A worldwide study into the prevalence and incidence of spinal muscular atrophy
Spinal muscular atrophy

- Degeneration of spinal cord motor neurons
- Caused by mutations in $SMN1$ gene

<table>
<thead>
<tr>
<th>SMA type</th>
<th>Age at onset</th>
<th>Highest achieved function</th>
<th>Natural age of death</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Prenatal/Foetal</td>
<td>Nil</td>
<td>&lt;6 months</td>
</tr>
<tr>
<td>I</td>
<td>&lt;6 months</td>
<td>Never sit</td>
<td>&lt;2 years</td>
</tr>
<tr>
<td>II</td>
<td>6-18 months</td>
<td>Sit</td>
<td>&gt;2 years</td>
</tr>
<tr>
<td>III</td>
<td>&gt;18 months</td>
<td>Stand and walk</td>
<td>Adult</td>
</tr>
<tr>
<td>IV</td>
<td>Adult (2nd or 3rd decade)</td>
<td>Walk during adulthood</td>
<td>Adult</td>
</tr>
</tbody>
</table>

- Prevalence ~1-2 per 100 000
- Incidence 1 in 10 000
Methods

- Literature review
- TREAT-NMD Global SMA Registry enquiry
- TREAT-NMD Care and Trial Sites Registry enquiry
- Survey among genetic laboratories
TREAT-NMD Global SMA Registry enquiry (1)

• Response
  ▪ 26 registries (29 countries)
  ▪ Total 4526 patients (1 Sept 2015)
TREAT-NMD Global SMA Registry enquiry (2)

- Majority of patients SMA type II

![Pie chart showing SMA type distribution in registry]

- 2035 patients (45%): Type I
- 1431 patients (32%): Type II
- 833 patients (18%): Unknown
- 227 patients (5%): Type III
TREAT-NMD Global SMA Registry enquiry (3)

- Nearly even split male and female
TREAT-NMD Global SMA Registry enquiry (4)

• In general ~2-5 times lower prevalence than literature

• Possible reasons
  ▪ Most literature predates genetic testing
  ▪ Date of registry set-up
  ▪ Genetic diagnosis pending for some patients
  ▪ Purpose of the registry
TREAT-NMD Care and Trial Sites Registry Enquiry (1)

• Response
• Data from 42 countries
  ▪ Total 6559 patients (15 Dec 2015)
TREAT-NMD Care and Trial Sites Registry Enquiry (2)

• Majority of patients SMA type II

**SMA type of patients in CTSR**

- 2,401 patients (37%)
- 1,028 patients (16%)
- 3,130 patients (48%)
TREAT-NMD Care and Trial Sites Registry Enquiry (3)

• Prevalence also lower than literature
  ▪ Differs per country: differences in health system

• Possible reasons
  ▪ Only specialised neuromuscular clinical sites:
    • Not all patients visit/have access to these sites
  ▪ Some patients only clinically diagnosed
  ▪ Some countries patients not identified due to lack genetic testing
Survey among genetic laboratories

• Online questionnaire to 294 laboratories (53 countries)

• Response rate variable
  ▪ In total 158 responses (40 countries)
    • 17 countries (fairly) good response rate
      – All in Europe

• Results
  ▪ Incidence around 1 in 5000 to 10 000
  ▪ Generally incidence rates increase when moving from North Europe to the South and the East
Acknowledgements

TREAT-NMD
National patient registry curators
Participating genetic laboratories

Newcastle
Agata Robertson
Hanns Lochmüller
Becca Leary
The Registry Team

CTSR (Freiburg)
Janberd Kirschner
Kirsten König

Funding
Biogen MA Inc