

Rate of shunt revision as a function of age in patients with shunted hydrocephalus due to myelomeningocele



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Background

- Myelomeningocele (MMC) is the most common form of neural tube defect
- Hydrocephalus present in 60-90% of children with myelomeningocele
- Complications of CSF shunts contribute to morbidity and mortality in individuals with MMC

Background

- Young age at first shunt placement is associated with:
 - Increased risk of revision
 - Increased risk of multiple revisions
- Higher risk of revision within 6 months of initial shunt insertion

Suggests a relationship between age and risk of revision

Purpose

Evaluate the burden of shunt revision for a given patient age

Methods

- Multidisciplinary spina bifida clinic
 - Adult: University of Alabama at Birmingham
 - Pediatric: Children's of Alabama
- Annual visit for all individuals with spinal dysraphism
- 99% are enrolled in the CDC National Spina Bifida Patients Registry (NSBPR)
- Discrete data elements entered into the NSBPR Electronic Medical Record
- All surgeries in past year entered into NSBPR EMR
 - Coordinator interview
 - Chart review
 - Verification with family

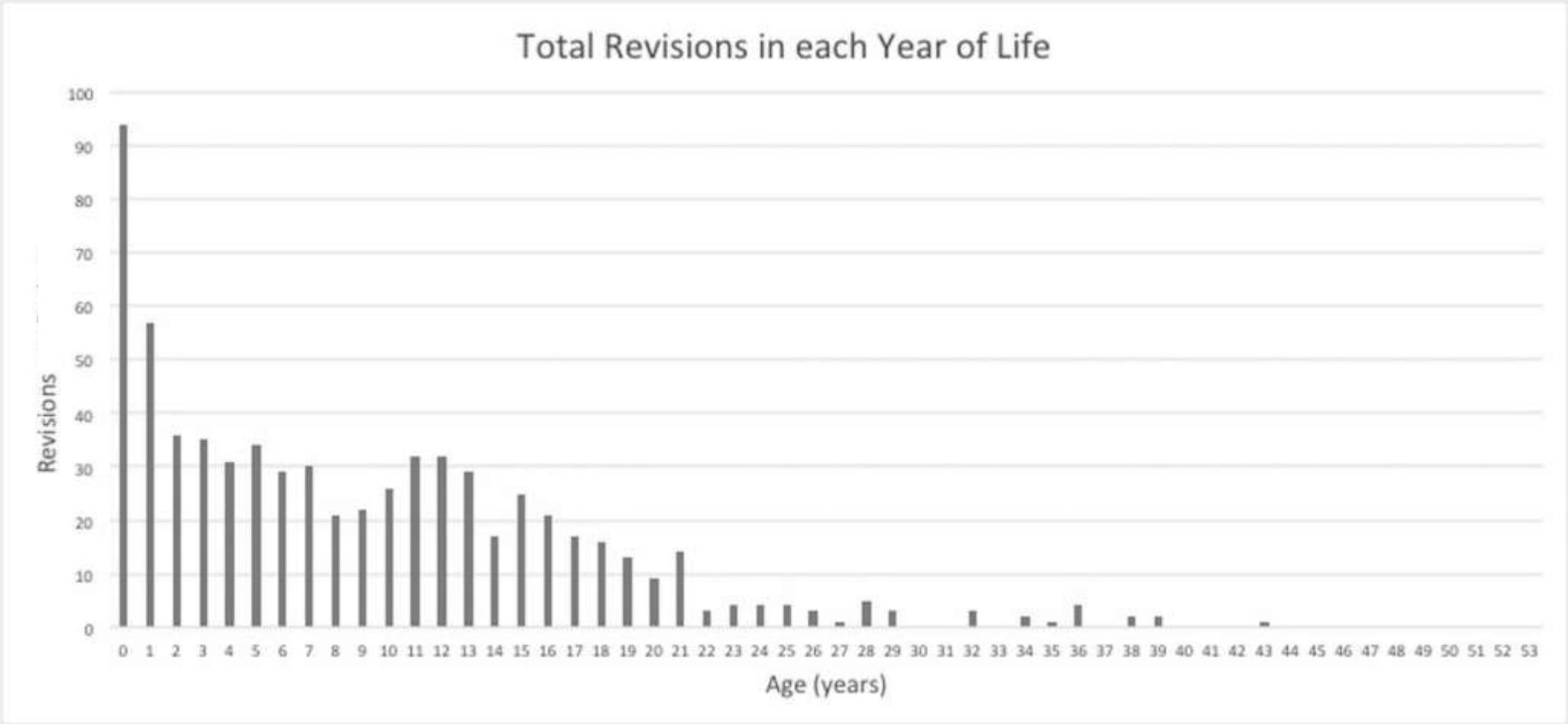
Methods

- Identify all patients with MMC and shunted hydrocephalus
- Exclude:
 - Closed spinal dysraphism (lipomyelomeningocele, split cord malformation, dermal sinus tract, etc.)
 - Hydrocephalus treated without shunt (ETV, ETV/CPC)
 - Included if shunted after failed ETV
- Identify each individual incidence of surgical treatment of hydrocephalus
 - Excluded events with no date available
- Identify age at the time of each surgery
- Identify how many patients lived through each year of life
- Calculate revision rate for each year of life

Results

- 655 patients
 - October 2009 to May 2016
- 519 patients with myelomeningocele
- 417 with shunted hydrocephalus
 - 39 shunt revisions without date available (excluded)

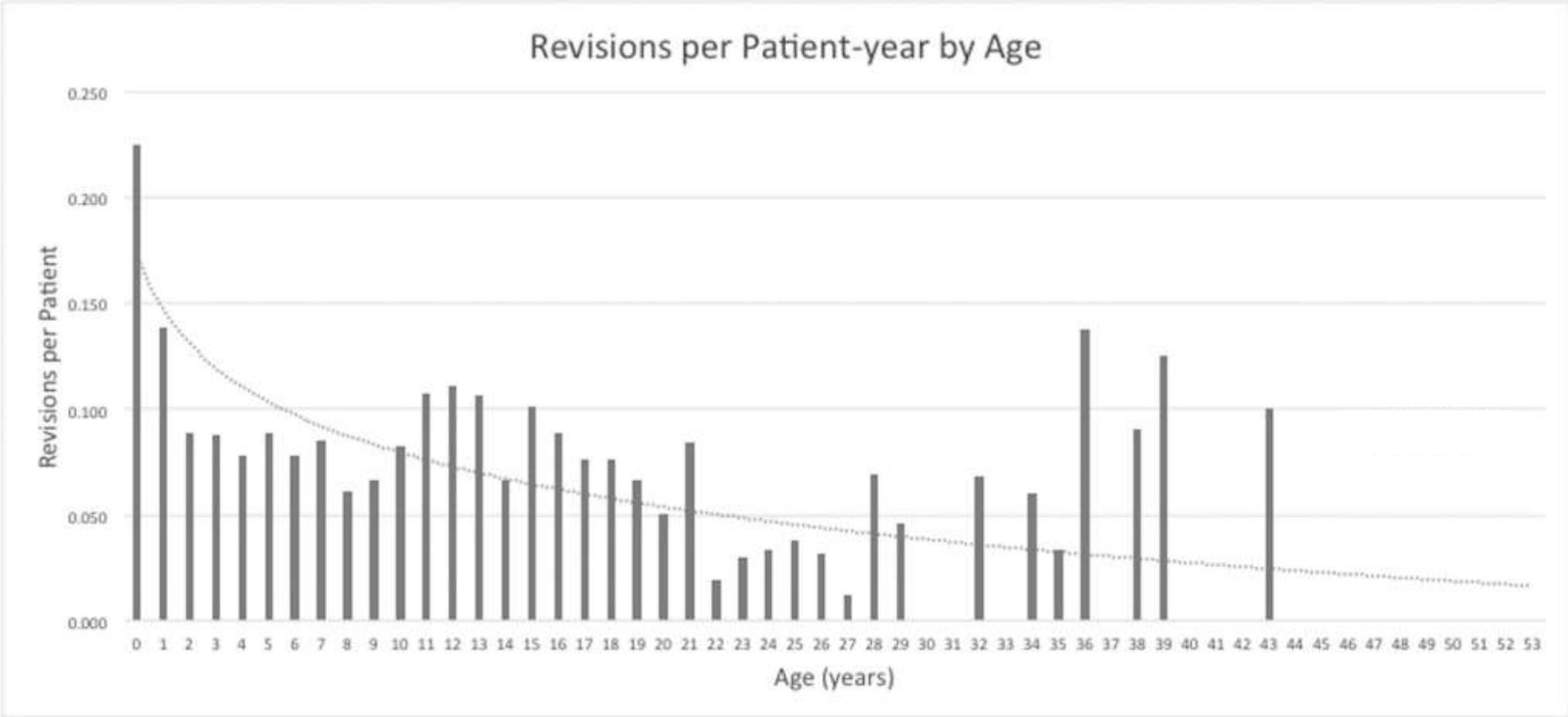
Results



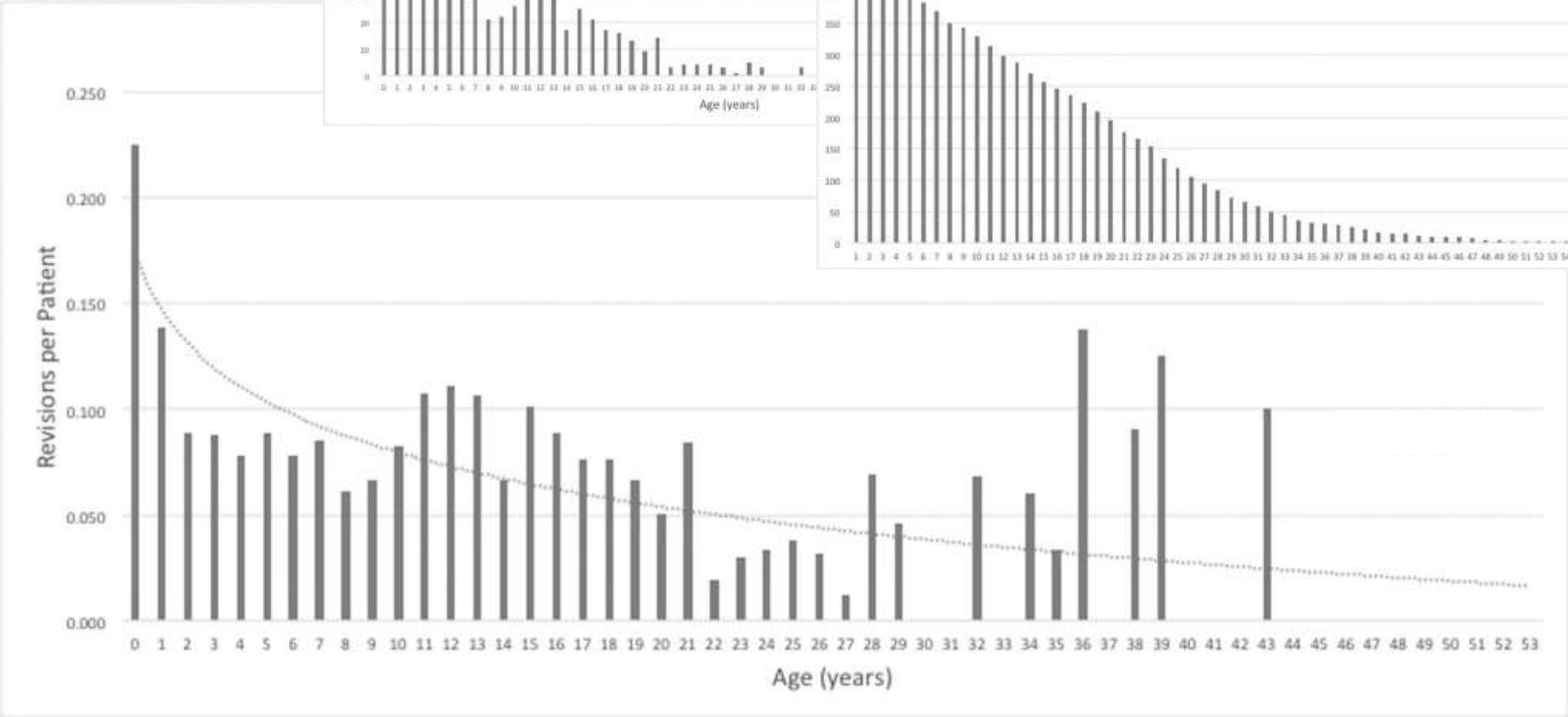
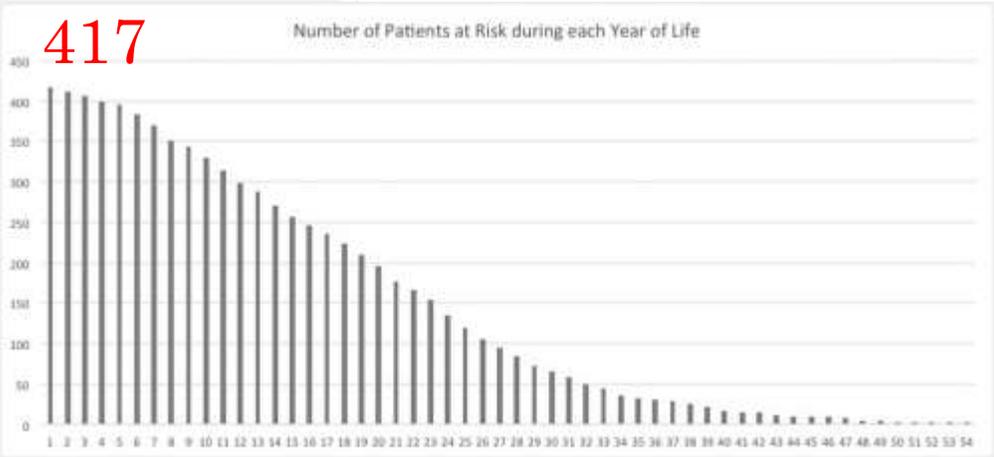
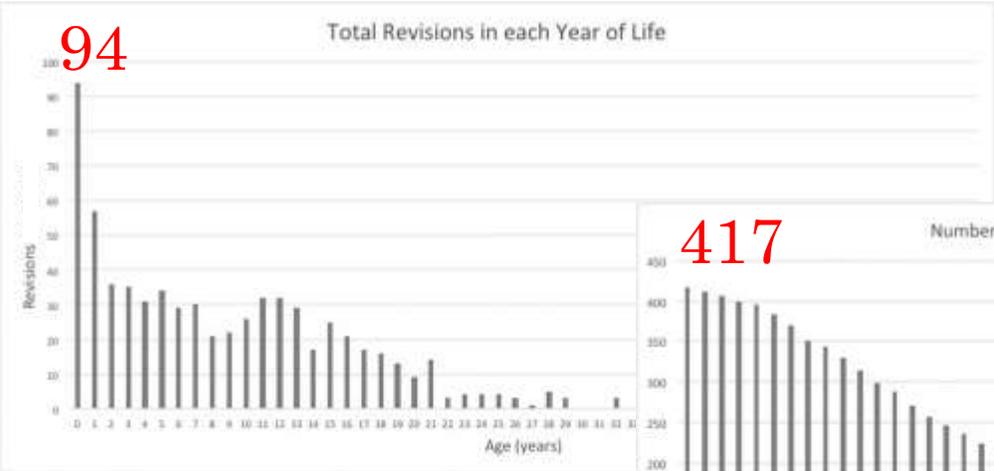
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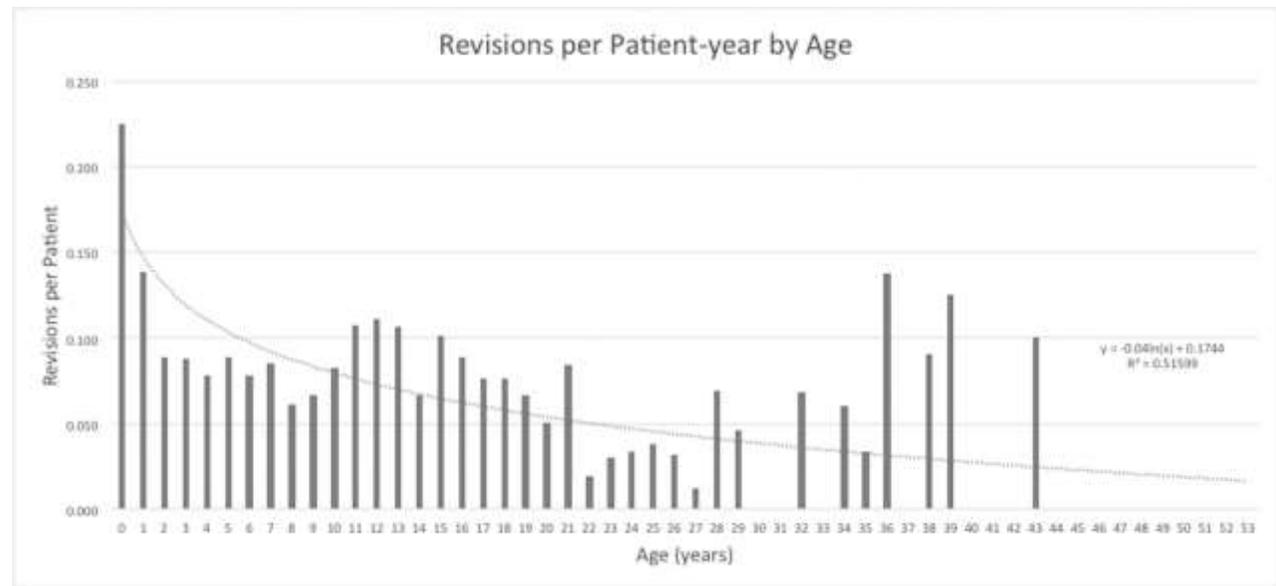


Results



Results

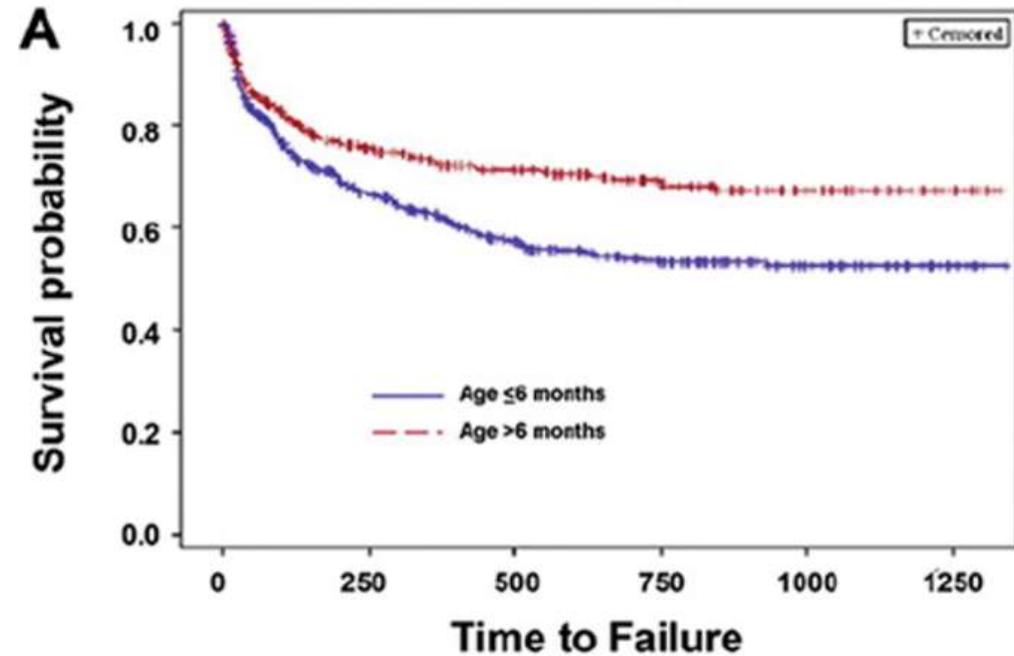
- First year of life
 - 94 shunt revisions
 - 417 patients at risk
 - 0.23 revisions per patient



- Fewer revisions per year with increasing age
- Increasing revisions per year in teen years
- Continued risk for revisions into middle age

Discussion

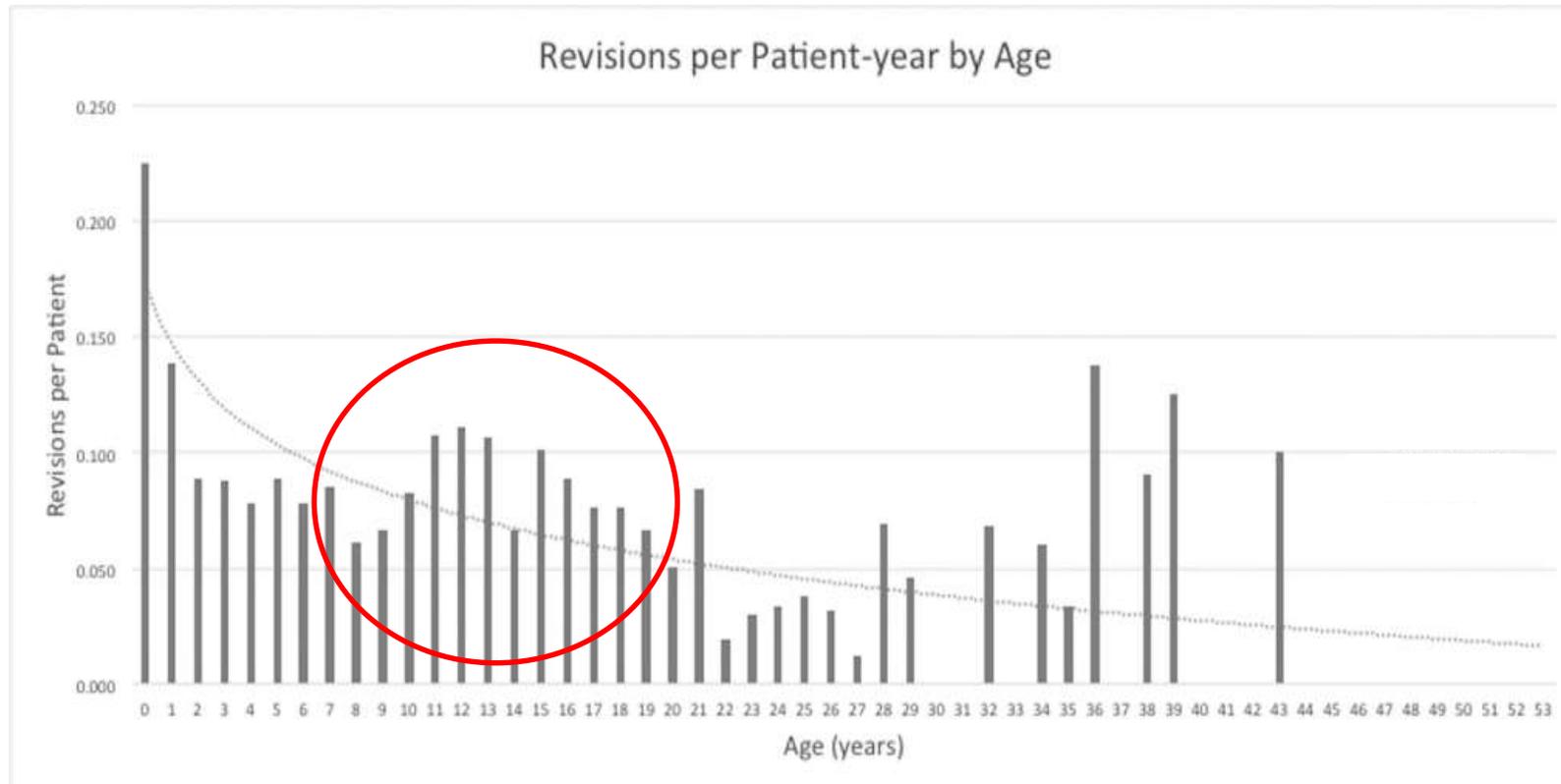
- Young age at time of placement is a risk factor for shunt revision



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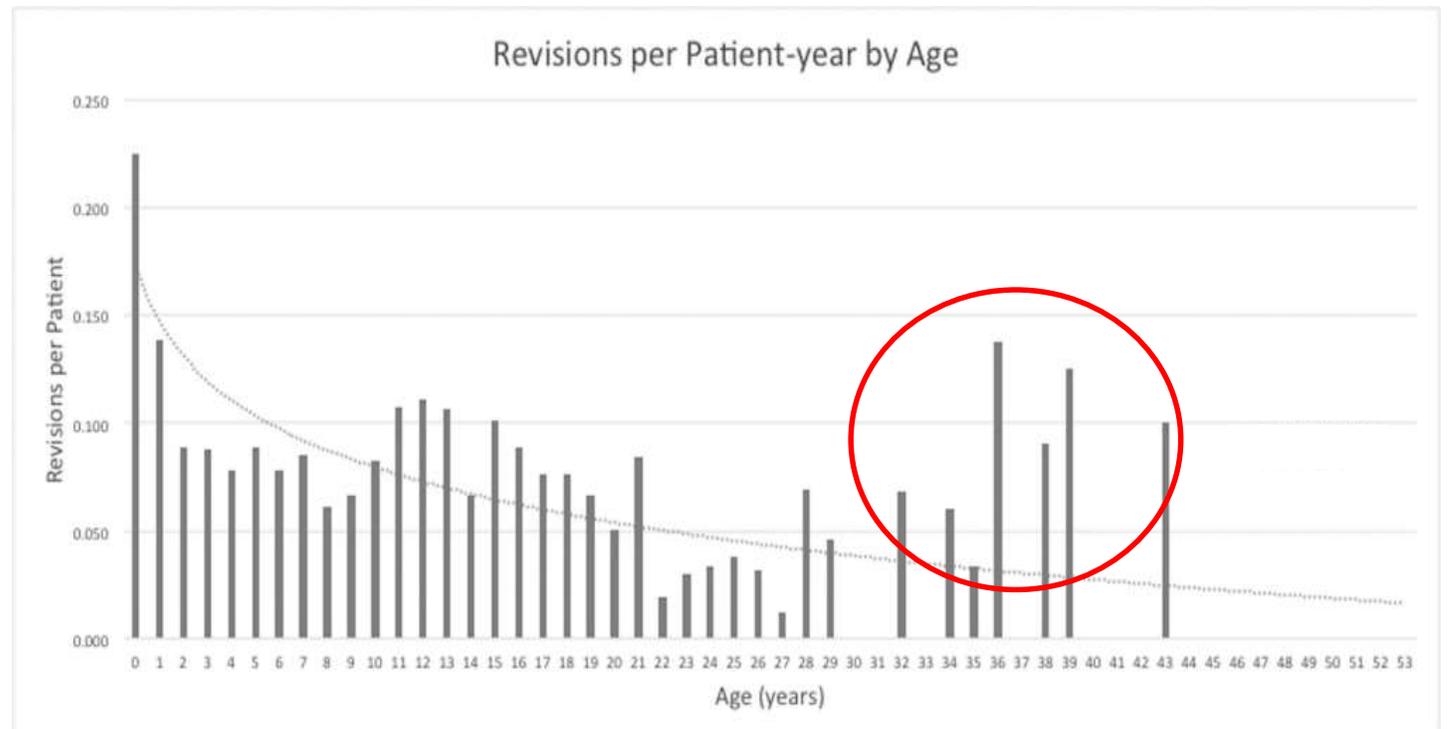
Discussion

- Young age at time of placement is a risk factor for shunt revision
- Increase in shunt revision frequency in early teen years



Discussion

- Young age at time of placement is a risk factor for shunt revision
- Increase in shunt revision frequency in early teen years
- Adults continue to experience shunt malfunction



Limitations

- Single institution
- Retrospective
- Single hydrocephalus etiology: myelomeningocele
- Assumption:
 - All patients received shunt within the first few months of life

Conclusions

- Risk of shunt failure is highest in the first year of life
- Risk declines with increasing age except in early teen years
- Risk of shunt failure persists into adulthood

Thank You

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