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# Hematopoietic stem cell transplantation for Multiple Sclerosis

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# What it is

- a one time treatment
- an attempt to fix the underlying problem
- very effective against inflammation in MS
- leads to stabilization of disease in about 2/3 of patients with RRMS

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# What it is not

- not a miracle cure
- not very good for SPMS or PPMS
- not without risk

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# How many have tried this therapy?

- in Sweden about 100 patients
- in the transplant registries 700 patients
- in the world an estimated 1500 patients

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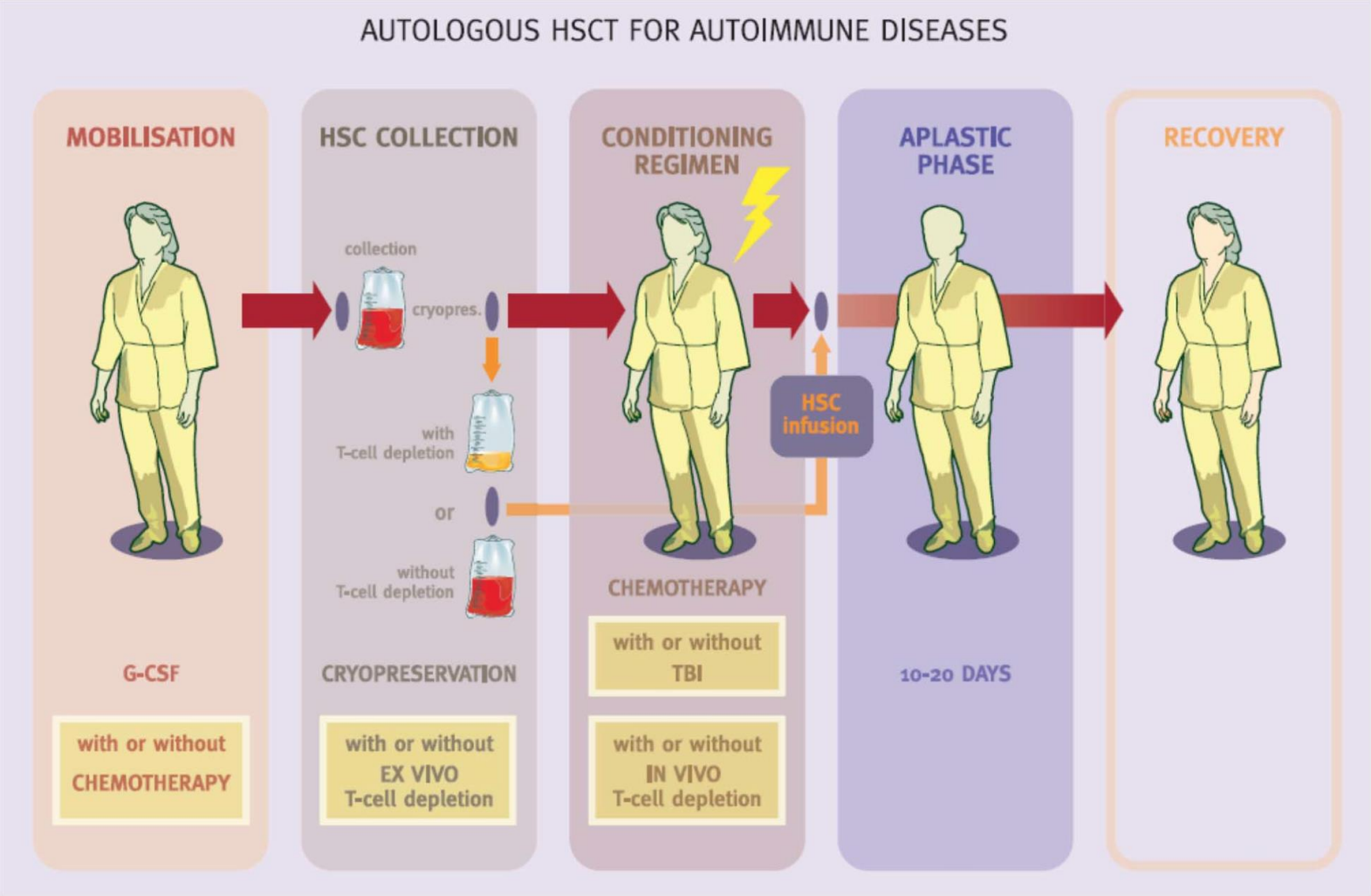
# Hematopoietic Stem cell Transplant

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# Adverse events

- Acute toxicity
  - loss of hair, nausea, mucositis
  - may need supportive blood products
  - infections
- Late adverse events
  - decreased fecundity
  - infections
  - secondary autoimmunity
  - secondary malignity

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# Mortality

- Mortality is dependent on
  - center experience
  - age of patient
  - intensity of conditioning
- Overall mortality rates have decreased
- No mortality (so far) with a low intensity conditioning regminen in RRMS patients

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# No evidence of disease activity

## NEDA

- no development of disability (progression)
- no new symptoms (relapses)
- Now new MRI lesions

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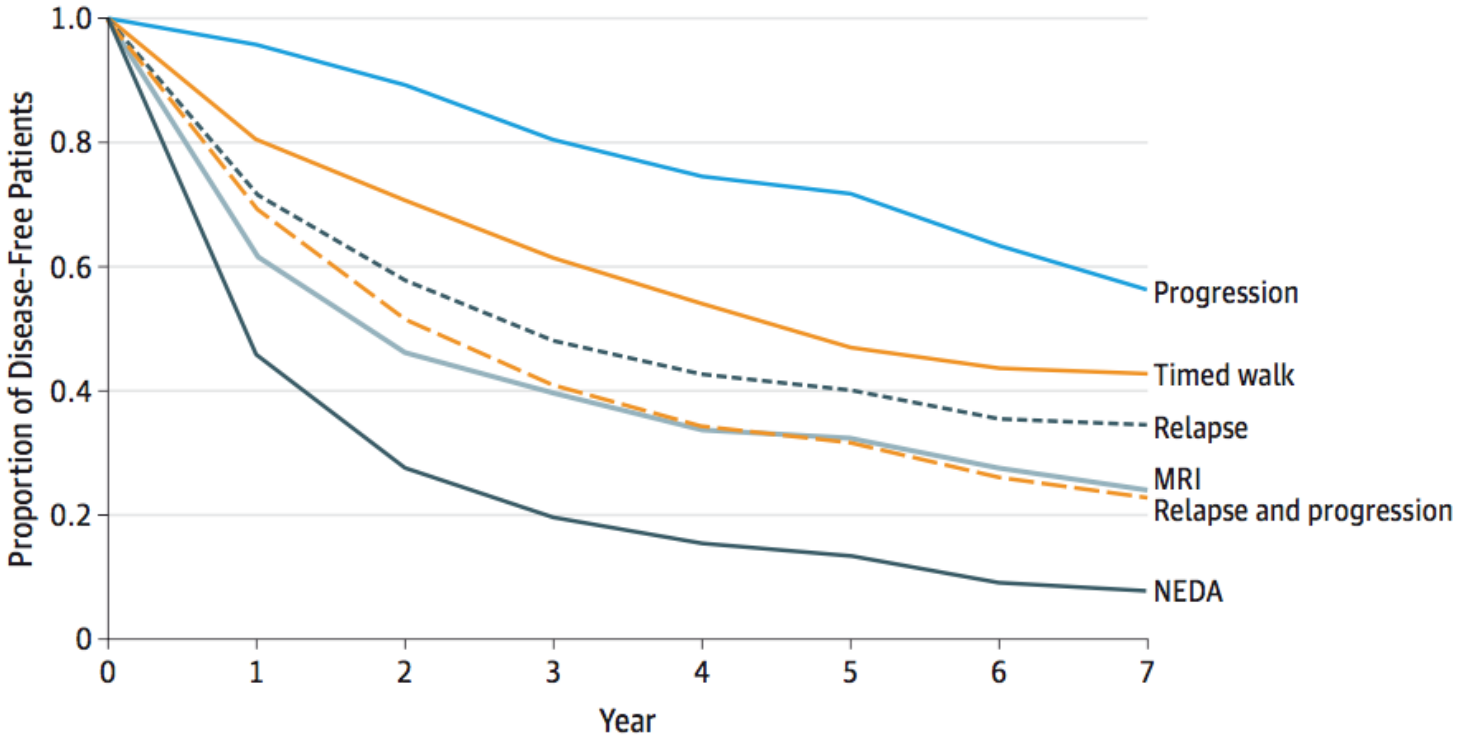
# NEDA

## CLIMB (2014)

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# NEDA

## Different clinical studies

**Table 3. NEDA in Clinical Studies**

| Clinical Study | Study Duration, y | Patients With NEDA Status, % |
|---|---|---|
| ADVANCE | 1 | Placebo, 15%; pegylated interferon beta-1a every 2 weeks, 34% |
| AFFIRM | 1 | Placebo, 15%; natalizumab, 47% |
| SELECT | 1 | Placebo, 11%; daclizumab, 39% |
| AFFIRM | 2 | Placebo, 7%; natalizumab, 37% |
| CARE-MS I | 2 | SC interferon beta-1a, 27%; alemtuzumab, 39% |
| CARE-MS II | 2 | SC interferon beta-1a, 13%; alemtuzumab, 32% |
| CLARITY | 2 | Placebo, 16%; cladribine, 46% |
| CLIMB | 2 | Early MS, 24%; established MS, 31% |
| FREEDOMS | 2 | Placebo, 13%; fingolimod, 33% |
| DEFINE | 2 | Placebo, 15%; dimethyl fumarate, 28% |
| CombiRx | 3 | IM interferon beta-1a alone, 21%; glatiramer acetate alone, 19%; glatiramer acetate and IM interferon beta-1a, 33% |
| CLIMB | 7 | Early MS, 6%; established MS, 10% |

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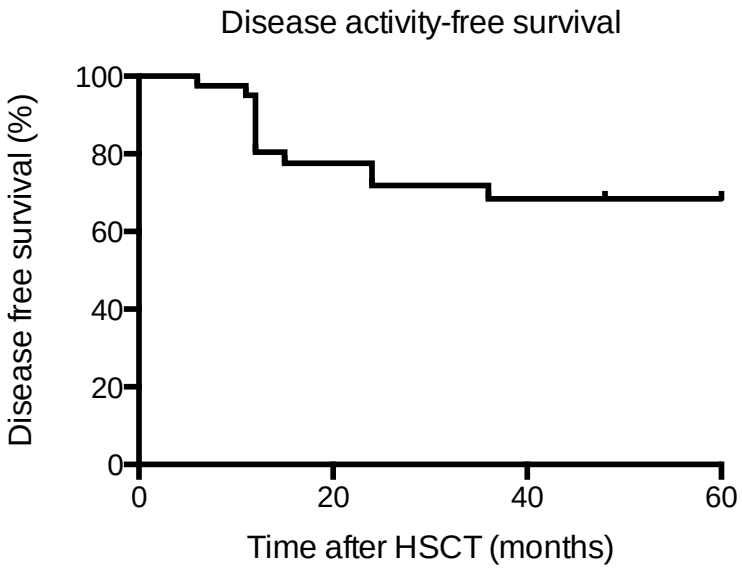
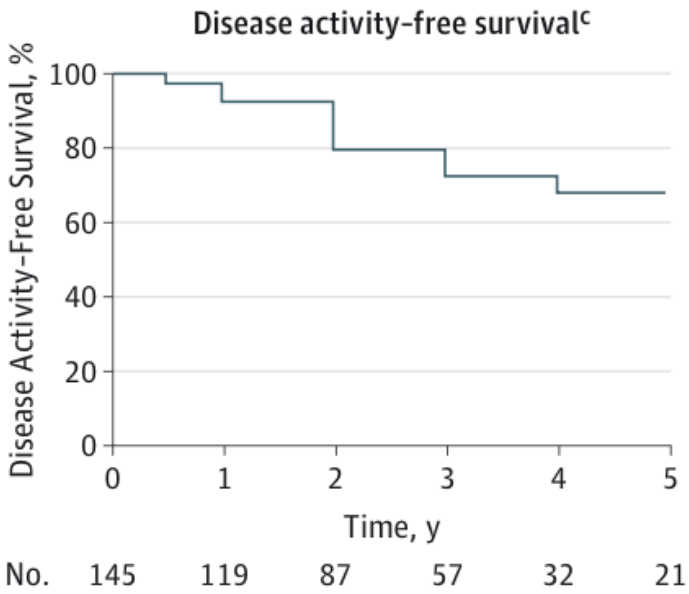
# NEDA

## The Swedish Experience & Chicago data

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RESEARCH PAPER

# Autologous haematopoietic stem cell transplantation for aggressive multiple sclerosis: the Swedish experience

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▶ Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/jnnp-2013-307207).

For numbered affiliations see end of article.

**ABSTRACT**

**Background** Autologous haematopoietic stem cell transplantation (HSCT) is a viable option for treatment of aggressive multiple sclerosis (MS). No randomised controlled trial has been performed, and thus, experiences from systematic and sustained follow-up of treated patients constitute important information about that long-term remission, and maybe even cure, can be achieved.[5–8]

The goal of this therapy is to achieve long-term remission through short-lasting ablation of the immune system. The mode of action is not yet fully understood, and several mechanisms probably contribute to the effect. We know that HSCT causes a

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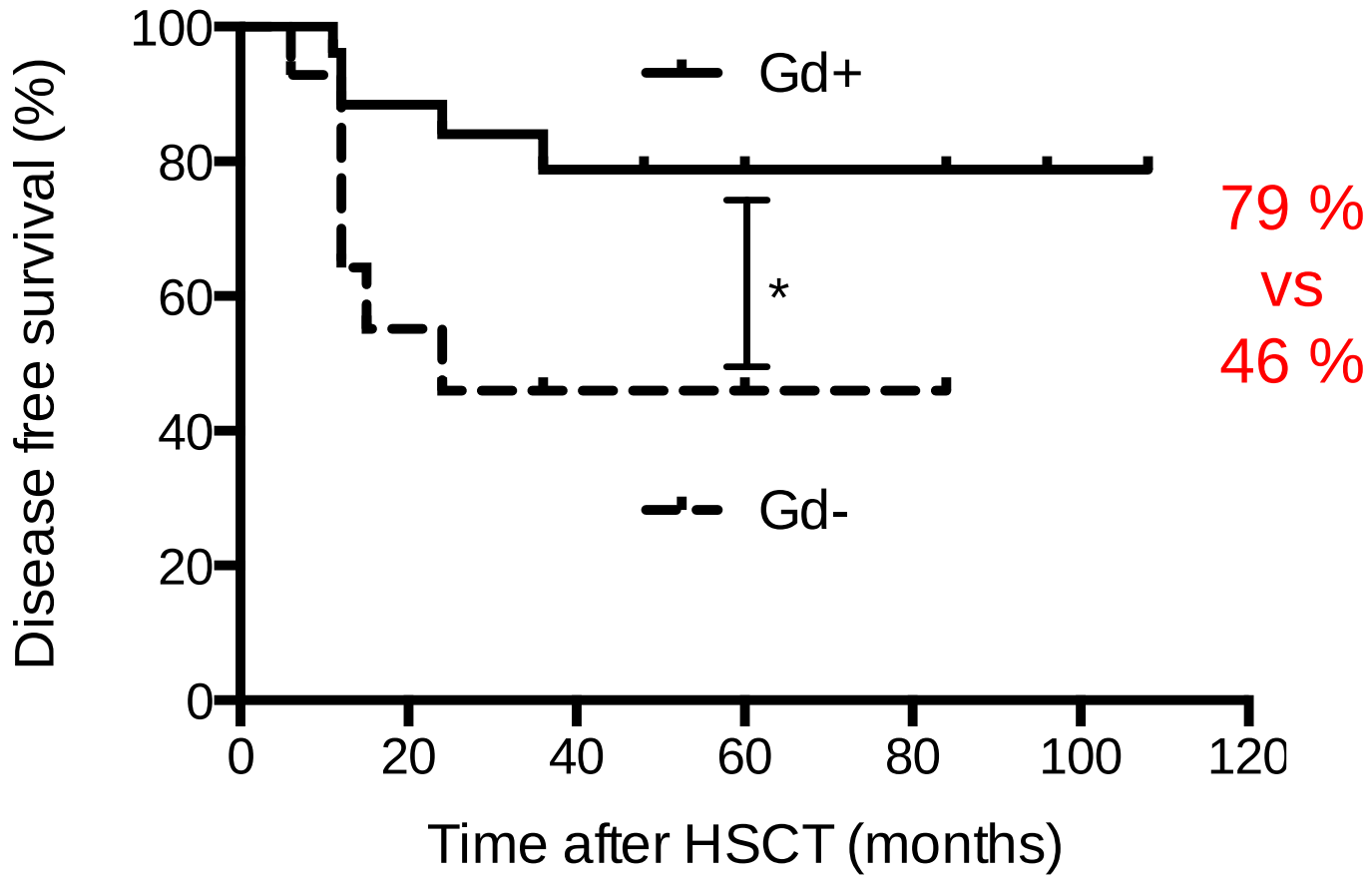
# HSCT for MS

## The Swedish Experience




79 %
vs
46 %

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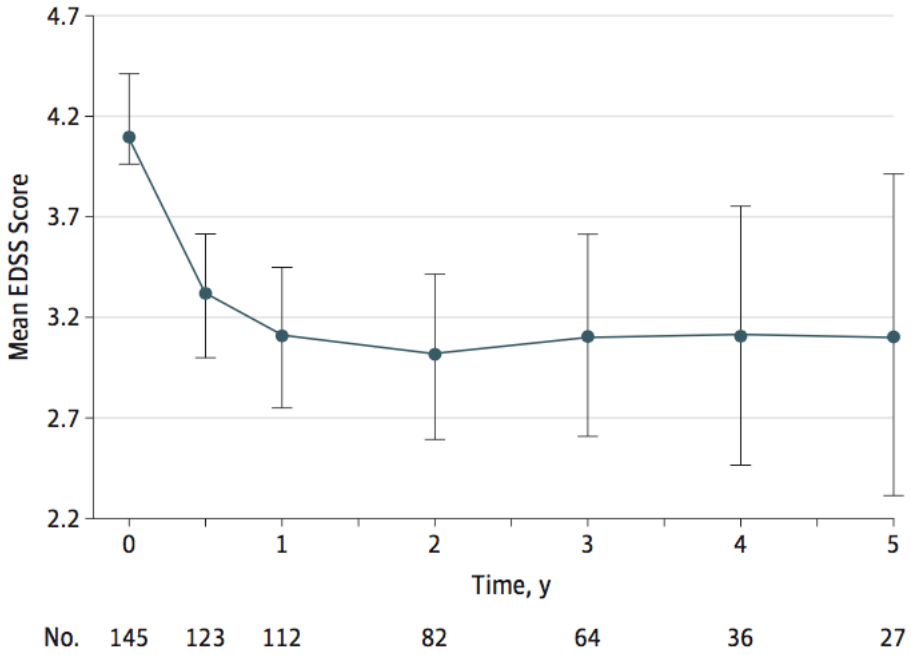
# HSCT for MS

## Chicago data & The Swedish Experience




| | Pre-HSCT | | At HSCT | Post-HSCT | |
|---|---|---|---|---|---|
| | Lowest EDSS | Highest EDSS | EDSS | EDSS at 1 year | EDSS at 2 years |
| RRMS | 2.5 (0-6.5) | 6 (3.5-9) | 5.5 (1.5-8.5) | 3.25 (0-7) | 3 (0-7) |
| PRMS | 6.5 (5-7.5) | 6.5 (6-8) | 6.5 (6-8) | 6.5 (6-8) | 6.5 (6-7.5) |

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# HSCT for MS

## The Swedish Experience

- no deaths were recorded
- no patient required ICU care

- eight patients (17 %) developed shingles up to three years after HSCT
- four patients developed thyreoid disease (8.3 %)

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# Conclusion

- HSCT is the most effective treatment of RRMS
- HSCT can reverse disability to some extent
- HSCT can be performed safely in experienced hands

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