develop a tool that enables standardized and consistent driving messaging across clinicians working in a specialist memory clinic, across the span of cognitive disorders **Methods:** We developed a driving recommendations generator that allows clinicians to produce information handouts personalized to individual patient capabilities and needs. Clinicians select from a list of established recommendations that were developed with neurologist and geriatrician input, and consistent with provincial requirements. Recommendations cover patients' current driving ability, road safety examinations, alternate transportation, and license revocation. Early driving retirement is emphasized and encouraged, to proactively support patients' choices, safety and independence. Recommendation and handouts are printed for the patients. **Results:** Patients reported that the recommendations were easy to read and understand, and helped them to implement physician suggestions. All surveyed clients recommended continuing to provide such recommendations to future patients and families. Clinicians agreed that the tool helped them to save time, and simplified the process of finding accurate information to provide patients. **Conclusions:** Clinicians have found the system timesaving and useful for simplifying the process of providing helpful, informative resources for patients.

P.012

SketchNet: Equipping Cognitive Examinations With Neural Network Computer Vision

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Background: With the advance of technology, our capacity to assess patients with dementia is also developing. It is possible to administer cognitive examinations using technology, such as the iPad-based Toronto Cognitive Assessment, but hitherto difficult to autonomously administer them. Many of the 'inputs' from patients could be easily scored with software, but highly variable inputs such as the clock drawing are extremely difficult to score, precluding automated administration and scoring. This work focuses on the development of a neural network designed to assess cube drawings, infinity drawings, and clock drawings. **Methods:** 3200 drawings, evenly split between clocks, cubes and infinities were generated, with half being correct and half incorrect. A SqueezeNet was trained on 2000 images, validated on 800 drawings, and then tested on 400 drawings. **Results:** The SqueezeNet was able to achieve 97% accuracy on 400 images it had never seen before in categorizing images as "Cube", "Clock",

"Infinity", or "Other" (incorrectly drawn). **Conclusions:** This neural network can successfully determine the difference between correctly and incorrectly drawn images commonly used in cognitive examinations, overcoming the final barrier to autonomously administering and scoring cognitive examinations. Next steps are to clinically validate an autonomous examination program which has been modeled after the Addenbrooke Cognitive Examination-3.

P.013

Machine Learning on Drawing Tests of Cognition: A Systematic Review

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Background: Machine learning (ML) methods hold promise in allowing early detection of dementia. We performed a systematic review to assess the quality of published evidence for using ML methods applied to drawing tests of cognition, and to describe the accuracy of the methods. Methods: Embase, Medline, and Cochrane Central Library databases were searched for potential studies up to December 8, 2018 by four independent reviewers. Included articles satisfied the following criteria: 1) use of ML on 2) a drawing test in order to 3) assess cognition. The quality of evidence was then assessed using GRADE methodology. Results: The initial search yielded 4620 citations. Of these, 64 were eligible for full text review. 18 articles then met inclusion criteria. Median AUC across all models was 0.765, with certain ML algorithms performing better in terms of AUC or diagnostic accuracy. However, based on GRADE, the quality of evidence was deemed very low. Conclusions: ML has been applied by several groups to drawing tests of cognition. The quality of evidence is currently too low to make recommendations on their use. Future work must focus on improving reporting, and using standard algorithms and larger, more diverse datasets to improve comparability and generalizability.

P.014

A Novel Canadian Family with the Rare IVS10+14 Tau Mutation

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Background: The IVS10+14 mutation in the microtubule-associated protein tau gene, *MAPT,* is a rare point mutation that dysregulates tau splicing resulting in pathological aggregation. This mutation has been identified in three families with severe neurodegenerative disease. We characterized the clinicopathological features of a fourth, Canadian family with the IVS10+14 *MAPT* mutation and compared them to previously reported families. **Methods:** Clinical and neuropathological records from three family members with the IVS10+14 *MAPT* mutation were reviewed. Neuropathological section from one available case were analyzed. **Results:** Considerable interfamilial phenotypic heterogeneity is reported in all cohorts that express the IVS10+14 *MAPT* mutation, with prominent motor, cognitive, behavioural, and respiratory symptoms. The Canadian cohort also expressed profound sensory and sleep abnormalities, not reported previously. In the two siblings with available neuropathological

records, neuropathological changes ranged from mild to severe. **Conclusions:** All families expressing the IVS10+14 *MAPT* mutation display striking inter- and intrafamilial clinical and neuropathologic phenotypic variability. Our cohort adds sensory and sleep abnormalities as potential symptoms and illustrates a lack of clear clinicopathological correlates for these heterogenous symptoms.

Reference: Maxwell et al. 2021. Clinical and Neuropathological Variability in the Rare IVS10+14 Tau Mutation. Neurobiology of Aging. In Press. *DOI: 10.1016/j.neurobiolaging.2021.01.004.*

P.015

What Happens to the Worried Well? – Follow-up of Subjective Cognitive Impairment

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Background: Concern around perceived neurocognitive decline is increasing, leading to increased number of referrals and anxiety for patients. We aimed to explore the likelihood of the "worried well" experiencing neurocognitive decline. **Methods:** 166 "worried well" patients who attended the Rural and Remote Memory Clinic between 2004 and 2019 were included. Mini Mental Status Examination, Center for Epidemiologic Studies Depression Scale, and Functional Assessment Questionnaire scores were measured and compared at initial assessment and at 1-year follow-up. MMSE scores over time were assessed with a mean follow-up of 2.95 years (SD 2.87). **Results:** There was no statistically significant difference in MMSE, CESD, or FAQ scores between clinic day and one-year follow-up, and no consistent pattern of MMSE score over time. Of the 166 patients with SCI on initial assessment, nine were eventually given a neurological diagnosis. **Conclusions:** There is no pattern of neurologic decline observed in the "worried well". Though the likelihood of a patient with SCI developing a neurological diagnosis is reassuringly low, (9/166), it is not irrelevant. This, along with the benefits of early diagnosis and treatment for dementia, leads us to believe that patients with SCI should still be seen in follow-up at least at the one-year mark.

P.016

Hypertensive disorders in pregnancy are associated with future development of vascular dementia: A systematic review and meta-analysis

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Background: We aimed to evaluate the association between hypertensive disorders in pregnancy (HDP) and future risk of cognitive impairment and dementia. **Methods:** Systematic searches were performed in MEDLINE and EMBASE up to April 27th, 2020. Exposure of interest included the different types of HDP. Outcomes of interest included dementia incidence, dementia subtype, and cognitive testing. **Results:** On qualitative review, 4/9 studies showed impaired memory, visual motor processing speed, executive function, and verbal testing in previously preeclamptic women. 2/4 studies showed impaired visual motor processing and subjective cognitive complaints in previously eclamptic women. Six cohort studies involving >2.6 million women were included in the meta-analysis. Pooled hazard ratios (aHR) with 95% confidence intervals were generally adjusted for age at delivery ethnicity, and vascular risk factors. Women with a history of gestational hypertension were more likely to develop vascular dementia (aHR 2.02 [1.45-2.83], I^2:0%), but not Alzheimer disease (1.24 [0.93-1.66],single-study). Women with a history of preeclampsia were also more likely to develop vascular dementia (2.17 [1.20-3.91],I^2:61.1%), but not Alzheimer dementia (1.19 [0.83-1.69],I^2:69.9%). **Conclusions:** Whereas studies of neuropsychological testing in previously preeclamptic and eclamptic women have been heterogeneous, a history of HDP is associated with developing vascular dementia in later life.

Epilepsy and EEG

P.017

Nutritional deficiency: A mysterious case of psychosis and seizures

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Background: As a neuroactive steroid, vitamin D is essential for optimal neuronal functioning[1]. Its immunomodulatory and neuroprotective effects aid in reduction of proconvulsant cytokines, membrane excitability and seizure prevention[2-3]. Deficiency plays an important role in neurological and psychiatric illnesses, though clinical manifestation with seizures and psychosis have not been described. **Methods:** A 61-year-old female presented with 3-day history of confusion, insomnia and new onset seizure. She was noted to have poor dentition, deformed nail bed and multiple ecchymosis. Neurologically, there were brisk reflexes with some spread. She worsened with frequent seizures and psychosis. **Results:** Laboratory investigation showed serum Vitamin D level of 19nmol/L, hemoglobin of 70g/L. MRI head revealed T2 hyperintensities in bilateral anterolateral temporal lobes and EEG consistent with bitemporal lobe epilepsy. Autoimmune and infectious work up were negative. Treatment with antipsychotics, several antiepileptics, high dose Vitamin-D and iron supplements were initiated. Initially, she remained unresponsive to neuro/psych medications. Improvement in clinical symptoms was noticed in 4th week of admission, with complete resolution of MRI, EEG findings. **Conclusions:** Evidence surrounding hypovitaminosis D and risk on the central nervous system continues to grow. This case highlights the significance of vitamin-D on brain processes and its neurological manifestations in state of deficiency.

1. Kalueff.A.,2006. 2. Garcion. E, 2003. 3. Eyles, D., 2013.