Background: Specific triggers for sudden cardiac arrest (SCA) in youth are poorly understood.

Methods: Parent Heart Watch members with children who had SCA were surveyed. Questions included 1) occurrence of prior symptoms, evaluation, diagnosis; 3) family history; 4) medications, other triggers 5) activity; 6) circumstances.

Results: Response rate of 53 of 88 members (60%) included 7 with prior symptoms. The SCA mean age was 15.9 (4.6) yrs, median 15 yrs, interquartile range 10-22 yrs. At least one prior cardiac symptom was reported in 58%. Fatigue 37% (checksheet); 30% palpitations; 19% chest pain; 14% shortness of breath 18%; emesis 14%; and sleep disturbance 14%. Family history of SCA was reported in 20%. Medical evaluation or symptoms occurred in 15 (31%) with cardiology consult; 8 ECG; 4 echocardiagrams; 6 Holter; 2 MRI. Cardiac diagnoses were made prior to SCA in 4 (7.5%), and after SCA in 20 (54%). Cause of death is known in only 62.3%.

Objective: To identify possible triggers of SCA in youth.

Evaluation and Diagnosis

**Medical evaluation occurred prior to SCA in 31%.**

**Evaluation was related to symptoms (17%), heart murmur (15%), family history (5%).**

**Evaluation included ECG (28%), Echo (17%), Holter (1%),**

**Exercise stress test (3%), MRI (2%).**

**Cause of death known in only 62.3%.**

Diagnosis

<table>
<thead>
<tr>
<th>Unknown</th>
<th>Known After Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>39%</td>
<td>61%</td>
</tr>
</tbody>
</table>

Trigger partners

| SCA was activity related in 58%. Illness occurred in month prior to SCA in one-third. Over half were on a medication or used a substance around time of death. Activity Flu-like illness 32% Medications/Substances 58% |

<table>
<thead>
<tr>
<th></th>
<th>SCA Witnessed</th>
<th>Bystander CPR</th>
<th>EMS CPR</th>
<th>Total CPR</th>
<th>AED On-site</th>
<th>AED Used</th>
<th>EMS &lt;5 min</th>
<th>EMS &gt;5 min</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>74%</td>
<td>63%</td>
<td>66%</td>
<td>77%</td>
<td>52%</td>
<td>51%</td>
<td>54%</td>
<td>54%</td>
</tr>
</tbody>
</table>

|                  | STAR (none)   | Anderson (male); Drezner (female) |
|                  | 32%           | 10%                        |

|                  |               |                           |
|                  |               |                           |

Emergency Response to SCA

**Survival associated with CPR, AED, and early EMS arrival.**

**Barriers included delays in CPR, lack of AED on site, and difficulty of EMS to access site promptly.**

Conclusions

**Possible triggers of SCA identified by this survey include activity, intercurrent or recent illness, and the use of medications or substances.**

**Prior symptoms and family history are often present and should result in appropriate testing for conditions associated with SCA.**

**Early CPR and AED use and timely EMS transport were associated with survival in this group.**

**Prompt evaluation after SCA should be performed including molecular autopsy in appropriate cases to identify the cause of death.**

**All close relatives should be evaluated after SCA.**

**Improved primary prevention (diagnosis, treatment, and appropriate screening) and secondary prevention (AED and early EMS on site for all school and organized activities for youth sports) response plans must be critically needed to enhance survival of children at risk for SCA.**

A comprehensive registry of SCA in youth is needed.

Contact Information

Victoria L. Vetter, MD, MPH, email: vetter@chop.edu

We would like to acknowledge and thank all the Parent Heart Watch members for their courage, determination, and perseverance.