

# Continued increase of multiple sclerosis and neuromyelitis optica in Japan; updates from the 5th nationwide survey

Noriko Isobe<sup>1</sup>, Masaaki Niino<sup>2</sup>, Takuya Matsushita<sup>1</sup>, Yuri Nakamura<sup>3,4</sup>, Ichiro Nakashima<sup>5</sup>, Mitsuru Watanabe<sup>1</sup>, Yasunari Sakai<sup>6</sup>, Ayako Sakoda<sup>4</sup>, Jin Nakahara<sup>7</sup>, Izumi Kawachi<sup>8</sup>, Hirofumi Ochi<sup>9</sup>, Yuji Nakatsuji<sup>10</sup>, Yusei Miyazaki<sup>11</sup>, Juichi Fujimori<sup>5</sup>, Kenji Kufukihara<sup>7</sup>, Tatsusada Okuno<sup>12</sup>, Shoko Fukumoto<sup>1</sup>, Fumie Hayashi<sup>1</sup>, Kousuke Yonemoto<sup>6</sup>, Ryoji Taira<sup>6</sup>, Yosikazu Nakamura<sup>13</sup>, Koshi Nakamura<sup>14</sup>, Kiyomi Sakata<sup>15</sup>, Rinako Shimada<sup>1</sup>, Makoto Matsui<sup>16</sup>, Jun-ichi Kira<sup>1,3,4</sup>

<sup>1</sup>Department of Neurology, Graduate School of Medical Sciences, Kyushu University, <sup>2</sup>Department of Clinical Research, Hokkaido Medical Center, <sup>3</sup>Translational Neuroscience Center, Graduate School of Medicine, and School of Pharmacy at Fukuoka, International University of Health and Welfare, <sup>4</sup>Department of Neurology, Brain and Nerve Center, Fukuoka Central Hospital, International University of Health and Welfare, <sup>5</sup>Department of Neurology, Tohoku Medical and Pharmaceutical University, <sup>6</sup>Department of Pediatrics, Graduate School of Medical Sciences, Kyushu University, <sup>7</sup>Department of Neurology, Keio University School of Medicine, <sup>8</sup>Department of Neurology, Brain Research Institute, Niigata University, <sup>9</sup>Department of Neurology and Geriatric Medicine, Ehime University Graduate School of Medicine, <sup>10</sup>Department of Neurology, Toyama University Hospital, <sup>11</sup>Department of Neurology, Hokkaido Medical Center, <sup>12</sup>Department of Neurology, Osaka University Graduate School of Medicine, <sup>13</sup>Department of Public Health, Jichi University, <sup>14</sup>Department of Public Health and Hygiene, University of the Ryukyus, <sup>15</sup>Department of Hygiene and Preventive Medicine, Iwate Medical University, <sup>16</sup>Department of Neurology, Kanazawa Medical University, Japan

## Backgrounds & Objective

### <Backgrounds>

1. Japan is the only one country in Asia that has regularly conducted nationwide epidemiological surveys of MS since 1972. The surveys showed the increase of MS prevalence, decrease in age of onset, milder disease progression.
2. No nationwide survey has been conducted in Japan since the discovery of anti-AQP4 antibody in NMO yet.

### <Objective>

- To clarify the epidemiological characteristics of MS & NMOSD through the 5<sup>th</sup> nationwide survey.

## Methods

1. Following the approval from IRB at Kyushu University Hospital and Iwate Medical University, Facilities were randomly selected, using pre-determined sampling rates according to the stratification based on the number of hospital beds, in addition to the facilities that extremely see these diseases.

2. Preliminary survey: started in Nov, 2018 and Secondary questionnaire: started in Feb, 2019.

**Study target period:** Jan 1<sup>st</sup> ~ Dec 31<sup>st</sup>, 2017.

### Diagnostic Criteria:

- MS: McDonald 2010
- NMOSD: Wingerchuk 2006 and/or AQP4 Ab (+)
- Baló: Concentric lesions confirmed by MRI/pathology

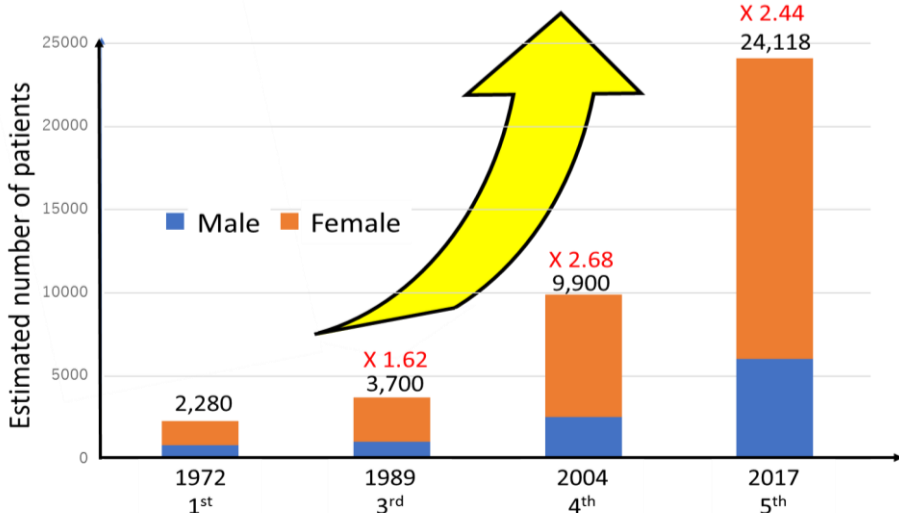
**Departments** Neurology/Internal medicine, Ophthalmology, Pediatrics

## Results

### <Response rates (RR)>

- Preliminary survey: 2,284 / 3,799 departments (RR: **60.1%**)
- Secondary survey: 6,956 / 13,067 questionnaire (RR: **53.2%**)

### <Estimated number of patients with MS & NMOSD>

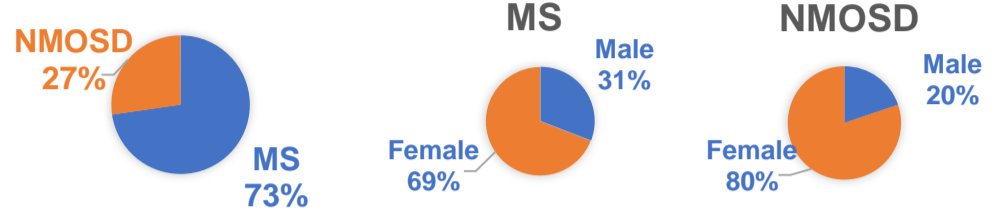


### Prevalence

MS **14.3** / 100,000 population  
 NMOSD **5.3** / 100,000 population

## Results

### <Disease & Gender compositions>

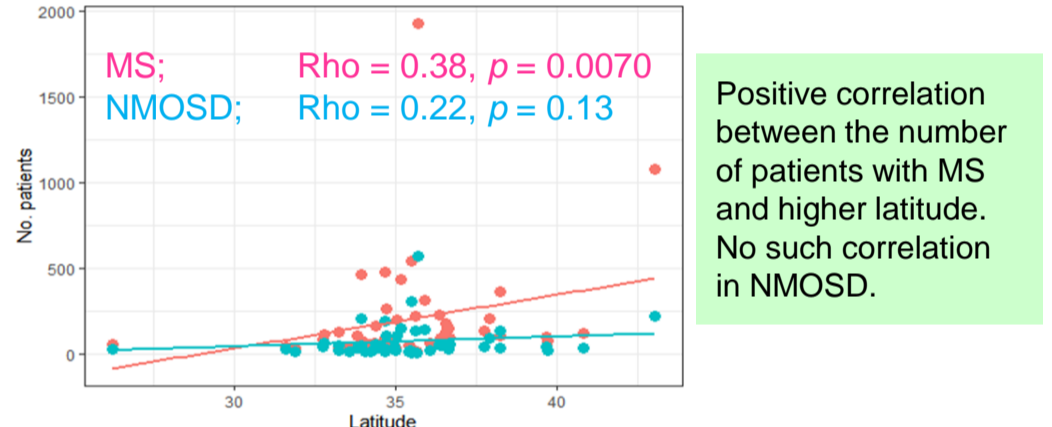


### <Demographic features in the secondary survey>

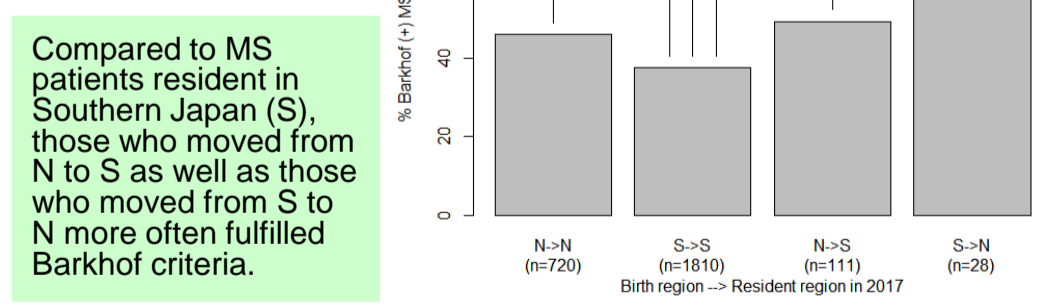
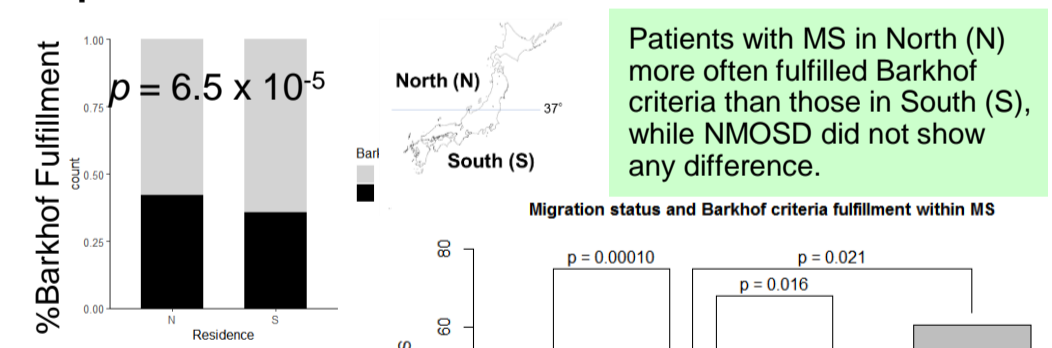
	MS (n = 4,926)	NMOSD (n = 1,829)	Baló (n = 9)
Sex (M/F, M:F)	1,446/3,462 (1:2.4)*,§	253/1,570 (1:6.2)*,§	5/4 (1:0.8)
Age at onset (y.o.)	32.3 ± 11.6*	44.1 ± 16.1*	49.6 ± 16.5
Disease duration (years)	11.6 ± 8.9*	9.5 ± 9.1*	8.8 ± 7.0
Age at exam (y.o.)	45.6 ± 12.9*	55.1 ± 15.2*	60.0 ± 15.7
EDSS	2.7 ± 2.4*	3.6 ± 2.4*	4.7 ± 3.1
Smoking (%)	1,194/3,502 (34.1%)*	239/1,239 (19.3%)*	2/7 (28.6%)
BMI	22.2 ± 4.1	22.2 ± 4.2	21.2 ± 2.9
Family history (%)	51/4,552 (1.1%)	16/1,624 (1.0%)	0/8 (0.0%)
Child birth (%) (in Female)	1,314/2,622 (50.1%)*	789/1,131 (69.8%)*	2/4 (50.0%)

\*P < 0.0001 (MS vs. NMOSD), §P < 0.01 (vs. Baló)  
 In the previous 4<sup>th</sup> nationwide survey, conventional MS patients demonstrated mean EDSS of 3.5 ± 2.9 with mean disease duration of 10.6 ± 8.4, while OSMS patients showed mean EDSS of 4.3 ± 2.7 with mean disease duration of 11.7 ± 9.1. (Osoegawa, et al. Mult Scler 2009)

### <Impact of latitude on patient distribution>



### <Impact of latitude on Barkhof criteria fulfillment in MS>



Compared to MS patients resident in Southern Japan (S), those who moved from N to S as well as those who moved from S to N more often fulfilled Barkhof criteria.

## Interpretations

- The prevalence of both MS and NMOSD appears to be still increasing.
- Disease severity may have become milder in MS and NMOSD compared with the 4<sup>th</sup> survey, though the disease durations were comparable.
- Higher latitude is a risk for MS but not for NMOSD in Japanese.
- Higher latitude contributes to higher proportion of Barkhof criteria fulfillment in MS.

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