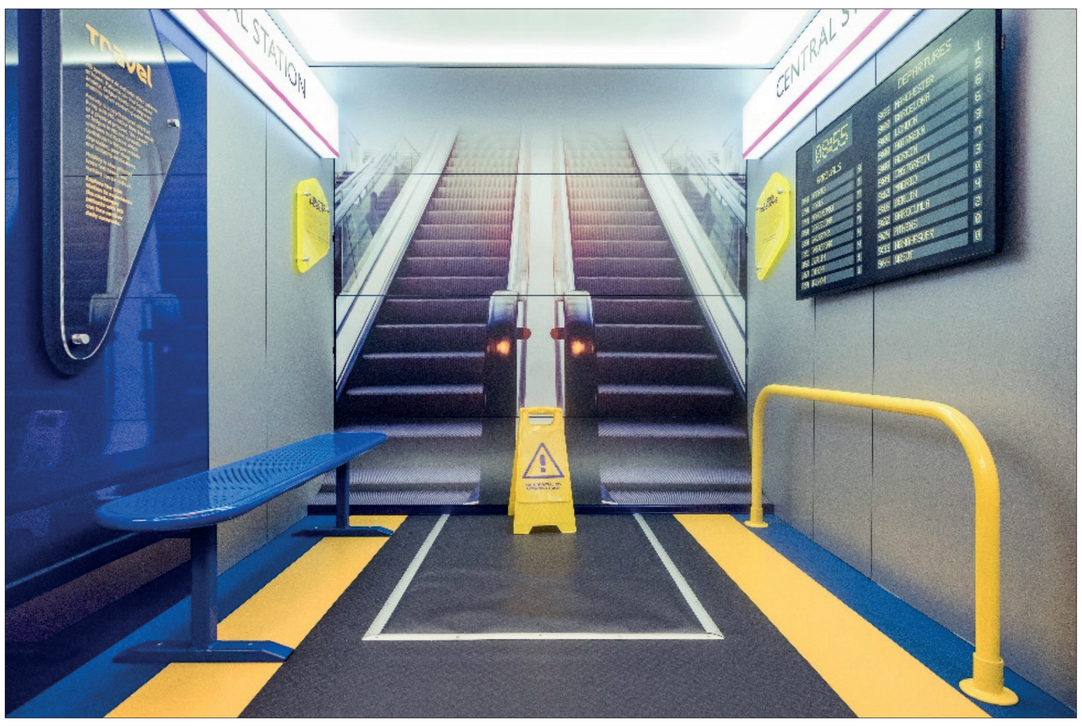

Figure 2: "TRAVEL" zone of the MS Inside Out House

Figure 3: My Other Life virtual reality experience

OUTCOMES

A post-experience survey provided the following key results:

- 95% said Inside Out improved their understanding and awareness of MS
- 78% said Inside Out improved their medical knowledge of MS
- 68% visited the experience to ACTIVELY improve their understanding of MS

"This House really has MS. The "hurdles" that visitors experience are very close to what MS patients deal with every day. The MS House gives healthy people an impression of life with MS and this is key to create awareness and understanding amongst the lay public." (Birgit Bauer, living with MS)

"The anxiety you experience in the workspace is overwhelming. The physical symptoms are hard enough to deal with, but you often forget the mental and emotional toll the condition takes on the sufferer." (HCP)

ACKNOWLEDGEMENTS

Aliquam nec lacus eget sapien venenatis semper. Donec placerat. Phasellus bibendum semper ligula. Duis vitae massa. Integer suscipit. Donec non elit vel nunc tincidunt iaculis. Nam in lectus ac lectus. Donec ultricesam quis sem. Nulla vestibulum vehicula arcu. Vestibulum feugiat eleifend elit. Proin condimentum molestie urna. Etiam ut diam. Quisque viverra lectus ac lectus. Donec ultrices, nisi nec mollis ultricies, quam diam aliquam enim, eu vulputate sem leo non magna. Donec consequat facilisis

Patient, Investigator, Nurse, Carer Questionnaire (PINC-Q): exploring the impact of less frequent medication administration in the maintenance treatment of schizophrenia

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The Value of Innovation Series

Margaret Walker[1], Nigel Olisa[2], **Katalin Pungor[3]**,
Vadim Strulev[3], Annette Wooller[3]

[1]EUFAMI (European Federation of Associations of Families of People with Mental Illness),
[2]GAMIAN Europe (Global Alliance of Mental Illness Advocacy Networks-Europe),
[3]Janssen, EMEA Medical Affairs

PINC-Q

BACKGROUND

Since the introduction of haloperidol in 1958, Janssen has continued its mission to minimise the burden of disease for people living with schizophrenia, by understanding and producing treatments that address unmet needs. Recognizing that non-adherence is a consistent feature of schizophrenia, Janssen has continued its effort to develop daily oral antipsychotics into long-acting injectable formulations, most recently with the introduction of a treatment that requires administration only 4-times a year.

But, what is the real impact of making medication administration less frequent? While classical clinical trials established the efficacy, safety and convenience of administration 4-times a year, some subtle, but very important changes in daily life for patients and their families may be not fully understood. Such assessment requires the development of very specific and delicate instruments, and should include all critical stakeholders involved in the treatment of people living with schizophrenia.

OBJECTIVES

PINC-Q (Patient, Investigator, Nurse, Carer Questionnaire) is a multi-country, cross-sectional, retrospective, non-interventional study designed to explore the impact of less frequent administration of antipsychotic medication in the maintenance treatment of schizophrenia, incorporating the perspective of multiple critical stakeholders involved in the treatment of people living with schizophrenia. The involved stakeholders are planned to be: the patients, their carers, nurses and and treating physicians. The study will be run in 8 countries in Europe (Figure 1).

- The Questionnaire is designed to collect feedback on treatment experience with an antipsychotic which is administered 4-times per year. The questions will be categorized as indicated below and amended accordingly for each responder group:
- Demographics and other characteristics of patients, to describe the study population
- Impact of treatment with less frequent administration on relationship/interactions between the patient/carer and the clinical team
- Involvement in the treatment decision
- Reasons for switching to medicine with less frequent administration
- Impact on patient/carer
- Experience with antipsychotic treatment
- Experience with less frequent administration

DESCRIPTION

As the objective is to understand the implication of antipsychotic administration 4-times per year from the perspective of all four stakeholders involved, it was of critical importance to ensure their involvement in the design phase, to ensure proper insight and understanding. An additional dimension and point of vigilance has been to respect and manage the country specific variety of aspects of patient's life like relationship with family, communication with healthcare professionals, topics patients speak to their carers are very sensitive to cultural and social environment, structure of mental care and many other details. The collaborative approach is also reflected in the logo of the study (displayed in the upper right corner of this poster).

In order to ensure the most appropriate design 8 healthcare professionals (including nurses) from 6 European countries, 5 members of EUFAMI from 3 European countries, 2 members of GAMIAN from 2 European countries and 10 Janssen employees from 10 different countries closely collaborated to develop a unique tool/questionnaire, which is designed to effectively capture important information on the real impact of four per year antipsychotic medication administration. Moreover, the design of the study will allow to make a full 360° analysis, as some of the questions will be similar to all stakeholders and will therefore allow to understand how the same aspects are perceived from different perspectives: clinicians, nurses, patients and their carers (Figure 2).

OUTCOMES/END RESULTS

The results are anticipated to provide important insights into the value of less frequent administration of medication and on the communication from the perspective of the person living with schizophrenia and their carer, physician, nurse. Such insight will empower patients and their carers to be active participants in their care. Information on expected timelines are shared in Figure 3.

Figure 1: Involved countries: Belgium, France, Germany, Hungary, Ireland, Italy, UK, Spain

Category: Involvement in treatment decision

Question: To what extent were the nurse, patient and carer involved in the decision to switch from PP1M to PP3M?		**Question:** To what extent were you involved in the decision to switch from PP1M to PP3M?	
Doctor	**Nurse**	**Patient**	**Carer**
Patient was: a) Highly involved b) Involved to some extent c) Not involved at all **Carer was:** a) Highly involved b) Involved to some extent c) Not involved at all **Nurse was:** a) Highly involved b) Involved to some extent c) Not involved at all	a) Highly involved b) Involved to some extent c) Not involved at all	a) Highly involved b) Involved to some extent c) Not involved at all	a) Highly involved b) Involved to some extent c) Not involved at all

Figure 2: Schema of how questions were aligned and tailored to the 4 different stakeholders

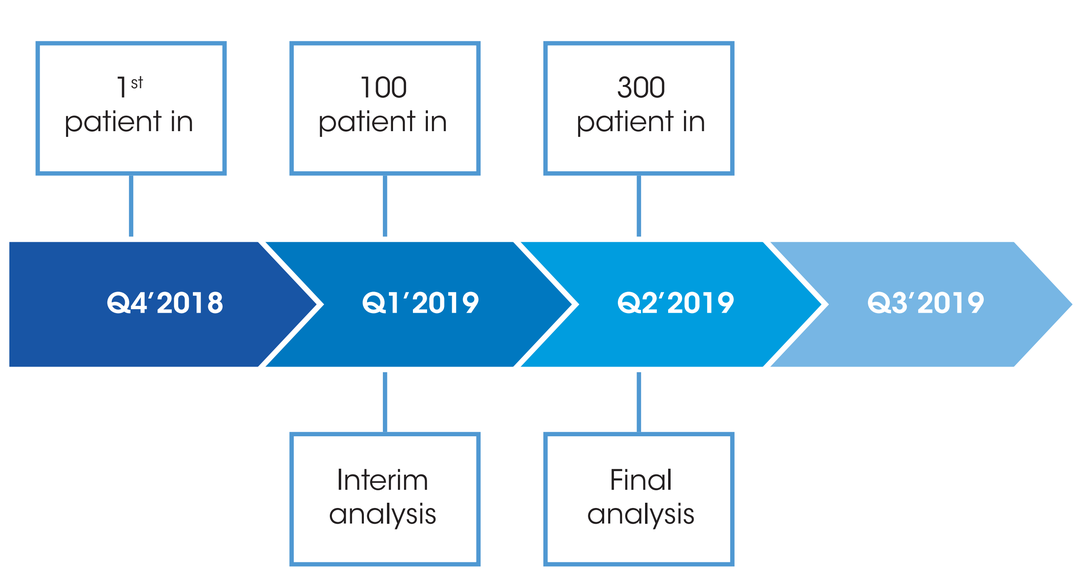

Figure 3: Study timelines

ACKNOWLEDGEMENTS

We would like to express our sincere gratitude to Prof. Rebekka Lencer, Dr. Umberto Albert, Prof. Eric Fakra, Dr. Pedro Sanchez Gomez, Prof. Tamás Tényi, Dr. Steegen Geertje, Mrs. Sarah Dampier, Mr. Koen Verbelen, Pierre Cherubin, Marjolein Lahaye, Katja Stahl, Cecile Deal, Laszlo Feher, Ijeoma Matthew, Maria Cristiana, Marieke Buitenhuis, as well as colleagues from GAMIAN-Europe and EUFAMI for their input into the design of the PINC-Q study.

janssen
PHARMACEUTICAL COMPANIES OF Johnson&Johnson

Co-creation of Psychosis Information Brochure for Patients and Family/Caregivers

Hilde Piryns, Anneleen Vindevogel, Lies Clerx, Stefan Pyp

Janssen Belgium

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The Value of Innovation Series

Janssen Neuroscience

PHARMACEUTICAL COMPANIES OF Johnson & Johnson

BACKGROUND

Psychosis is a complex disorder that is poorly understood, and often misunderstood, by the public. When confronted with a disorder like psychosis, often a difficult and long process starts, for both patients and their family, to obtain clear and adapted information.

Similes and Janssen realized there was a need to optimize this process and decided to co-create a new tool so that all people who are confronted with this disorder, should have easily access to information that is relevant, comprehensible and trustworthy.

OBJECTIVES

Co-creation of Janssen Neuroscience with Similes (*Flemish association for family members of patients with a psychotic vulnerability https://nl.similes.be/*), as **equal partners**. Goal: to develop an information tool on psychosis, practical and up-to-date, adapted to the real needs of families and patients. The content of the brochure was gathered via advisory boards where 4 psychiatrists, who are closely connected with Similes, gave their clinical input.

DESCRIPTION

Co-creation process - started end 2017

- Brainstorming Similes and Janssen: what are the needs of families and patients when confrontated with psychosis?
- All the needs & gaps were listed and grouped in different chapters
- 4 psychiatrists were contacted to help with the scientific content, and a chapter was assigned based on the speciality of these doctors
- The scientific information was complemented with testimonials from caregivers and patients, via Similes
- The three parties involved (Janssen, Similes and psychiatrists) discussed the content during several advisory board meetings
- A final text was reviewed by a medical writer to create a uniform style, understandable for a lay public
- A final revision by a patient expert
- A professional creative agency (Bones) was consulted for the brochure lay-out

Similes provided real-life insights into ideation, testimonials and expert review. Janssen was sponsor and coordinator of the process.

Distribution and awareness strategy to multiple stakeholders

Face to face contacts (start mid Oct 2018):

- Similes: informed families during contacts with peers
- Janssen: product specialists use this brochure to discuss possible psychoeducational options during their visits with health care professionals.
- N=1500 printed brochures

Social media coverage:

- First wave (mid Oct. 2018) initiated by Similes and 'shared/liked/retweeted' by Janssen (Janssen Belgium N=5.100 followers on Facebook, Similes N=1.700 members)
- Second wave (begin Nov. 2018) initiated by Janssen and 'shared/liked/retweeted' by Similes
- E-newsletter of Similes (N=2830 receivers, N=1184 read it, N=238 (20%) click through to brochure)
- E-newsletter to employees of Janssen
- E-version on website Similes / Janssen Informeert / PsychoseNet

Advertising: for the large public via a life style magazine 'Bodytalk' (printed on 190.000ex) and also available online

Figure 1: Cover and content table of the brochure *'Psychose pak je samen aan'*

Figure 2: Example of the lay-out of the brochure

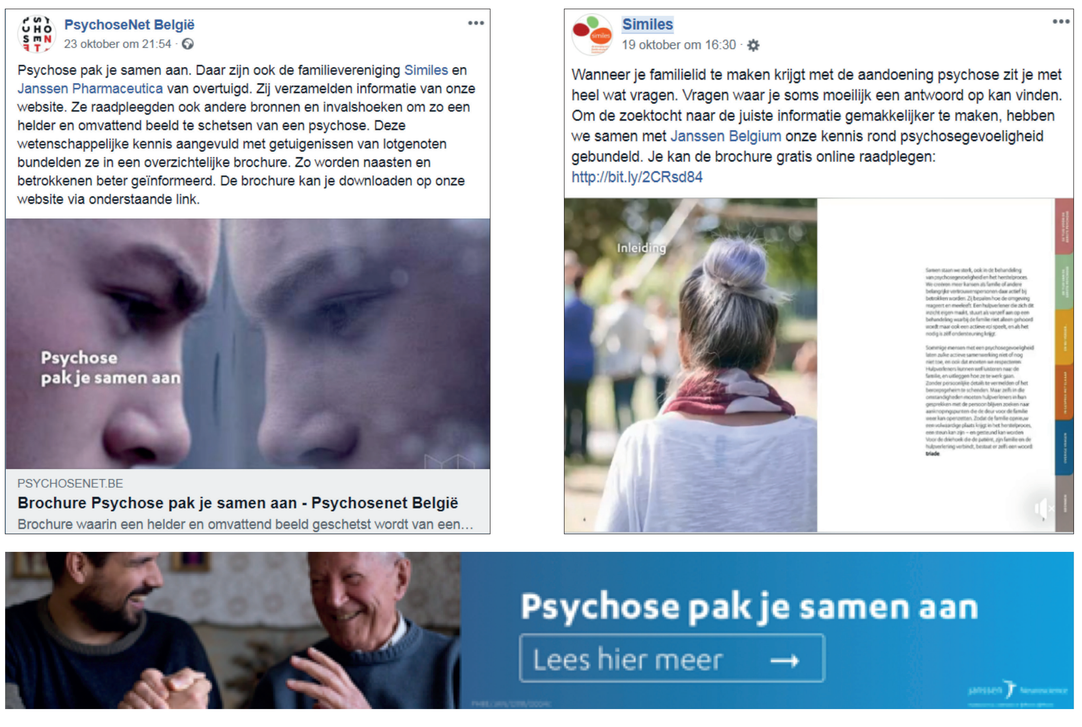

Figure 3: Examples of the different announcements: Websites, Facebook, banner in lifestyle magazine

OUTCOMES

Caregivers and patients benefit directly from this practical information which can help them to get more insight in their illness and treatment. It gives patients and caregivers means to deal with this together, step by step, in close contact with their doctor.

Distribution and public announcement of the brochure was done via multiple channels (F2F contacts, social media, advertising, websites) and via multiple stakeholders (physicians, families of patients with psychotic vulnerability and large public). The feedback on this project is very positive.

Distribution started October 2018 and will continue in 2019. Results on impact will follow.

ACKNOWLEDGEMENTS

Thanks to: Lut Rubbens (familievertegenwoordiger Similes), Hilde Vanderlinden (coördinator participatieproject Simles PSY 107), Dr. Geertje Steegen, Prof. Dr. Ruud van Winkel, Dr. Jeroen Kleinen, Dr. Wim Simons

QR code
for the brochure

similes
vereniging voor familie van psychisch kwetsbare mensen

Shift.ms: Awareness and Understanding of Paediatric MS

Emily Thompson[1], George Pepper[1], Stephanie Ribbe[2]

[1]Shift.ms, www.shift.ms; [1]Novartis

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BACKGROUND

- A collaboration between Shift.ms and Novartis to raise the awareness of the experience and needs of people living with and treating paediatric MS.
- Shift.ms is the social network for people living with MS (MSers).
- Alongside the network Shift.ms utilizes the pioneering patient-led video interview format, called 'MS Reporters'.
- This patient engagement initiative bridges the communication gap between MSers and relevant experts.
- MSers trained as citizen reporters interview leading experts on questions centred around needs of the wider MS community.
- The interviews create a video library of expert knowledge, accessible online to a global audience.

OBJECTIVES

- To use the MS Reporters patient-led video interview format to increase the understanding of paediatric MS.
- The series addressed questions on
    - the prevalence of paediatric MS,
    - the symptoms and diagnosis of paediatric MS,
    - the unique challenges that children and parents face when MS is diagnosed so young,
    - and what tailored support is available for this audience.

DESCRIPTION

- The paediatric MS Reporters project started in July 2018 and was overseen by a steering group of MSers to ensure the content was patient driven and beneficial for people with MS.
- Interview questions were gathered from the Shift.ms community (**Figure 1**).
- Three MS Reporters interviewed experts who were selected based on their understanding of paediatric MS and their area of expertise to ensure a balanced response.
- They interviewed a paediatric MS clinical nurse specialist (**Figure 2**), a consultant paediatric neurologist, and an expert MSer (someone diagnosed with MS as a teenager).
- The resulting nine videos were launched over a two week period starting w/c 24th September via the Shift.ms online channels, and in partnership with Novartis was also be featured on Novartis disease-specific and corporate channels e.g. http://livinglikeyou.com/

OUTCOMES

- Children and teenager MSers, parents of paediatric MSers, and the general MSer community were better informed about paediatricMS and available support.
- Engagement midway through dissemination is shown in **Figure 3**.
- Videos have already received >70,000 views highlighting the interest in this content from the MS community.
- Whilst the videos are filmed in English language, this concept can be applied elsewhere in the world, or content translated, where knowledge in paediatric MS continues to be lacking.
- Shift.ms wish to scale this patient-led video interview format for people living with other long-term neurological conditions from 2019

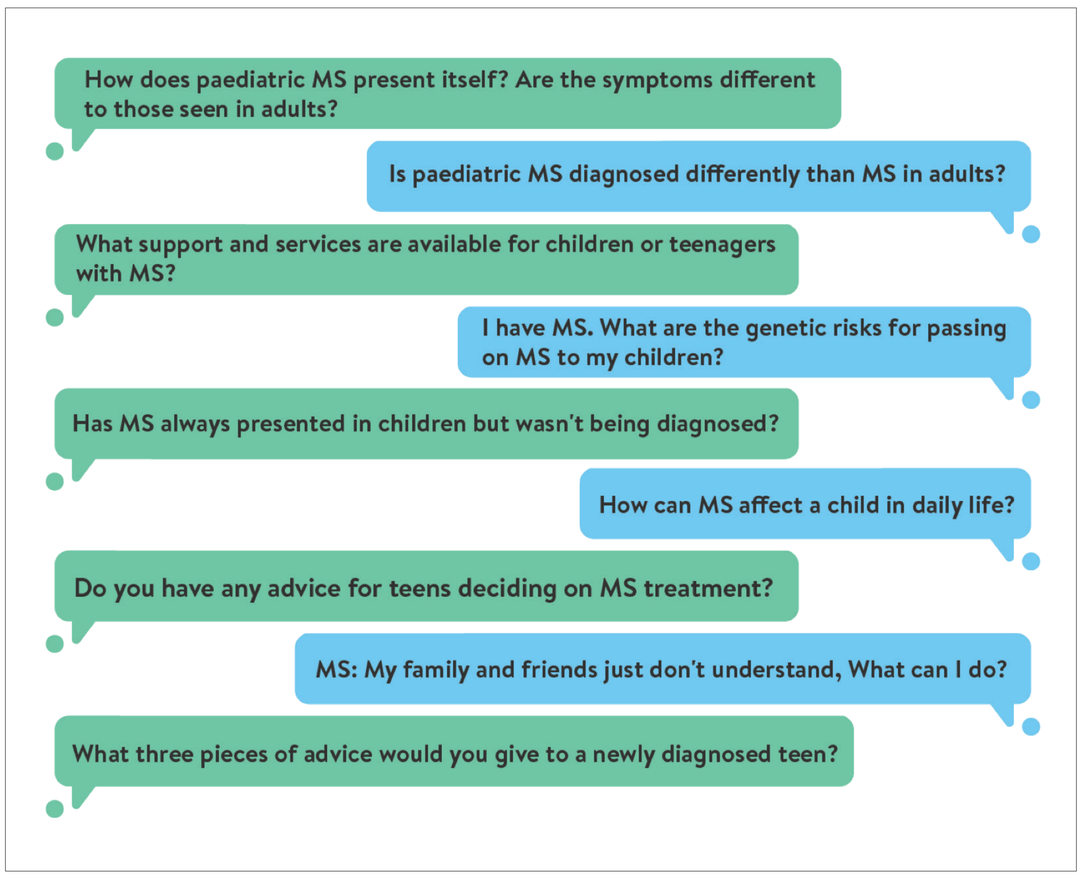

Figure 1: Interview questions gathered from the Shift.ms community

Figure 2: MS Reporter Nat interviewing Katie Hanson, Clinical Nurse Specialist, Great Ormond Street Hospital

Figure 3: Paediatric MS series – video viewing statistics at one month

ACKNOWLEDGEMENTS

This project was supported by Novartis. Novartis had no influence over the content.

- Interviewers: Nat, Sarah, and Joan, all MS Reporters from the MS community.
- Interviewees: Katie Hanson, Clinical Nurse Specialist, Great Ormond Street Hospital; Cheryl Hemingway, Consultant Paediatric Neurologist, Great Ormond Street Hospital; Alice, expert MSer who was diagnosed as a teenager.
- Shift.ms team
- Great Ormond Street Hospital
- Novartis

All nine videos can be viewed at: www.shift.ms/Children-and-Teens-with-MS

Shift.ms NOVARTIS

Harnessing the voice of the mental health community on social media

Cristiana Maria

EMEA Communications & Public Affairs, Janssen NV, Beerse, Belgium

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BACKGROUND

The mental health community is very active on social media, and social media has played a huge part in addressing the stigma surrounding mental health issues. However, a recent social listening exercise revealed a major imbalance between different mental health conditions and social media activities. Whilst online discussions around 'mainstream' mental health issues, such as depression and anxiety were very common, other mental health conditions such as schizophrenia were not discussed as frequently online. Janssen Neuroscience wanted to raise awareness and amplify the voice of the schizophrenia community on social media.

OBJECTIVES

- Stimulate discussion amongst the mental health online community to reduce stigma around schizophrenia and encourage treatment dialogue between patients and healthcare professionals (HCPs)
- Highlight the need for more open discussions between HCPs and their patients living with schizophrenia
- Reinforce Janssen Neuroscience's commitment to supporting those living with mental health conditions

DESCRIPTION

To help amplify the voice of the schizophrenia community on social media, and to encourage the broader mental health community to discuss this topic, Janssen Neuroscience created campaigns around three moments in time. The campaigns ran across Twitter, using the **@JanssenEMEA** account, and included:

#TalkSchizophrenia – on World Mental Health Day 2017, a one-hour tweetchat was hosted in partnership with the online patient group, TalkHealth. Over the course of the hour, five questions were posed, each designed to stimulate discussion around schizophrenia and create positive dialogue around diagnosis of schizophrenia, to address the stigma of the condition. Following the tweetchat, the full conversation was curated into a Storify article and shared on social media.

#SeasonsTweetings – the festive season can be a lonely time for those living with mental health issues. To help support these individuals, Janssen created a social media 'advent calendar', designed to raise awareness of the mental health challenges that can occur during the festive season and to provide links to useful information and resources, including advice for people living with schizophrenia. Each day, a new resource was shared, leading up to a big reveal on Christmas Eve, when the full advent calendar was shared.

#LoveMeFirst – hearing positive stories of recovery can provide a huge amount of support and inspiration to those living with mental health conditions. Working with patient groups across Europe, inspirational patient stories were collected and transformed into love letters that showcased their journeys to recovery. Each love letter was written by the patient to their former self, offering hope and encouragement. A selection of patient stories were included to provide variety, from those living with anxiety to bipolar disorder and schizophrenia. These love letters were teased on social media and then compiled into an ebook, which was published on Twitter.

OUTCOMES

Collectively, these innovative campaigns generated over **3.15 million impressions and almost 30,000 engagements** on social media from patients, carers, HCPs and academics!

#TalkSchizophrenia was the first ever tweetchat co-hosted by @JanssenEMEA. **Seventy-seven people** contributed to the discussion, which resulted in **202 tweets**!

#SeasonsTweetings received the most engagements (almost **18,000**) with the 'big reveal' of the advent calendar receiving over **1,700 likes** alone!

#LoveMeFirst received over **10,000** engagements and reached an audience of **750,000**. Furthermore, it was recognised by Janssen EMEA's company group chairman, Kris Sterkens, who **blogged about it** on LinkedIn.

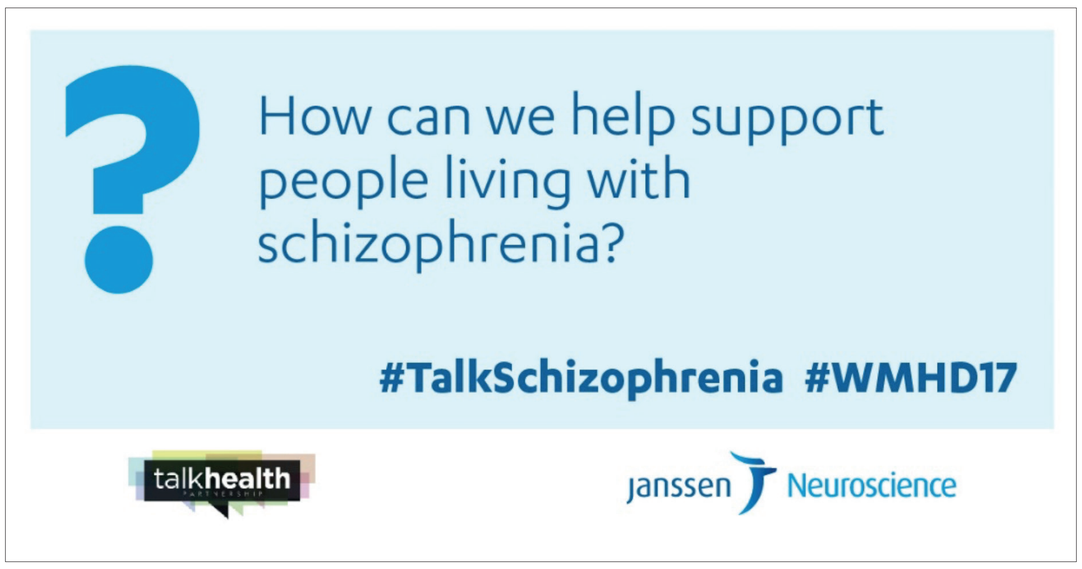

Figure 1: First of its kind, #TalkSchizophrenia was a tweetchat that pushed boundaries in the digital mental health space, increasing online conversation about this disease, and encouraging patients and carers alike.

Figure 2: #SeasonsTweetings was a 12-day campaign that sought to offer support and advice via an 'advent calendar' of tips, helping people to look after their mental health over the holiday period.

Figure 3: #LoveMeFirst brought the association between mental health and self worth into the limelight, using empowering patient stories to reach a wide audience on Twitter and LinkedIn.

ACKNOWLEDGEMENTS

The following patient groups and charities engaged and supported the three above campaigns by liking, retweeting and commenting on Janssen EMEA's social media posts. In addition, they enabled Janssen to share their content as part of the #SeasonsTweetings campaign.

• EUFAMI • GAMIAN • EBC • Mind UK

Janssen Neuroscience

Silent MRI: Imaging Structure and Function in the Brain

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The Value of Innovation Series

Nikou L Damestani[1], Emil Ljungberg[1], Steven CR Williams[1], David J Lythgoe[1], Florian Wiesinger[1,2], Ana Beatriz Solana[2], Tobias Wood[1], Fernando O Zelaya[1] & Gareth J Barker[1]

[1]Department of Neuroimaging, Institute of Psychiatry, Psychology and Neuroscience, King's College London, [2]ASL Europe, General Electric Healthcare, Munich, Germany

BACKGROUND

- Magnetic resonance imaging (MRI) produces acoustic noise comparable to the sound levels of standing next to a running chainsaw (Figure 1)
- This has made studying some groups of people very difficult, such as neonates and people suffering noise-triggered migraines
- Recent innovations in MRI reduce the acoustic noise to conversation level, without significant detriment to image quality or sensitivity[1,2,3]

OBJECTIVES

In collaboration with General Electric (GE) Healthcare, we are developing and optimising novel near-silent MRI acquisition methods, as well as showing that they are comparable or better than the existing noisy methods used.

DESCRIPTION

We present advances in silent imaging in two main areas:

1. Silent imaging of brain structure and tissue properties
2. Silent imaging of the brain's functional response to different stimuli

Structural and Quantitative Imaging

- By adjusting the scan parameters, structural imaging can produce different weightings (known as T_1 and T_2) that change the contrast between parts of the brain, highlighting different types of brain anatomy and pathophysiology
- Quantitative imaging is an advanced type of structural imaging with the ability to assess tissue properties such as water content and myelin concentration (related to T_1 and T_2)
- We have implemented silent T_1 and T_2 weighted imaging, as well as quantitative techniques for estimating T_1 and myelin concentration (Figure 2). We are now working on estimating T_2

Functional Imaging

- Changes in blood oxygenation induced by neuronal activity affects the local signal intensity, allowing brain function to be imaged
- Conventional fMRI has high acoustic noise which is particularly problematic for studies of auditory processing
- Our collaborators at GE Healthcare have developed a silent functional imaging technique known as Looping Star[8]
- We have demonstrated that Looping Star has comparable performance relative to conventional noisy fMRI (Figure 3)

OUTCOMES

- **We have successfully demonstrated silent structural and functional MRI**
- These are the first steps towards a complete silent imaging protocol, removing a major problem with conventional scanning techniques
- Further work will validate these techniques for adoption in a clinical setting

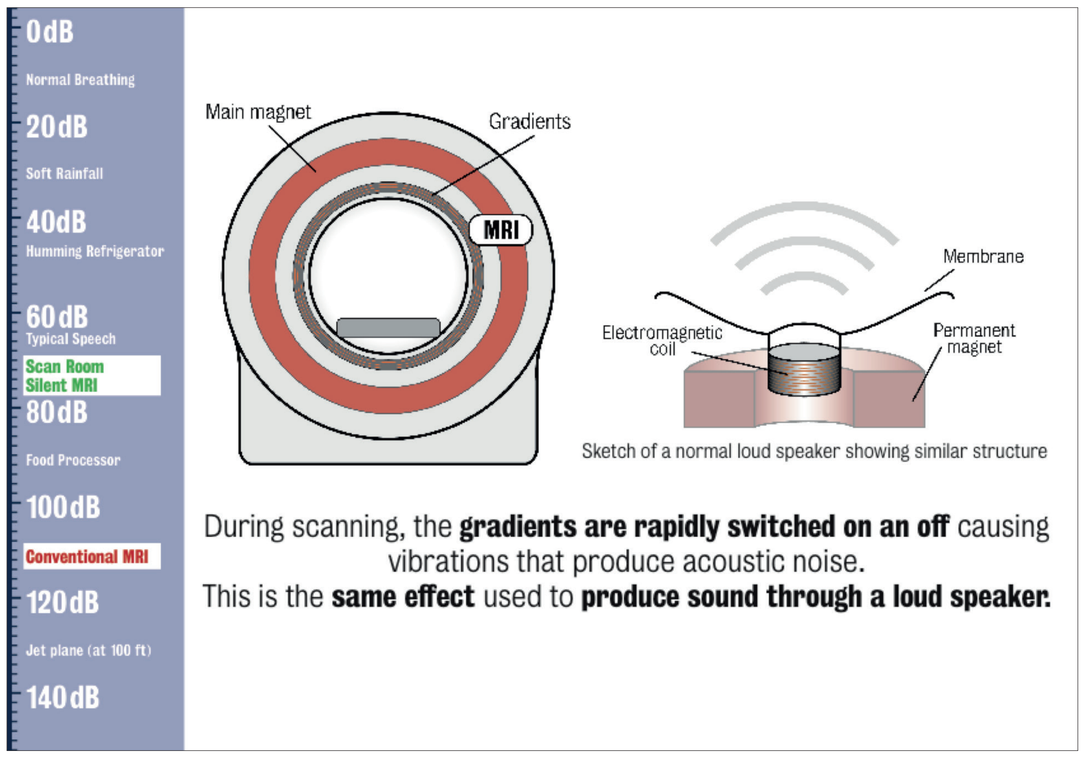

Figure 1: A scale of acoustic noise levels relative to common noises, with the silent and standard methods highlighted (left), and a schematic of why an MRI scanner is noisy (right)

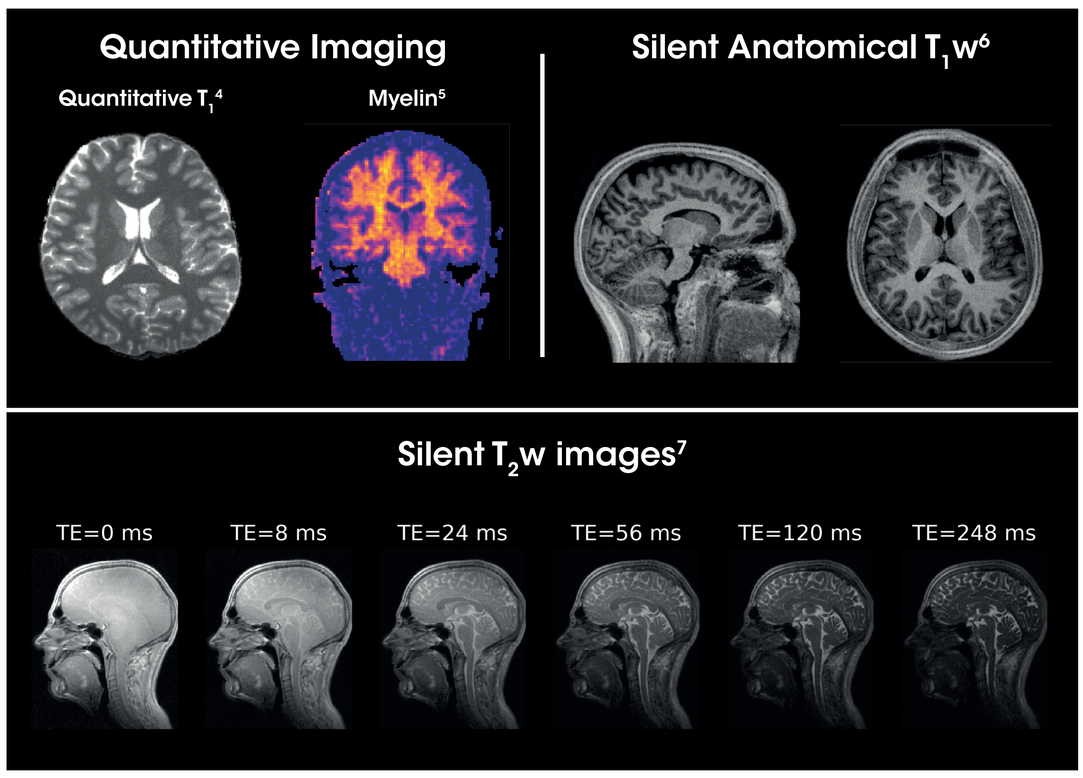

Figure 2: Examples of silent structural and quantitative imaging for studying brain tissue properties and anatomy

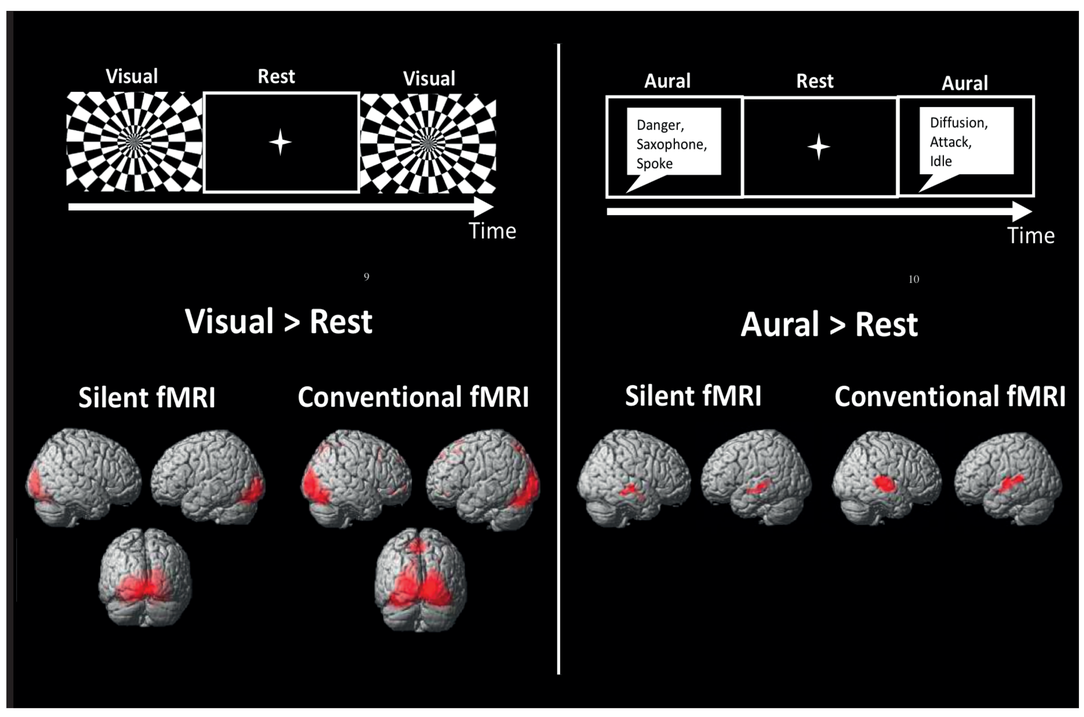

Figure 3: Examples of group-level functional activations across eight participants are shown for visual (left) and auditory (right) responses in the brain, imaged with conventional fMRI and the silent fMRI sequence known as Looping Star.

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REFERENCES

1. GE Healthcare, 2013, ***Amidst the silence we heard the patient***, GE Signal Pulse, accessed online 12/11/2018
2. Solana, A.B., et al. 2016. ***Quiet and distortion-free, whole brain BOLD fMRI using T2-prepared RUFIS***. Magnetic resonance in medicine, 75(4), pp.1402-1412.;
3. Madio, D.P. and Lowe, I.J., 1995. ***Ultra-fast imaging using low flip angles and FIDs***. Magnetic resonance in medicine, 34(4), pp.525-529.;
4. Ljungberg E., et al. 2018, ***Silent T1-Mapping Using the Variable Flip Angle Method with Zero Echo Time***. Proc. ISMRM, Paris
5. Wood T., et al. 2018, ***Silent Myelin Imaging using Dipolar-Coupled Prepped RUFIS***, Proc. BC-ISMRM Oxford
6. (Submitted) Ljungberg E,. et al. 2018, ***Silent Structural Imaging and T1-mapping with a Rapid-Radial Twice-Prepared (R2P2) Sequence***, ISMRM 2019, Montreal.
7. (Submitted) Ljungberg E,. et al. 2018, ***Rapid, multi-TE, T2-prepared RUFIS for Silent T2-weighted imaging***, ISMRM 2019, Montreal
8. Wiesinger, F., et al. 2018. ***Looping Star***. Magnetic resonance in medicine, early view online
9. Damestani, N., et al. 2018, ***Looping Star – a novel silent approach to imaging brain function in health and disease***, Proc. BC-ISMRM Oxford
10. (Submitted) Damestani, N., et al. 2018, ***Looping Star silent fMRI: a platform for improving studies of auditory processing***, ISMRM 2019, Montreal

GE Healthcare

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Speeding up access to new treatments in Parkinson's Disease: A PPP collaboration seen from an industry participant perspective

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All authors employed by H. Lundbeck A/S

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The Value of Innovation Series

THE NEED FOR A MULTI-STAKEHOLDER APPROACH

Lundbeck is a company specialised in the research and development of new treatments for brain disorders, with a focus on psychiatric and neurologic diseases. Our scientific understanding of these diseases are improving in parallel with new methodologies for collecting, analysing and interpreting data becoming available. This leads to new opportunities and challenges for medicines development and regulatory decision making that can only be addressed by working closely across multiple stakeholders.

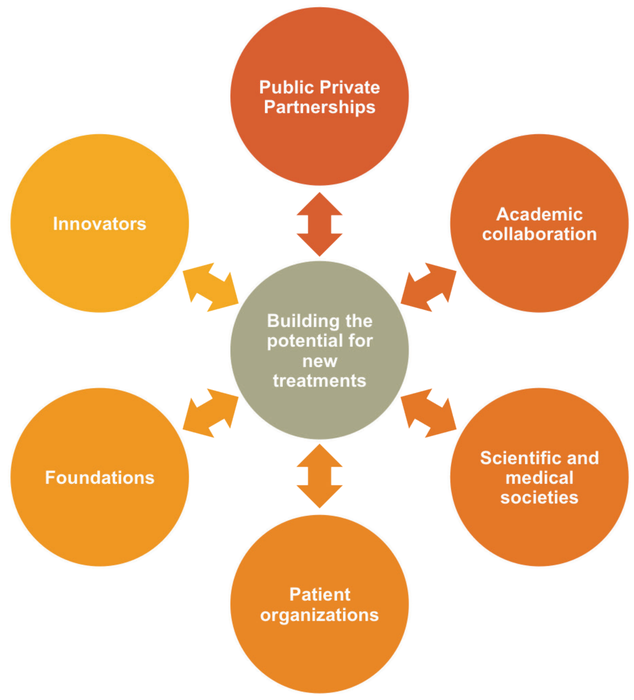

Figure 1: Collaboration across stakeholders is necessary to enable progress in understanding Parkinson's Disease and enable the development of new treatment options.

ABOUT THE CRITICAL PATH FOR PARKINSON'S

In the area of Parkinson's Disease (PD), the Critical Path for Parkinson's (CPP)[1] is together with Parkinson's UK, leading a collaboration that aims to achieve global regulatory endorsement of novel translational biomarkers and drug disease trial models for use in clinical medicines development trials. Lundbeck has been a member since 2014.

The CPP is a partnership for effective medicines development with a focus on ensuring regulatory acceptance of novel methodologies, including[1]:

- An integrated database with data from multiple sources to provide the basis for quantitative drug development tools and a resource for the Parkinson's research community.
- Validation of imaging biomarker measurement that can be used to select people with Parkinson's who are most suitable to take part in clinical trials.
- Collaborative assessment of additional work streams to support faster access to new treatments, e.g. utilisation of digital technologies in trials.

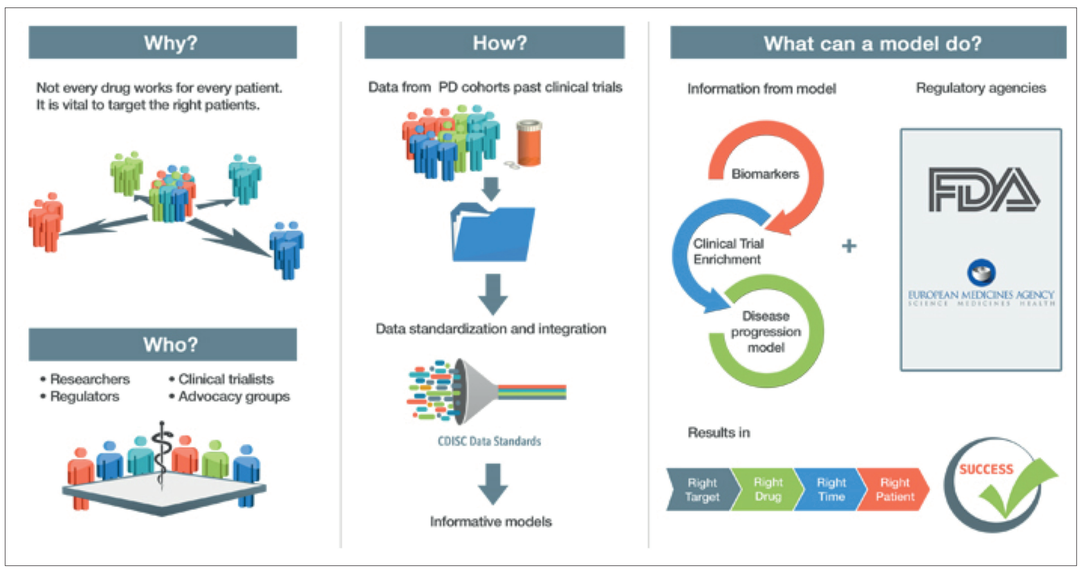

Figure 2: The CPP collaboration model.

THE VALUE OF A PARTNERSHIP APPROACH

> *"Disease progression models derived from the Critical Path for Parkinson's and other databases may enable a better understanding of the progression of PD and lead to the development of new comprehensive outcome measures that describe the totality of the patient experience. These precompetitive initiatives provide large, prospectively collected, standardized datasets of key relevance for the advancement of clinical trial methodology and supporting regulatory approval"* [2]

From a societal perspective, the CPP is thus adding value by joining forces to develop a better understanding of the disease which can be translated into better more targeted development plans. From a patient perspective, the collaboration adds traction to the hope of conceivably improving the therapeutic management of symptoms (both motor and non motor) in the near future.

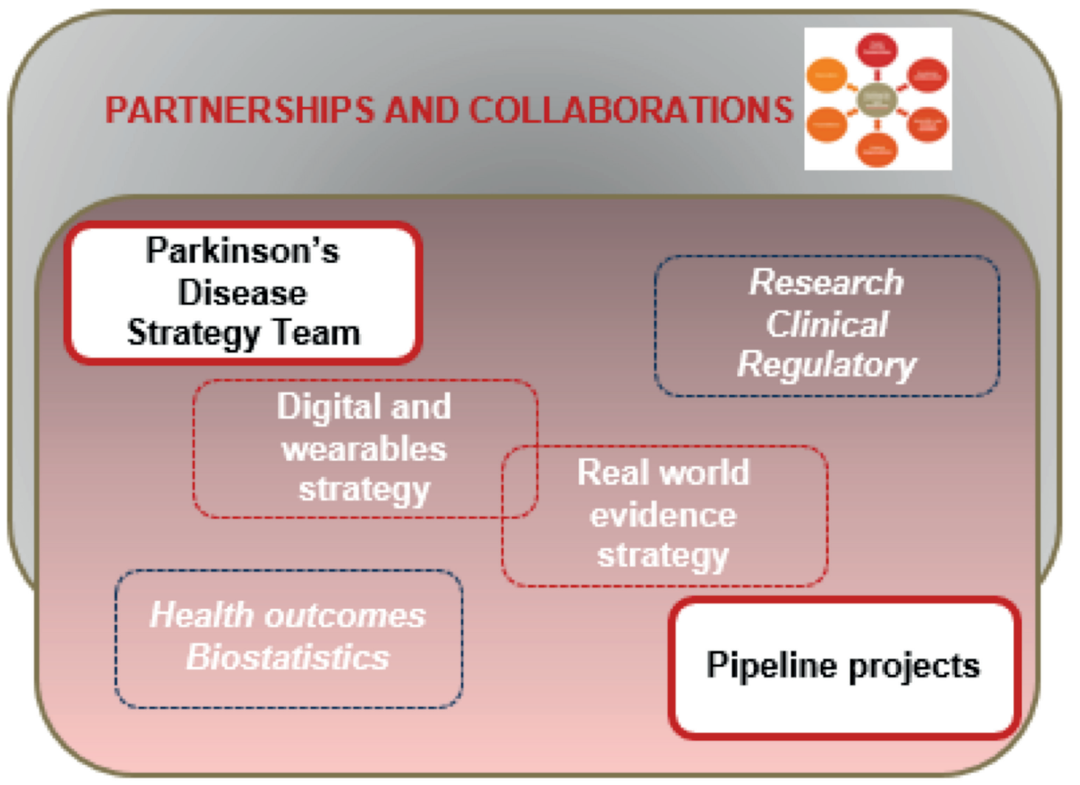

Figure 3: Lundbeck's cross functional working model to enable integration of external advances into strategies for development of new medicines.

OUTCOMES/END RESULTS

The benefit of pooling experience, data, ideas and learnings in a non-competitive environment such as CPP is unique. The collaboration is already leading to an increased awareness about the need for new outcome measures, scales and diagnostic tools by regulators, patients, healthcare professionals and industry, and is an excellent example of how PPPs can help address these needs by putting them on the public health agenda and facilitate a supportive regulatory path for future treatments.

1. https://c-path.org/programs/cpp/
2. Sardi, S et al. (2018). Targeted Therapies for Parkinson's Disease: From Genetics to theClinic. *Movement Disorders*, 33(5), pp 684-696.

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