association of Khorasan privence (the widest province in Iran). Quality of life was measured with MSQOL-54 instrument. Data was collected by employing a 32- item self-administered questionnaire in a face to face interview. Parametric, nonparametric tests and descriptive statistics analysis were applied (p value<0.05). Patients were grouped into three disability stages according to their Expanded Disability Scale Score (EDSS). **RESULTS:** The Patients mean age was 31.78 (SD: 9.67) years, % 73.8 were female and %26.3 were male, and their mean EDSS was 2.4 (SD; 1.26) whereas EDSS increases, the costs also increases, which is a positive correlation. The mean QOL was 0.54 that as QOL increases, the costs decreases, which is a negative correlation. The MS medications (Interferon) have a cost around $ 46625 per year for each patient that are subsidized about $ 24452 IR by governmental sector. Up to $ 17104 are paid by insurance and $ 5263 directly by patients. The costs per patient-year were calculated as $ 11560) - 27970.5591 (EDSS= 1-2.5), $ 29916.909-30015.645 (EDSS=3-4.5) and $34678.776- 34793.22 (EDSS= 5- 7.5). **CONCLUSIONS:** We conclude that the costs are relevant in MS, especially when disability increases. The catastrophic cost has a high burden to patients, society and health care system

PND32

WHOLE EXOME SEQUENCING AS A DIAGNOSTIC TOOL FOR COMPLEX NEUROLOGICAL DISORDERS

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OBJECTIVES: The primary objective of this study is to elucidate the effect of whole exome sequencing (WES) in diagnosing children with a developmental delay due to unexplained conditions presumed to be genetic. A secondary objective is to collect all resources used by these children to gain insight into the total costs over time for the traditional diagnostic pathway and the additional costs to diagnose a patient using WES. **METHODS:** We included twenty children at the Sylvia Toth Centre (STC) in Utrecht, the Netherlands, who have underwent previously extensive clinical diagnostic workups and for whom no diagnosis was found after the last extensive workup. On all twenty children and parents WES will be performed, thereby obtaining a list of exonic candidate mutations for each patient. In parallel all resources used were collected by assessing the clinical records of patients. These resources were linked to unit costs to obtain the total cost per patient. Total cost per patient was then compared to the cost of care using WES, assessed for each individual patient. **RESULTS:** The diagnostic yield from the 13 patients sequenced thus far is 23% indicating a 23% increase in number of diagnoses compared to the current diagnostic pathway. On average these patients have had numerous visits to the hospital, overnight stays and different diagnostic workups to unravel the genetic cause of their neurological disorder. Total cost of the current diagnostic pathway is therefore up to ten fold higher compared to the total cost of only providing WES. **CONCLUSIONS:** Comparing the diagnosis and costs with and without the use of WES gives a clear picture of the clinical and economic feasibility of putting WES into standard diagnostic practice at the STC and similar genetic centers over the world.

PND33

FINANCIAL AND CLINICAL IMPLICATIONS OF INTRAMUSCULAR VERSUS SUBCUTANEOUS INTERFERON BETA-1A IN PORTUGAL, BASED ON THE FINDINGS FROM THE COCHRANE COLLABORATION REVIEW OF FIRST-LINE TREATMENTS FOR RELAPSING-REMITTING MULTIPLE SCLEROSIS

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OBJECTIVES: To estimate the clinical and financial impact of Interferon beta-1a intramuscular (IM) and subcutaneous (SC) formulations in Portugal, based on the findings from Cochrane review regarding first-line treatments for relapsing-remitting multiple sclerosis. **METHODS:** An Excel-based model estimated the number of relapses and costs incurred by a hypothetical cohort of 1000 patients treated with two types of interferon beta-1a. The model evaluated the consequences of treatment with SC versus IM interferon beta-1a, as this was the only comparison whose data quality was assessed as 'high' by the Cochrane Review (Filippini 2013). Risk of relapse was based on the 2-year data from the Cochrane meta-analysis. The analysis was performed from a Portuguese National Health Service (NHS) perspective including only direct costs. Although efficacy was kept constant as Cochrane did not report outcomes based on Expanded Disability Status Scale (EDSS), costs of relapse were available for patients with different EDSS values, thus allowing estimation of cost impact for different types of population. **RESULTS:** According to the model, treatment with IM interferon beta-1a is expected to result in a total of 743 episodes of relapse, whereas SC interferon beta-1a is expected to result in a total of 570 cases, less 173 cases, over a 2-year period. Use of the SC formulation in a population with EDSS ≤3 will result in savings of €690,213.04 over the 2-year period due to avoided relapses. In a more severe population, with EDSS between 3.5 and 4.5, these savings are expected to be €889,865.74 over the same 2-year period. **CONCLUSIONS:** When compared with the IM formulation, the use of SC interferon beta-1a seems to be associated with fewer cases of relapse, resulting over a 2-year period in considerable potential savings to the NHS in terms of relapses avoided.

PND34

CLINICAL OUTCOMES AND HEALTH CARE RESOURCE UTILIZATION IN A 1-YEAR OBSERVATIONAL STUDY OF PATIENTS WITH NON-FOCAL DISABLING SPASTICITY WHO ARE RESISTANT OR INTOLERANT TO ORAL THERAPY TREATED WITH INTRATHECAL BACLOFEN THERAPY AT THE INSTITUT GUTTMANN (SPAIN). EPICE STUDY

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OBJECTIVES: To assess clinical outcomes, health care resource utilization and associated costs of intrathecal baclofen therapy (ITB) for the treatment of non-focal disabling spasticity (N-FDS) in patients who are resistant or intolerant to oral ther-

apy. **METHODS:** Observational, non-interventional, prospective, single-center study of 1 year follow-up from ITB implant onward. **RESULTS:** 20 consecutive patients with ITB indication were recruited; 13 received an ITB implant during the study period; 1 implant was rejected and thus explanted. 12 patients, of whom 10 had spasticity due to spinal-cord injury, 1 to multiple sclerosis and 1 to adrenoleukodistrophy, provided data for the study and 9 completed follow-up. After 12 months of ITB, mean changes from baseline were: -2.6 on the Penn scale (p=0.011), -1.1 (p=0.059) and -2.8 (p=0.011) on the Ashworth upper and lower scale, respectively and +4.4 on the FIM scale (p=0.075). Mean utility gain, assessed with the HUI3 scale, was 0.054 (p=0.091) after 1 year. Mean total ITB test and permanent implant cost per patient were €528 and €14,225, respectively. Mean quarterly spending on oral antispastics decreased by €42 at month 12, while consumption of intrathecal baclofen stabilized after 6 months at €39. At baseline, 4 patients received botulinum injections, while none did at the end of follow-up. Catheter-related adverse events occurred in 2 out of 12 patients, with a total mean cost per event of €2.387. While waiting to receive ITB, spasticity-related hospitalizations due to urological complications occurred in 2 out of 20 patients, with a mean cost of € 9.044 per event; no such events were observed after ITB implant. **CONCLUSIONS:** Clinical outcomes of patients with N-FDS improved after ITB. Initial therapy costs were considerable, but were partially offset by savings in drugs and spasticity-related events after 1 year follow-up. Results should be interpreted cautiously because of the small number of observations.

PND35

NUEDEXTA FOR THE TREATMENT OF PSEUDOBULBAR AFFECT: ESTIMATING THE FINANCIAL IMPACT TO THE SCOTTISH NHS

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OBJECTIVES: Pseudobulbar Affect (PBA) is a neurologic disorder of emotional expression, resulting in frequent and involuntary episodes of crying and/or laughing. Common neurological conditions associated with PBA include: Alzheimer's disease, amyotrophic lateral sclerosis, multiple sclerosis, Parkinson's disease, stroke and traumatic brain injury. Nuedexta® (Avanir Pharmaceuticals Inc.) is the only EMA-approved PBA treatment. The financial impact of introducing Nuedexta to a national health care system, including Scotland, has never been formally estimated. **METHODS:** An Excel® based cost-calculator was developed. Prevalence, epidemiology and mortality estimates for causative neurological conditions as well as PBA prevalence in those conditions were sourced from the literature. Unit costs (drugs, hospitalisation etc.) were taken from national databases and standard care treatment mix and resource use were derived from a US claims database. A range of market uptake rates were used with further sensitivity analyses undertaken. **RESULTS:** The estimated cost of standard care in Scotland for PBA is circa £32.4 million annually (circa 22,500 patients). In year 1 following introduction, 67 patients are expected to receive Nuedexta, resulting in a cost increase by £0.1 million to £32.5 million. By year five, 836 patients are estimated to receive Nuedexta, resulting in a projected total annual cost of £34.6 million. Therefore the estimated annual budget impact of Nuedexta ranges from £0.15 million (year 1) to £1.88 million (year 5). The incremental cost per patient is £2,246. The model was sensitive to changes in uptake rates, cost of background therapy and PBA symptom severity. When patients with moderate to severe PBA symptoms receive treatment, the projected cumulative year 5 budget impact estimate is £7.56 million. **CONCLUSIONS:** The estimated financial impact of introducing Nuedexta in Scotland is modest. Even if more patients are identified, the relatively small incremental cost per-patient of Nuedexta is unlikely to have a major impact on the Scottish NHS.

PND36

ANALYSIS OF EXPENDITURE IN MULTIPLE SCLEROSIS DISEASE MODIFYING THERAPIES EVOLUTION BETWEEN 2004-2013 IN SPAIN

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OBJECTIVES: To analyze factors of recent evolution of Multiple Sclerosis (MS) Disease Modifying Therapies (DMT) budgets in Spain between 2004 and 2013. **METHODS:** 2004-2013 single DMT monthly expenditure was provided by IMS Health. Monthly and annually evolution of number of patients, billing, drug cost per patient and cost per year of treatment were calculated. Two periods: 2004-2013 and 2007 (start marketing second lines DMT) -2013 period were analyzed for each DMT line. (First line: subcutaneous and intramuscular interferon (IFN) β-1a, subcutaneous IFN β-1b and glatiramer acetate injection. Second line: natalizumab and fingolimod). **RESULTS:** During 2004-2013 DMT expenditure increased from €115.5M to €319.3M due to: A greater number of patients 147% (10.60 % annual growth per year) and a further growth of annual cost per patient: 12% (1.29 % annual growth per year). In December 2013 second lines correspond to a 29.61% of DMT expenditure. Annual cost per patient in second line represents 70% over cost per treated patient and 83% greater than first line DMT cost per year. If year 2007 is omitted from analysis (Only 68 second-line treatments and M1.44€ of associated expense) and is analyzed 2008-2013 period, second-line DMT represent 43% of new treatments causing a 60% increase in DMT expenditure. In 2013 second line DMT participation reaches 64% of new regimens causing the 79% of increase DMT expenditure. **CONCLUSIONS:** The growing incorporation of new therapies and the noticeable rise in the number of treated patients (10.60 % annual growth per year) are components to consider in the pharmaceutical budget management.

PND37

HEALTH CARE RESOURCE USE AND COST OF MULTIPLE SCLEROSIS IN SLOVAKIA: RESULTS FROM THE NATIONAL CROSS-SECTIONAL STUDY

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OBJECTIVES: Comprehensive economic costs of multiple sclerosis (MS) according to EDSS states can only be assessed by evaluating MS management in real clinical practice. The objective of this cross-sectional study was to measure the

resource utilisation and the costs associated with health care management of MS in Slovakia and to provide a basis for cost-effectiveness evaluations. **METHODS:** Descriptive epidemiological data of 2,552 MS patients from 27 MS-centers across Slovakia were collected electronically and analyzed. In 152 selected patients followed up in 2011-2012 in 34 MS centers, all types of health care services and costs were analyzed. These patients were randomly included in the study. Continuous variables were calculated using standard descriptive statistical methods. **RESULTS:** 77% of patients had the relapsing-remitting form of MS (RRMS); 60 % of patients were in EDSS 1-3, mean age of patients at the time of diagnosis was 32.3 (± 9.7) years, and 68% of patients were females. Total direct health care costs, DMT excluded, ranged from €752 to EDSS 1 to €2,839 to EDSS 7, being the lowest for EDSS9 (at €963). Costs for DMT ranged from €8,584 for EDSS1 to €13,026 in EDSS4, being lower for EDSS6 (€1,668) and none for EDSS7-9.67% patients were receiving 1st line DMT, and 14 % receiving 2nd line treatment. DMT was mostly applied in EDSS 2 (97%). The most frequently used DMTs were glatiramer acetate (20%), interferon beta-1a IM (15%), natalizumab (9%) and fingolimod (5%). The most expensive grade 1/2 adverse events were abdominal pain (46.62 €), pain in joints, back and arms (39.35 €). **CONCLUSIONS:** This cross-sectional study determined the average annual direct cost per MS patient to be €1,640; DMT excluded. As the EDSS increases, DMT costs decrease (except of EDSS1-2) and the costs of medical devices rise.

PND38
COST OF HEALTH CARE SERVICES OFFERED BY PARKINSON DISEASE ASSOCIATIONS IN SPAIN
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OBJECTIVES: In Spain, Parkinson Disease Associations (PDA) offers a wide range of care services with partial and variable financial support from the government. The study objective was to estimate the costs of PDA services and to calculate the potential savings that they represent to the National Health System (NHS). **METHODS:** A survey conducted by the Federation of PDA collected information on their location, number of members, type and use by patients of the offered services. Services were classified according to whether or not they were financed by the NHS, based on the existing national portfolio for reimbursed services. Weekly use was recorded and costs were calculated upon official rates (updated to €, 2014). Potential savings for the NHS were estimated by calculating the weekly cost associated to unfinanced services that were provided by the PDA. **RESULTS:** 42 Spanish PDA that embraced a total of 11,420 patients participated in the study. From the 26 services offered, speech therapy (n=41), physiotherapy (n=39), cognitive stimulation (n=23) and occupational therapy (n=23) were the most frequently offered and used. The weekly cost associated to the provided services was €655,219.87 [mean: €15,980.97 (SD: 22,662.98)] per PDA. 53.8% of services were classified as potentially refundable by the NHS. Costs assignable to potentially financed services represented 78.29%, reaching savings for the NHS of €512,971.60/week. The cost of physiotherapy (27.3%) and of the adapted transport (21.3%) were the main components. Costs attributable to services not usually financed by the NHS accounted for 21.71% (€142,248.23), mostly attributable to cognitive stimulation costs (63.39%). **CONCLUSIONS:** PDA offer valuable services to patients and carers and afford a major proportion of the costs of the supportive and complementary care of the disease. Their economic efforts imply great savings to the NHS in Spain.

PND39
THE IMPACT OF ADHERENCE AND DEVELOPMENT OF NEUTRALIZING ANTIBODIES TO INTERFERONS Β ON TREATMENT OF MULTIPLE SCLEROSIS IN THE CZECH REPUBLIC
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OBJECTIVES: To compare clinical outcomes (reduction in relapse number) and costs associated with multiple sclerosis (MS) treatment with one of the interferon β in the Czech Republic in five-year horizon based on development of neutralizing antibodies (NAbs) and patient non-adherence. Intramuscular (IM) interferon β-1a is characterized by very high adherence rate and low rate of NAbs production. **METHODS:** Markov cohort model was developed with one-year cycle length. In the Czech Republic, patients with MS initiate treatment with one of the interferon β. NAbs-positive patients (in the model, NAbs are detected during the second year of treatment and thereafter) are switched/escalated to a different disease modifying drugs; DMD (glatiramer acetate, fingolimod, natalizumab). If patients experience two or more relapses during one year of treatment, they are escalated to fingolimod or natalizumab. Adherence data, development of NAbs, relapse rate and costs were sourced from the literature. **RESULTS:** One hundred patients, who initiated treatment with IM interferon β-1a, experienced 287 relapses over 5 years. Those, who started treatment with subcutaneous (SC) interferon β-1a and interferon β-1b, experienced by 15 and 19 relapses more. In one hundred patients, total cost of treatment with IM interferon β-1a was 6.4 million €. This was about 139-200 thousand € less compared to SC interferon β-1a and interferon β-1b. Hence incremental cost-effectiveness ratio was -262 thousand €/relapse avoided and -285 thousand €/relapse avoided. **CONCLUSIONS:** Intramuscular interferon β-1a represents dominant intervention in MS treatment, i. e. cost-saving treatment from payer's perspective and simultaneously more efficacy intervention in terms of reduction in number of relapses due to better patient adherence and lower incidence of NAbs compare to the other interferons β in the Czech Republic. The one-way sensitivity analyses showed that results are the most sensitive to DMD costs and relapse rate.

PND40
AN ECONOMIC EVALUATION OF SUBCUTANEOUS AND INTRAMUSCULAR INTERFERON BETA-1A IN MULTIPLE SCLEROSIS USING A DIRECT HEAD-TO-HEAD STUDY
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OBJECTIVES: To use health economic modeling techniques to quantify and compare the clinical and economic outcomes associated with the use of subcutaneous interferon beta-1a (scIFNβ1a) vs. intramuscular interferon beta-1a (imIFNβ1a) over 2 years in the management of relapsing forms of multiple sclerosis (MS) from a US health care payer perspective. **METHODS:** The 2-year decision analytic model was populated with IMS LifeLink Plus prevalence and treatment data, and clinical data from the EVIDENCE (EVidence of Interferon Dose-response: European North American Comparative Efficacy) study, a direct head-to-head comparison of 44 mcg scIFNβ1a three times a week vs. 30 mcg imIFNβ1a once a week. Relapse data from 16-month results were extrapolated for the 2-year model. Disease-modifying drug (DMD) costs were based on 2014 wholesale average cost with consideration of patient copayment in the base case. The model was created with the ability to customize the rate of copayment as well as to incorporate contractual discounts, if desired. One-way sensitivity analyses were conducted on key parameters using alternate plausible values, including the rates of real-world DMD adherence. **RESULTS:** For a hypothetical health plan with 1 million members, it is estimated that 911 patients with MS would be treated with DMDs. More relapses were avoided with scIFNβ1a over 2 years (979) than with imIFNβ1a over 2 years (778). The average cost-effectiveness of 44 mcg scIFNβ1a was lower (more favourable) than the average cost-effectiveness of 30 mcg imIFNβ1a ($123,854 vs. $148,749 per relapse avoided). Sensitivity analyses around model input values showed the model was robust and cost-effectiveness results were consistent. The model results are most sensitive to drug cost. **CONCLUSIONS:** Cost-effectiveness assessment may facilitate the decision-making process in selecting MS treatments. Using the highest-quality clinical data (Level 1, head-to-head study, EVIDENCE), the cost-effectiveness of 44 mcg scIFNβ1a was shown to be favourable compared with 30 mcg imIFNβ1a.

PND41
COST-EFFECTIVENESS EVALUATION OF DATA FROM THE EVIDENCE (EVIDENCE OF INTERFERON DOSE-RESPONSE: EUROPEAN NORTH AMERICAN COMPARATIVE EFFICACY) STUDY
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OBJECTIVES: To evaluate the cost-effectiveness of 44 mcg subcutaneous interferon beta-1a (scIFNβ1a) and intramuscular interferon beta-1a (imIFNβ1a) during the comparative and open-label extension phases of the EVIDENCE (EVidence of Interferon Dose-response: European North American Comparative Efficacy) study. **METHODS:** A decision analytic model from a US health care payer perspective was populated with 2-year data from the EVIDENCE study of imIFNβ1a and 44 mcg scIFNβ1a (comparative and open-label extension phases). EVIDENCE results showed that the annualized relapse rate of 44 mcg scIFNβ1a patients was 0.46 during the comparative phase and 0.34 during the open-label extension phase. The annualized relapse rate of imIFNβ1a patients during the comparative phase was 0.64. imIFNβ1a patients who switched to 44 mcg scIFNβ1a for the open-label extension phase had an annualized relapse rate of 0.32. These data were used to model the cost-effectiveness of 44 mcg scIFNβ1a and imIFNβ1a patients during the comparative phase as well as for the combined comparative and open-label extension phases (for patients remaining on scIFNβ1a throughout and for those switching from imIFNβ1a in the comparative phase to scIFNβ1a in the open-label extension). Disease-modifying drug (DMD) cost was based on 2014 wholesale average cost with consideration of patient copayment in the base case. **RESULTS:** The cost-effectiveness for 44 mcg scIFNβ1a and imIFNβ1a during the comparative phase was $123,854 and $148,749 per relapse avoided, respectively. The cost-effectiveness of patients who remained on 44 mcg scIFNβ1a throughout the study was $99,398 per relapse avoided, while the cost-effectiveness of imIFNβ1a patients who switched to 44 mcg scIFNβ1a for the open-label extension was $116,404 per relapse avoided. Sensitivity analyses showed that the model was robust and was most sensitive to DMD cost. **CONCLUSIONS:** This decision analytic model evaluation shows that remaining on 44 mcg scIFNβ1a and switching from imIFNβ1a to 44 mcg scIFNβ1a were cost-effective treatment strategies.

PND42
ECONOMIC EVALUATION OF LACOSAMIDE IN THE MANAGEMENT OF EPILEPTIC PARTIAL ONSET SEIZURES IN GREECE
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OBJECTIVES: To assess the cost-effectiveness of Lacosamide (LCM) in the management of epileptic partial onset seizures (POS) versus standard AED therapy in Greece, as well as its impact on the health care budget. **METHODS:** A cost-effectiveness model was developed simulating the treatment pathway of a hypothetical cohort of 1000 patients over two years. A comprehensive literature search was conducted to identify local resource use data for medical, pharmaceutical and hospital treatment. Due to lack of relevant data, an expert panel with 8 neurologists was convened. The perspective was that of the Social Insurance Fund, and unit costs were taken from officially published sources (Ministry of Health and Social Insurance Fund). Primary and secondary analyses were carried out, in which the treatment algorithm was based on trial data and was adapted to the Greek setting, respectively. Deterministic and probabilistic sensitivity analyses were conducted to test the model' results. In addition, a budget impact analysis (BIA) was carried out to estimate the annual cost of treating uncontrolled epileptic patients in Greece. **RESULTS:** Treatment with LCM was shown to be dominant compared to standard therapy, as it is associated with 38 additional QALYs and reduced cost by €410,024 and €754,684 in the primary