

# Multiple Sclerosis in the Argentine Patagonia: Lack of a Latitude Gradient

Mario O. Melcon<sup>1</sup>, Leonor Gold<sup>2</sup>, Adriana Carra<sup>3</sup>, Fernando Cáceres<sup>4</sup>, Jorge Corrales<sup>5</sup>, Edgardo Cristiano<sup>6</sup>, Nora Fernandez Liguori<sup>7</sup>, Orlando Garcea<sup>8</sup>, Geraldine Luetic<sup>9</sup> and Marcelo Kremenchtzky<sup>10</sup>

From **1** Foundation for Neuroepidemiology Research, Junin, Buenos Aires Province, Argentina • **2** President INEBA - Institute of Neurosciences Buenos Aires • **3** MS Section, Hospital Británico Buenos Aires • **4** Director INEBA - Institute of Neurosciences Buenos Aires • **5** Neuroimmunology Section - FLENI, Buenos Aires • **6** MS Section, Italian Hospital, Buenos Aires • **7** MS Section, INEBA - Institute of Neurosciences Buenos Aires • **8** Clinical Neuroimmunology, Ramos Mejia Hospital, Buenos Aires • **9** MS Section, Hospital Británico, Rosario • **10** London Health Science Center, University of Western Ontario, Canada. For the Patagonia Project of MS (PPMS) Neuroepidemiologic Study Group



## Objectives

- To determine the prevalence of multiple sclerosis (MS) in the Patagonia.
- To evaluate whether or not there is a north/south gradient in MS prevalence in the southern hemisphere, in particular in the Argentine Patagonia.
- To assess optimal case-finding strategies for this kind of research in the region.

## Background

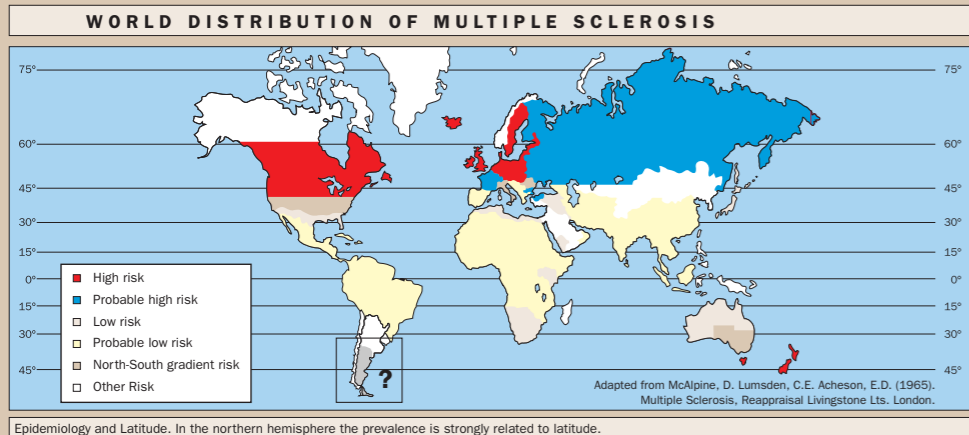
A latitude gradient, which postulates a higher prevalence directly related to the distance from the Equator, has been supported by prevalence studies in the Northern hemisphere<sup>4-5,6,7</sup> and to certain extent in Australia<sup>9,10</sup>. Currently there are only two preliminary surveys of MS prevalence in Argentina: the Junin Study<sup>2</sup> and the Buenos Aires Study<sup>3</sup>.

- The **Buenos Aires Study**, 34°S, capture/recapture method, **18/100.000** Cristiano E et al<sup>3</sup>
- The **Junin Study**, 34 °S, multiple case finding method, **12/100.000** Melcon M et al

Other relevant work to the one being presented, are:

- The **Uruguay Study**: **20.2/100.000**. Ketzoian C et al<sup>8</sup>
- The **Rio de Janeiro Study**: a prevalence rate of **5/100.000**. Alvarenga RMP et al<sup>11</sup>
- In **Australia**, a latitude gradient has been demonstrated to a certain extent from 79.9 in Otago to 18.3 in Queensland, the farthest north territory studied.

- A number of studies showed a north-south gradient for the northern hemisphere.
- There is a lack of prevalence studies in the region between parallels 36°S and 55°S.
- Based upon this information, it was expected that the prevalence of MS at this latitude would be higher than those of Buenos Aires, Junin and even Uruguay.



## Material and Method

- This is a descriptive epidemiological study.
- The study was conducted as a population-based one in the Argentine Patagonia between 36°S and 55°S latitude, using multiple case-finding methods. Four cities located at increasing southern latitudes were selected: Neuquen 39°S, Trelew 43°S, Rio Gallegos 51°S and Ushuaia 55°S.
- The population under study was **417,666 inhabitants**, which represents **24%** of the total Argentine Patagonia population.
- The prevalence day, and we defined crude point prevalence as the number of confirmed MS cases in a given population at a precise moment, was established as **March 1, 2002**.
- Most of the population is of European descent and Mestizos.
- One or more neurologists with experience in MS, confirmed each case's diagnosis.

The study was divided in 2 phases

**Phase I :** We established the network with multiple sources of information (see Table 1) A public awareness campaign was run by the national MS society (EMA) during the study period (2002) and information was provided through local newspapers, radio and TV stations explaining the goal of the study and its importance. Teaching activities on MS were organized to inform and educate professionals, patients, families and the community.

TABLE 1: SOURCES OF INFORMATION
Neurologists practice review
Other physicians practice review, such as ophthalmologists, neurosurgeons, internists.
MS clinics
MS societies
Hospital charts review
Health care providers. National or regional health systems
Chronic care facilities
Media announcements
Self or family member identification

**Phase II:** Evaluation phase. For data verification, listing of the identified cases and information sources, diagnostic confirmation according to Poser's criteria<sup>1</sup> as well as including data into the registry.

- A specifically designed survey for the study was used and it was administered to all cases, suspected of having MS.
- A signed consent form was obtained in all cases.
- Official statistical data provided by the INDEC (National Institute of Statistics and Census) were used.
- Provincial governments and local public health offices data were integrated in the process.

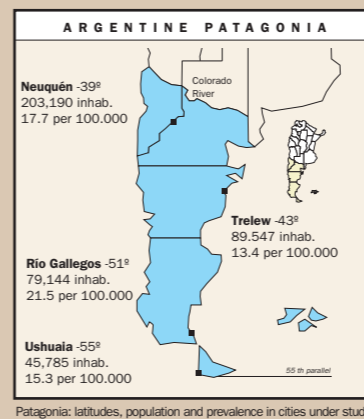
## Results

A total number of 140 subjects were included. **72 cases fulfilled Poser's diagnostic criteria for MS.**

- Distribution:
- 97% of patients were classified as having clinically definite MS
  - 3% as laboratory-supported MS.

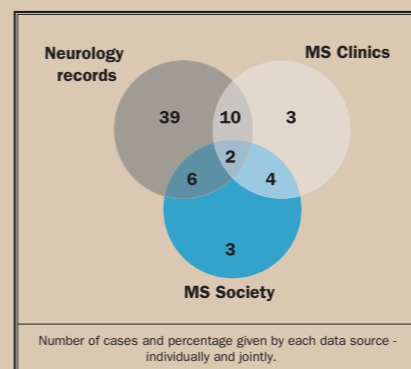
The point prevalence rate for the 4 cities in Argentina Patagonia was **17.2 per 100,000**.

City and Latitude	Inhabitants	Prevalence rate (per 100,000)
Neuquén - 39°S	203,190	17.7
Trelew - 43°S	89,547	13.4
R.Gallegos - 51°S	79,144	21.5
Ushuaia - 55°S	45,785	15.3
<b>Total Population</b>	<b>417,666</b>	<b>17.2</b>



### Sources of Information

Neurologists' records contributed to 57 cases (79.2 %) while MS Clinic identified 19 cases (26.4 %). 12 cases were coincident from both sources, which led to 64 MS patients out of a total of 72 (88,9%). MS Society yielded 15 cases in all, only 3 of which were not identified by any of the other sources. The remaining 12 cases were coincident as well. This led to 67 MS cases of a total of 72 (93.05%). Media announcement produced 3 cases and self-identification or from family members 1 case, leading to a total of 71 out of 72 cases (98.6%) Chronic-care facilities yielded only 1 case that was not identified by other sources and this led to: 72 cases (100%). Other physicians, hospital chart review and health care provider, did not add new cases.



### Clinical Data

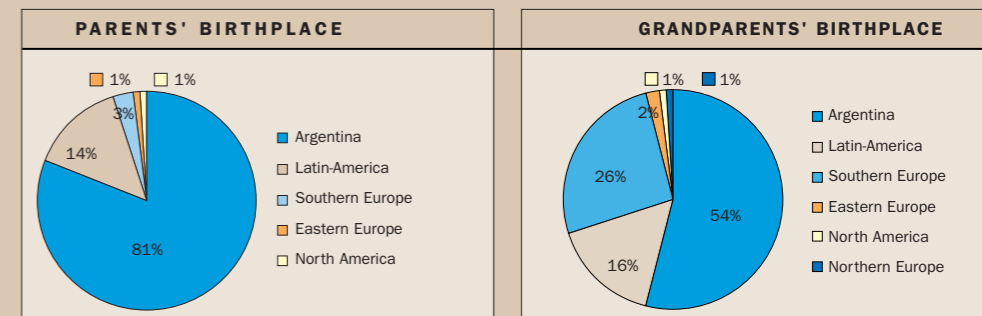
- Sex: **Female** 48 (66,7) • **Male** 24 (33,3%)
- The female/male sex ratio was 2 : 1

Clinical data	Range	Median
Age at prevalence date in yrs	16-62	41.55
Average age at onset of symptoms	9-58	29.26
Duration of illness for the examined group in yrs	0-43	12.33
EDSS	0-9,5	3,8

Disease Course:
RRMS: 75% SPMS: 15% PPMS:10%

### Race

- The study population is mainly of European descent and Mestizo (94%).
- Only 6% of the study population is of aborigine descent.
- No cases of MS were identified among the aborigines.
- When seeing parents and grandparents place of birth, we found as expected, that while 26% of grandparents came from Europe, only 3% of parents did so, indicating that a larger number of patients had 1st generation Argentinean born parents.



### Migration Pattern

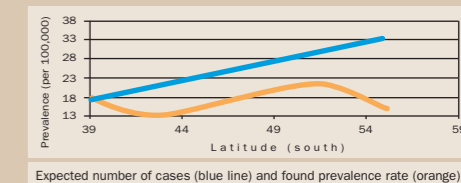
42% of the identified patients were born in the Argentine Patagonia. Of the 58% of cases that were not Patagonia-born, 90% migrated to the south, within Argentine territory.

- 7% were from the Northern region (22° - 28°).
- 22% were from Central region (28° - 34°).
- 61% were original from the Buenos Aires and the Pampa Region.
- Only 10% of the patients moved from Chile and other countries.

- 35% of the patients migrated before age 15.
- 32% had symptoms before migrating.

### Prevalence gradient

An increasing prevalence rate was expected to be found as further south away from the Equator. However, this did not occur and the graphic shows the prevalence found in the Argentine Patagonia.



## Conclusions

- The prevalence of MS in the Argentine Patagonia was **17.2 per 100,000 (medium risk)**.
- There was a **lack of a south-north gradient between 55° S and 39° S latitude south**.
- The **methodological results revealed that the highest yield sources were the neurology practice chart reviews, MS Clinics and MS Societies**.
- White population is at greater risk than aborigines in as far as it could be evaluated**
- We can not yet explain the obvious inconsistencies we found in disease distribution, but the knowledge of them will be useful in assessing further information from the data we have and indicating the direction these epidemiological surveys should take.

### References

1. Poser CM, Paty DW, Scheinberg L, McDonald WI, Davis FA, et al. New diagnostic criteria for multiple sclerosis: guidelines for research protocols. *Ann Neurol* 1983; 13:227-231. • 2. Melcon MO, Vergara RH, Ceratto R. Prevalencia de Esclerosis Múltiple en Junin (B) Argentina al 1/1/1991. *Rev Neurol Arg* 1994; 19:3-8 • 3. Cristiano E, Patrucco L, Garcea O, Carrá A, Cáceres F, Kremenchtzky M, Lopez L, Gold L, Vetere S, Tessier J. Prevalencia de multiple sclerosis (MS) in Argentina estimated by the capture-recapture method. *Neurology* 1999;52(5) Suppl 1 page 52 [abstract P05.108]. • 4. Cook SD, McDonald I, Tapp W, Poskanzer D, Dowling PC. Multiple sclerosis in the Shetland Islands: an update. *Acta Neurol Scand* 1988; 77:148-151 • 5. Swingle RJ, Compton A. The distribution of multiple sclerosis in the United Kingdom. *J of Neurol Neurosurg Psychiatry* 1986; 49: 1115-1124 • 6. Allison RS, Millar JHD. Prevalence of disseminated sclerosis in Northern Ireland. *Ulster Med J* 1954; 23 (suppl 2): 1-92. • 7. Nelson LM, Hamman RF, Thompson DS. Higher than expected prevalence of multiple sclerosis in northern Colorado: Dependence on Methodologic Issues. *Neuroepidemiology* 1986 5: 17-28 • 8. Ketzoian C, Oehringer C, Alcantara J, Rega I, Garcia M, Gomez-Anon A, et al. Estudio de la prevalencia de la Esclerosis Múltiple en Uruguay. *Acta Neurol Colomb* 1999; 15 ( SUPL): 6 • 9. McLeod G, Simon R, Hammond and Jeremy Hallpike. Epidemiology of multiple sclerosis in Australia. *Medical Journal Australia* Vol. 160, 7 February 1994 • 10. Hammond SR, English DR and McLeod JG. The age-range of risk of developing multiple sclerosis. Evidence from a migrant population in Australia. *Brain*, Vol. 123, N° 5, 968-974, May 2000. • 11. Alvarenga RMP, Santos CMM, Vasconcelos CCF, Auto I, Camargo S, Perna PS, Poser CM. Multiple Sclerosis in Rio de Janeiro. A study of 240 patients. *Lactims* 2000, Buenos Aires 2000

The PPMS supported by an unrestricted educational grant of Serono International and Fundación Mundo Sano in Argentina. • Neither the presenting author Dr. Mario Melcon nor the other authors have any significant financial interest/arrangement or affiliation with any organization/institution whose products or services are being discussed in this session. • **Acknowledgements** • The authors thank the following MDs for their active collaboration in patient's identification and facilitating patient's evaluation: **Neuquén:** Drs. N. Aguilera, J. Fernandez and J. Salcan • **Ushuaia:** Dr. P. Labal • **Rio Gallegos:** Drs. G. Arguello, M.E. Zapata, N. Rufino y S. Moreno • **Trelew:** Drs. I.Cuenca Aranda, J.D'Alfonso, R. Hughes, M. C. Ferreyra and J. Moreno • **Dolavon:** Dr. C. Ghigliotto • **Gaiman:** Dr. Mariángelo • **Buenos Aires:** Dr. S. Tenenbaum; Lic. D. Fleschler, EMA-Esc. Mult. Argentina; Lic. J. Finkelstein, study coordinator. • **WE ARE VERY GRATEFUL TO PATIENTS AND FAMILIES.**