

# Discriminative Ability and Predictive Validity of the Timed Up and Go test, TUG, in Identifying Falls Risk in People with Multiple Sclerosis

Gillian Quinn<sup>a,b</sup>, Dr Rose Galvin<sup>a</sup>, Dr. Chris McGuigan<sup>b</sup>, Laura Comber<sup>a</sup>, Prof. Susan Coote<sup>a</sup>,  
Clinical Therapies Dept, University of Limerick<sup>a</sup>, St Vincent's University Hospital Dublin<sup>b</sup>.

## Background

Multiple Sclerosis is a chronic disease with a high falls incidence of greater than 50% (Nilsagard 2015). Gait and balance are commonly impaired in MS which can result in the occurrence of falls. The International MS Falls Prevention Research Network (IMSFPRN) recommends the assessment of dynamic balance as part of a comprehensive falls risk assessment (Cattaneo 2014). Many different clinical measures have been used to assess balance and falls risk in MS but no one specific measure has been recommended to reliably identify future falls risk. Predictive tools are essential to allow early identification of PwMS who are at risk of falling and initiate more timely and appropriate falls prevention interventions. The Timed Up and Go (TUG) (see Figure 1) is a dynamic walking test frequently used by clinicians; it is an objective measure which is quick to administer, does not need any special equipment and therefore is useful for busy neurology clinics.

## Aim

The objective of this analysis is to determine the discriminative ability and predictive validity of the TUG in identifying falls risk in people with MS (PwMS).



Figure 1. TUG Administration

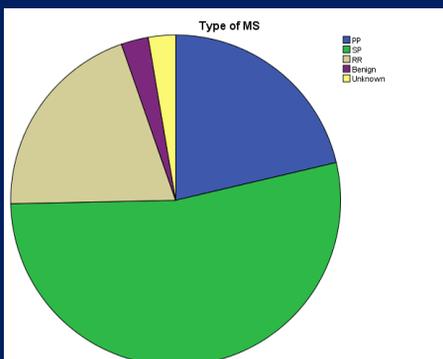
## Methods

Consecutive patients with MS attending the Neurology service in a tertiary hospital were recruited. Data collected included the EDSS score (disability), time since diagnosis, type of MS and walking aid(s) used. Consenting participants completed a questionnaire of falls risk factors and the TUG as part of the baseline assessment.

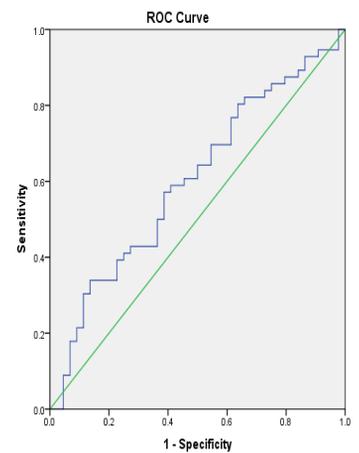
Falls were prospectively recorded for 3 months using falls diaries and participants were also asked about retrospective falls. A descriptive analysis of the data was carried out using SPSS. Paired t or related non-parametric tests were used to test for significant changes between fallers and non fallers and receiver operating characteristic curve (ROC) analysis was used to examine the predictive validity of the TUG.

## Results

Mean age (N= 100) was 52.6 (10.7) and 66% were female. Mean EDSS was 5.3 (1.1) and mean time since diagnosis was 14.3 (9) years. 72.3% of the sample had progressive MS with 73% using a mobility aid. There were 791 falls reported over the three-month period from a total of 56 participants.



## Results



The median TUG for fallers was 11.99 (IQR 7.7) and for non-fallers was 11.19 (IQR 5.3) and for recurrent fallers (2 or more falls) was 11.25 (IQR 4.8). There was no significant difference between fallers and non-fallers in the TUG ( $p = 0.09$ ) or between recurrent fallers and non-fallers ( $p = 0.52$ ). The diagnostic accuracy of the TUG was poor with an AUC value of 0.6 ( $p = 0.09$ ). With a cut point of 9 seconds the TUG has 82% sensitivity and 34% specificity in identifying fallers among PwMS.

## Conclusion

The TUG alone should not be used to identify falls risk in PwMS. It may be useful as part of a falls prediction tool in conjunction with cognitive scores and other clinical variables. Further regression analysis will be used to develop a more sensitive falls risk algorithm and thus prompt more focused and timely interventions.

### References:

- Nilsagård, Y., et al. (2015). "Falls in people with MS—an individual data meta-analysis from studies from Australia, Sweden, United Kingdom and the United States." *Multiple Sclerosis (Houndmills, Basingstoke, England)* 21(1): 92-100.
- Cattaneo, D., et al. (2014). "Targeting Dynamic Balance in Falls-Prevention Interventions in Multiple Sclerosis: Recommendations from the International MS Falls Prevention Research Network." *International Journal of MS Care* 16(4): 198-202.