

# The Impact of Multiple Sclerosis in the Pacific Northwest

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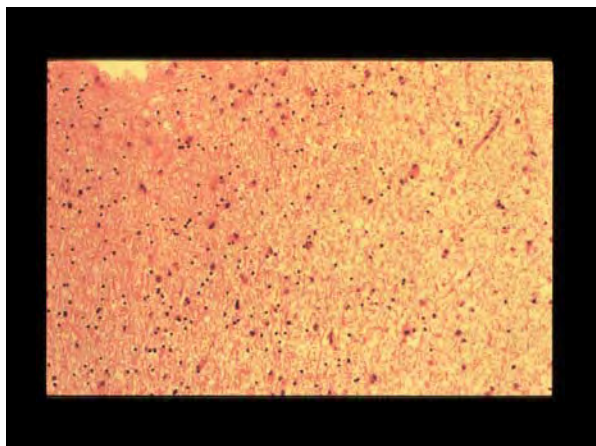
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### Motor Symptoms of MS

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- Weakness
- Spasticity - stiffness, brisk reflexes
- Ataxia
- Tremor

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### Sensory Symptoms of MS

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- Numbness
- Paresthesia (sensory signals misinterpreted)
- Pain
- Trigeminal Neuralgia
- Lhermitte's phenomenon (electrical buzzing on bending the neck)

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### Visual Symptoms of MS

- Loss of vision (optic neuritis)
- Diplopia (double vision)
- Nystagmus (eye movements jerking)
- Internuclear ophthalmoplegia (misalignment of eyes in a particular manner)

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### Paroxysmal Symptoms

- Symptoms
  - Pain/Paresthesias
  - Spasticity/Dystonia
  - Trigeminal Neuralgia
  - Lhermitte’s phenomenon

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### Autonomic Symptoms of MS

- Bladder
  - Urgency
  - Hesitancy
  - Frequency
- Bowel
  - Constipation
  - Urgency
- Sexual dysfunction

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## Other Symptoms of MS

- Fatigue
- Heat sensitivity
- Restless leg syndrome
- Cognitive impairment

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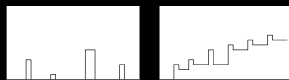
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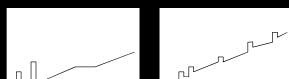
Relapsing/remitting



Primary progressive



Secondary progressive



Progressive/relapsing



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## Diagnosis

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### McDonald 2010

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- **Dissemination in Space:** Any 2
  - Lesions in  $\geq 2$  locations
    - Periventricular
    - Juxtacortical
    - Posterior fossa\*
    - Spinal cord\*

\* Symptomatic lesions in these sites do not count

Swanton J. JNNP 2006;77:830-3.  
Polman C. Ann Neurol 2011;69:292

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### MAGNIMS Modification

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- **Dissemination in Time:** Any time
  - New T2 lesion on scan at any time
  - Enhancing + non-enhancing lesions on same scan

Swanton J. JNNP 2006;77:830-3.  
Polman C. Ann Neurol 2011;69:292

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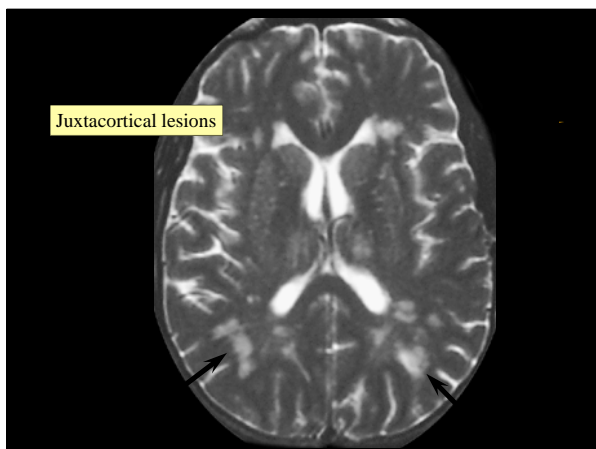
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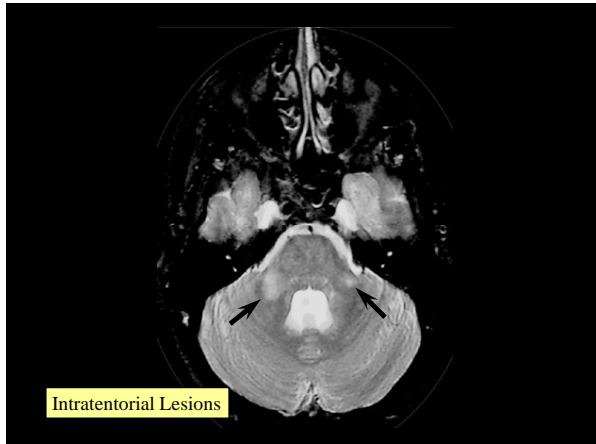
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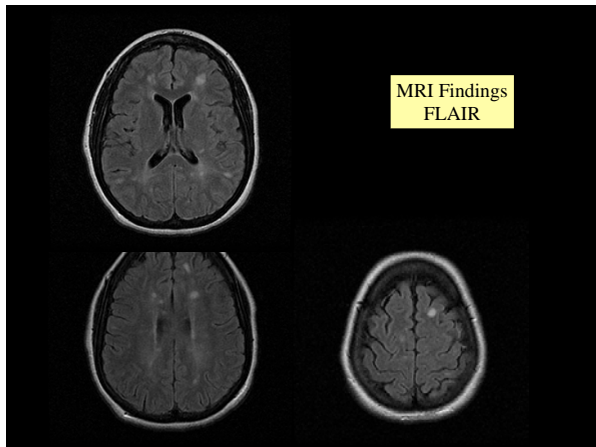
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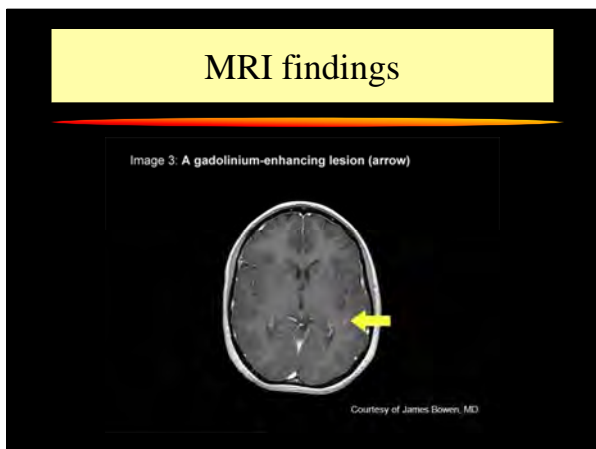
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Epidemiology

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Genetics of MS

- 20% of patients have another affected family member
- Risks to siblings = 4%
- Risks to parents = 3%
- Risk to child = 2.5% (mostly female)
- Monozygotic twins = 26%
- Dizygotic twins = 2.3%

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Genomewide Study

- Of 110 SNPs, 3 significant
- HLA-DRA – accounts for 4% of risk
- IL-7R – accounts for 0.2% of risk
- IL-2RA – accounts for 0.2% of risk

N Engl J Med 2007;357:851

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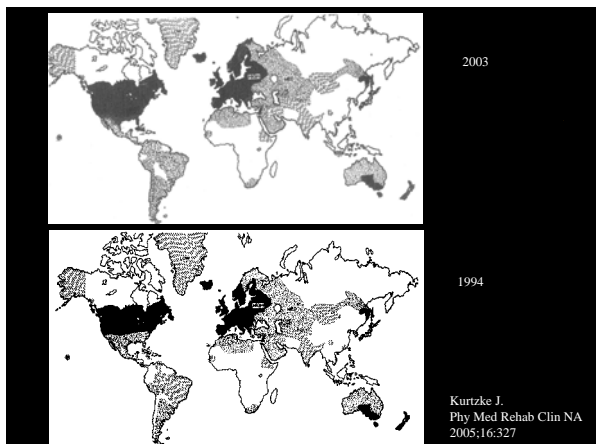
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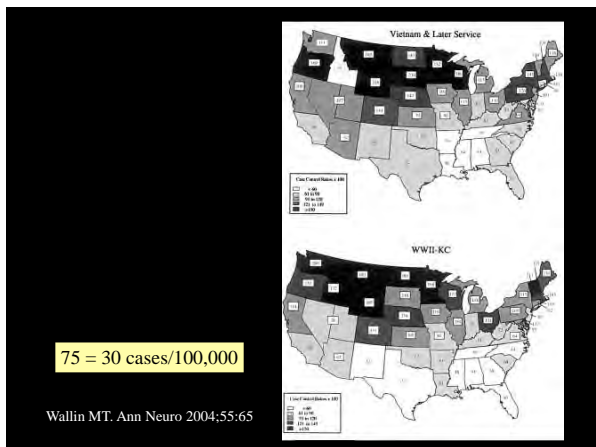
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### North South Ratios

	WWII/KC	Vietnam
Male		
White	2.47	1.97
Black	1.94	1.92
Other	-	1.58
Female		
White	3.46	1.52
Black		1.90
Total	2.64	2.02

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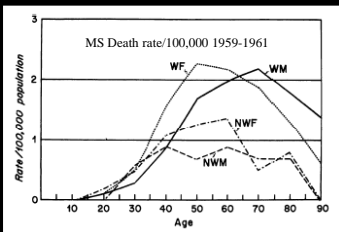
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### Changing Gender Rates



- Males predominated in US and Europe in early 20<sup>th</sup> century
- Switch to female predominance in 1950-60s
- In graph, death rate for white women higher in young, males in older. i.e. demographics are changing
- Now 70% female

Kurtzke J. Phy Med Rehab Clin NA 2005;16:327

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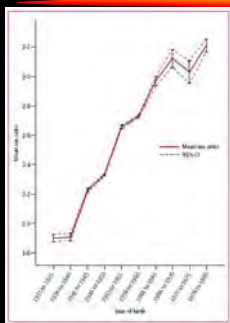
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### Mean Sex Ratio by Year of Birth



% women increases by 0.85%/yr

Orton S. Lancet Neuro 2006;5:932

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### Changes in Racial Distribution

	WWII/KC	Vietnam Era
Male		
White	1.00	1.00
Black	0.44	0.67
Other	0.22	0.30
Total	0.95	0.94

Female		
White	1.79	2.99
Black	1.28	2.86
Other	-	3.51
Total	1.79	2.96

Kurtzke J. Phy Med Rehab Clin NA 2005;16:327

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Treatment

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Treatment of Attacks

- Methylprednisolone 3-5 days
- Plasma Exchange 5 cycles

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Disease Modifying Therapies

- Interferons
  - Avonex Interferon  $\beta$ -1a IM
  - Betaseron Interferon  $\beta$ -1b
  - Extavia Interferon  $\beta$ -1b
  - Rebif Interferon  $\beta$ -1a SQ
- Glatiramer acetate: Copaxone
- Mitoxantrone: Novantrone
- Natalizumab: Tysabri
- Fingolimod: Gilenya

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### MS in the Pacific Northwest

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### MS and the Northwest

- 1:500 in WA state
- Twice national average
- 3<sup>rd</sup> most expensive disease of young adults
- 20-50 years of age
  - Building family
  - Peak earning years
  - Expensive disease

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### Needs in our Region

- 8,500 patients in Western WA
- 12,000 in WAMI region
- 750 pts/MS neurologist
  - 12 Neurologists
  - 4 Rehabilitation

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### Costs

- 2003: \$47,215/patient/yr
  - \$16,050 - DMTs
  - \$13,685 - Retirement, \$18,436 - lost productivity
- 2003-6: Medicare non-medication costs
  - \$23,630 Progressive disease
  - \$5,887 Relapsing disease
- DMTs now: \$42-48K/yr

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### Multiple Sclerosis

Current Research Studies	
2009	18
2010	24
2011	23

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### Resources

- One of largest MS Centers in US
- Comprehensive MS Services
  - Diagnosis
  - Neurology
  - Rehabilitation
  - Social/vocational
- Extensive research infrastructure

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**Wellness**

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- Physical Wellness: exercise program
- Emotional Wellness
  - Rehabilitation Psychology: Toshima
  - Counseling: Wittenberg
- Social Wellness
  - Case management/Social Work: Wittenberg
  - Vocational Rehab Counseling: Virani

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**Wellness**

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- Education
  - Lecture series
  - Podcasts
  - Website
  - Newsletter
- Support groups (4)
- Yoga
- Music/movement

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**Completing the Vision**

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- Consolidate space
- Improve access
- Allow for growth
- PT/Wellness: equipment
- Meeting room/Yoga/Music&movement
- Education facility
- Therapy garden
- Added Services: education, neuro-psychology, recreation therapy

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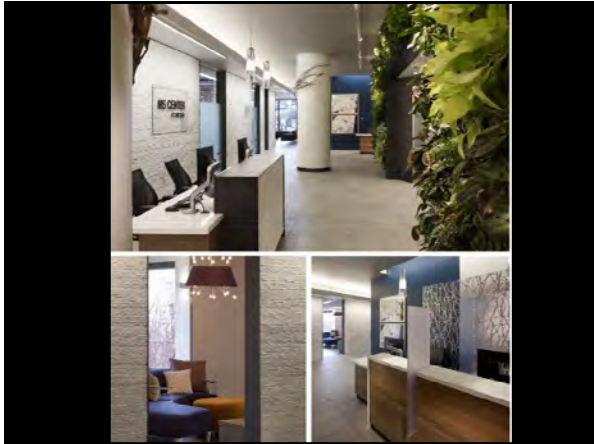
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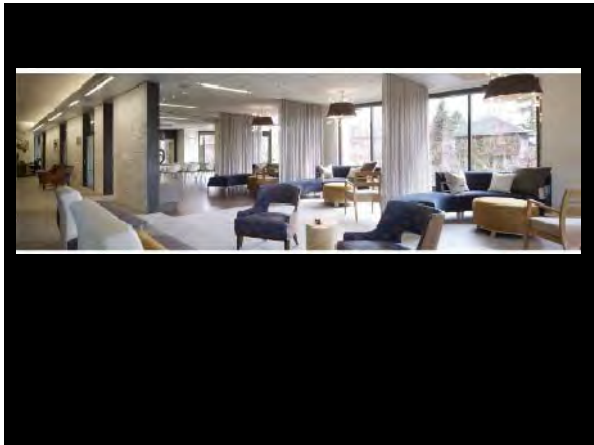
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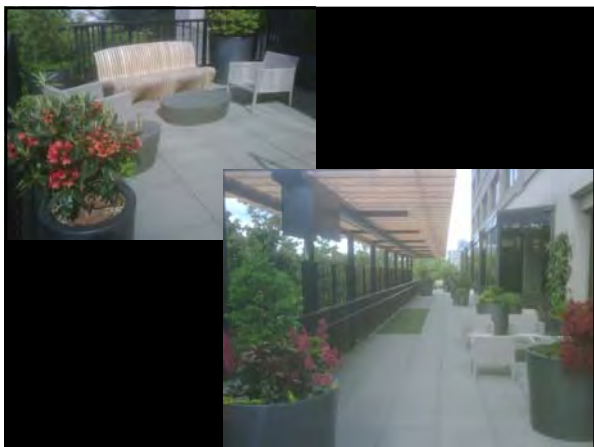
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