# Severity Score for PA and MMA

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# Do we have the data in EIMD to predict how severe a patient will be over time?

- Definition of severe:  repeated hospitalization, life-threatening complications (EKG, Cardiomyopathy, Renal failure)

- Our hypothesis is that those who present either prior to NBS results or in the first 30 days are more severe.

# Cohort

| Diagnosis | Time/method of diagnosis | Number of patients | Current median age (Years) |
|---|---|---|---|
| MMA | Newborn screening | 25 | 9.128 |
| | Selective screening | 121 | 13.541 |
| | Symptomatic 0-30 days | 74 | 12.047 |
| | Symptomatic 31 days to 4 months | 9 | 13.708 |
| | Symptomatic 4 months to 12 months | 29 | 11.376 |
| | Symptomatic 12 months to 24 months | 11 | 21.046 |
| | Symptomatic 2 years- 6 years | 9 | 9.213 |
| | Asymptomatic | 14 | 9.003 |
| | | | |
| PA | Newborn screening | 38 | 9.834 |
| | Selective screening | 82 | 15.504 |
| | Symptomatic 0-30 days | 75 | 12.29 |
| | Symptomatic 31 days to 4 months | 14 | 13.96 |
| | Symptomatic 4 months to 12 months | 12 | 14.086 |
| | Symptomatic 12 months to 24 months | 4 | 16.047 |
| | Symptomatic 2 years- 6 years | 7 | 16.46 |
| | Asymptomatic | 8 | 8.003 |

# Timing of presentation
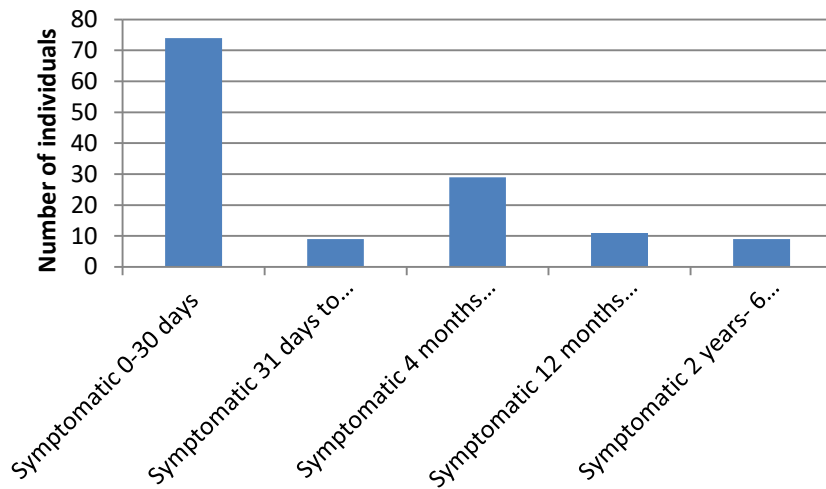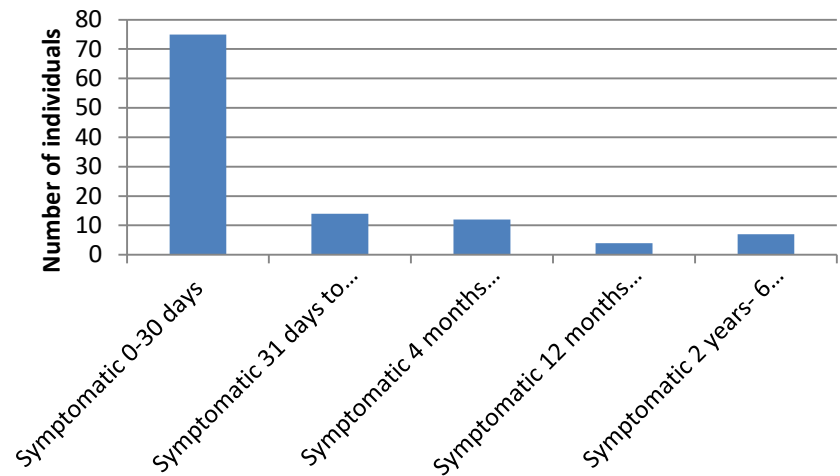
| Diagnosis | Time of diagnosis | Median days in hospital (per year) | Regular visits | Emergency visits | Terminal disease visits |
|---|---|---|---|---|---|
| MMA | Newborn screening (N=25) | 2.579 | 60 | 28 | 0 |
| | Selective screening (N=121) | 4.22 | 343 | 146 | 5 |
| | Symptomatic 0-30 days (N=74) | 5.012 | 219 | 112 | 2 |
| | Symptomatic 31 days to 4 months (N=9) | 19.13 | 24 | 5 | 1 |
| | Symptomatic 4 months to 12 months (N=29) | 1.547 | 98 | 30 | 2 |
| | Symptomatic 12 months to 24 months (N=11) | 1.97 | 14 | 3 | 0 |
| | Symptomatic 2 years- 6 years (N=9) | 4.457 | 16 | 8 | 0 |
| | Asymptomatic (N=14) | 0 | 32 | 16 | 0 |
| | | | | | |
| PA | Newborn screening (N=38) | 8.33 | 8 | 100 | 0 |
| | Selective screening (N=82) | 3.15 | 283 | 140 | 4 |
| | Symptomatic 0-30 days (N=75) | 4.261 | 243 | 185 | 2 |
| | Symptomatic 31 days to 4 months (N=14) | 6.275 | 17 | 1 | 2 |
| | Symptomatic 4 months to 12 months (N=12) | 1.811 | 58 | 16 | 0 |
| | Symptomatic 12 months to 24 months (N=4) | | 9 | 0 | 0 |
| | Symptomatic 2 years- 6 years (N=7) | 9.92 | 8 | 8 | 0 |
| | Asymptomatic (N=8) | 3.451 | 28 | 30 | 0 |

# Ammonium
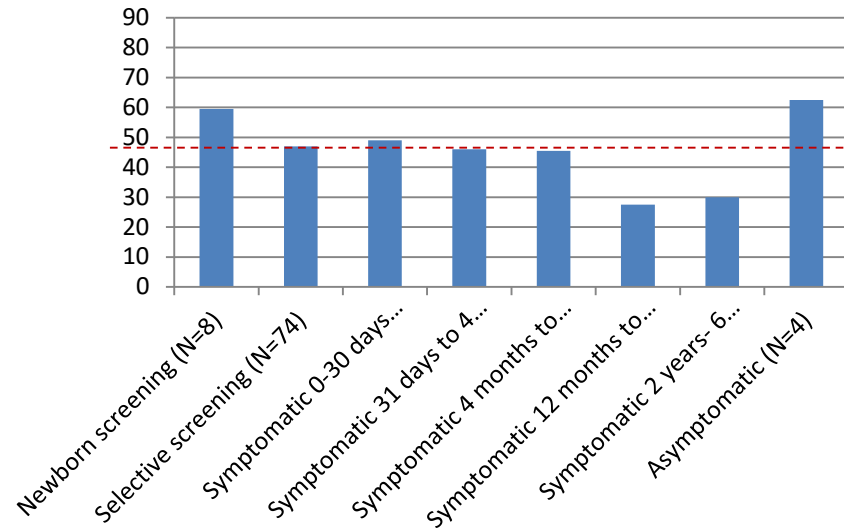


MMA
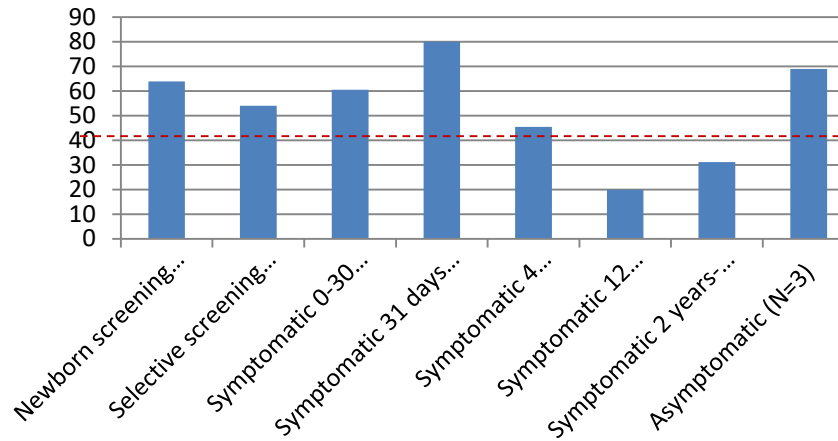


PA

**C3**
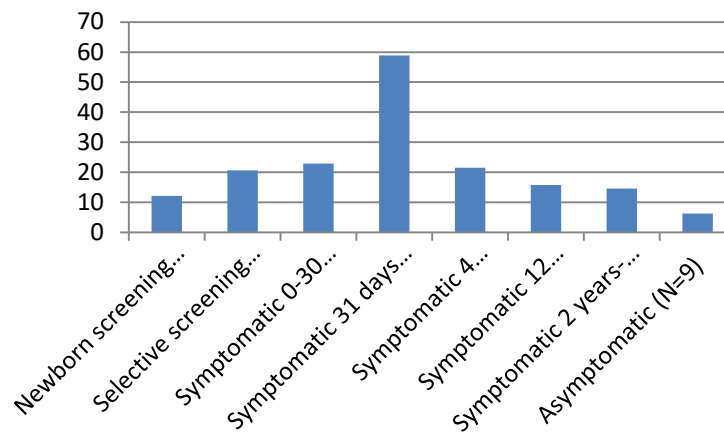


MMA
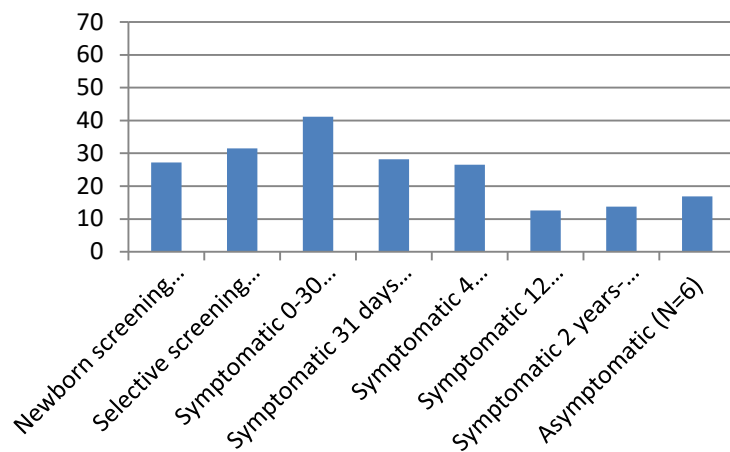


PA

## EKG results

| Age (years) | Number | "Abnormal" | Long Qtc | Total |
|---|---|---|---|---|
| <1 | 3 | 2 (67%) | 0 | 67% |
| 1-6 | 16 | 1 (6%) | 0 | 6% |
| 6-12 | 17 | 3 (17%) | 1 (6%) | 24% |
| 12-18 | 9 | 1 (11%) | 0 | 11% |
| >18 | 12 | 0 | 1 (8%) | 8% |

MMA

| Age (years) | Number | "Abnormal" | Long Qtc | Total |
|---|---|---|---|---|
| <1 | 2 | 1 (50%) | 0 | 50% |
| 1-6 | 15 | 1 (7%) | 2 (15%) | 25% |
| 6-12 | 18 | 3 (17%) | 7 (39%) | 56% |
| 12-18 | 12 | 1 (8%) | 6 (50%) | 58% |
| >18 | 16 | 2 (13%) | 8 (50%) | 63% |

PA

# Echo

| Age (years) | Number | "Abnormal" | CM | Total |
|---|---|---|---|---|
| <1 | 2 | 1 (50%) | 0 | 50% |
| 1-6 | 15 | 2 (13%) | 1 (7%) | 20% |
| 6-12 | 16 | 1 (6%) | 1 (6%) | 12% |
| 12-18 | 11 | 1 (9%) | 0 | 9% |
| >18 | 13 | 1 (8%) | 3 (23%) | 31% |

MMA

| Age (years) | Number | "Abnormal" | CM | Total |
|---|---|---|---|---|
| <1 | 3 | 0 | 0 | 0% |
| 1-6 | 15 | 3 (20%) | 2 (13%) | 33% |
| 6-12 | 18 | 4 (22%) | 2 (11%) | 33% |
| 12-18 | 11 | 2 (18%) | 1 (9%) | 27% |
| >18 | 14 | 7 (50%) | 3 (21%) | 71% |

PA

# Summary

- Presentations between 31 days and 4 months has the highest ammonias (for PA), elevated C3 (MMA), most hospitalizations (MMA)

- Cardiomyopathy or abnormal ECHOs may be age related, similar to EKG findings

- EKG and ECHOs done and recorded in early ages, appear to be related to symptoms.

# Next to do

- Awaiting results which give the spread of the abnormal findings (are the means/mediums caused by a non-normal distribution)?

- Should also look at acidosis (pH and $CO_2$) and neurological outcomes (if available)

EIMD
European registry and network for
Intoxication type Metabolic Diseases