Reducing Drownings Through Epidemiology & Interventions

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Disclaimer: The findings, conclusions and opinions in this presentation are those of the author(s) and do not necessarily represent the views of the New York State Department of Health.
Overview

• Background
• Process
• Findings
• Prevention
• Questions/Discussion
Background
NYS Drowning Risk
Drownings at “Regulated” Beaches and Pools

Drownings = Preventable ≠ Accident

- 1980’s-DOH established policy to investigate & report on drownings

- Applicable to “public” bathing beaches and swimming pools
  - Regulated under State Sanitary Code
    - 1,500 beaches
    - 7,500 swimming pools

- Regulations applied by 46 Local Health Departments
  - Facility Design Approval
  - Operational Inspections
  - Required incident reporting
Process
Process-Overview

Investigate/Collect Data

Analyze/Develop Interventions

Prevent Drownings
Epidemiological Model Applied to Drowning
# Haddon Matrix

<table>
<thead>
<tr>
<th></th>
<th>Pre-Event</th>
<th>Event</th>
<th>Post-Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agent</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Environment</td>
<td></td>
<td></td>
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</tbody>
</table>
Investigation

- Investigate/Collect Data
- Analyze/Develop Interventions
- Prevent Drownings
Drowning Investigation

Investigation Data

- Facility/Environmental
- Supervision: Quantity/Quality
- Emergency Response
- Interview: Witnesses/Supervisory Staff/Victim Contacts
- Records/Reports
Investigation Tools

Data collection:

- Investigation tools developed/provided to field offices
- Data categories: environmental, supervision, victim, etc.
- Balance between quantitative and qualitative
Findings

- Investigate/Collect Data
- Analyze/Develop Interventions
- Prevent Drownings
Drownings at NYS Regulated Bathing Facilities
1987 - 2014

Annual Mean: 7.71
Fatal Drownings at NYS Bathing Facilities 1987 - 2014

Beaches  N = 97

- State Parks: 24
- Hotels/Campgrounds: 10
- Children's Camps: 4
- Part 6: 59

Pools  N = 98

- State Parks: 9
- Children's Camps: 3
- Hotels/Campgrounds: 27
- Part 6*: 59

* Includes: 7 Spas, 5 Phys Ed Classes, 1 Wave Pool, 1 Aquatic Theme Park
Fatal Drownings NYS Regulated Bathing Facilities: Age and Sex of Victim 1987-2014

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Female</th>
<th>Male</th>
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<tbody>
<tr>
<td>0-5</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>6-10</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>11-15</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>16-20</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>21-25</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>26-30</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>31-35</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>36-40</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>41-45</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>46-50</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>51-55</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>56-60</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>61-65</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>&gt;66</td>
<td>7</td>
<td>18</td>
</tr>
</tbody>
</table>

N = 195
n = 38
n = 157
Number of Drowning Victims and Average Age over Time

- Number of Victims
- Linear (Number of Victims)
- Average Age of Victim
- Linear (Average Age of Victim)

Total victims = 195
Water Depth at Location of Submersion 1987 - 2014

Number of Drownings

- **Pool n = 98**
- **Beach n = 97**

N=195

- **Unknown**: 2 22
- **0-3.5**: 21 17
- **>3.5-5**: 33 20
- **>5-10**: 34 29
- **>10-15**: 7 7
- **>15**: 3

- Supervision: 90 (52%)
- Environment: 38 (22%)
- Victim: 46 (26%)

- Excessive Depth: 6
- Bottom Conditions: 4
- Strong Current: 7
- Water Clarity: 12
- Excessive Spa Immersion: 1
- Glare (Outdoor AND Indoor): 7

*174 Contributing Factors Identified in 112 Drownings, 1987-2001
Contributing Factors*: Supervision 1987-2001

*174 Contributing Factors Identified in 112 Drownings, 1987-2001
Contributing Factors*: Victim 1987-2001

*174 Contributing Factors Identified in 112 Drownings, 1987-2001

- Supervision: 90 (52%)
- Environment: 38 (22%)
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- Hyperventilation: 4
- Drugs, Alcohol Medication: 11
- Developmental Disability: 13
- Seizure Disorder: 9
- Other Medical: 9

† 1 Diabetes, 7 Cardiac
1 Unknown event
Don’t Blame the Victim
Prevention

- Investigate/Collect Data
- Analyze/Develop Interventions
- Prevent Drownings
Prevention: Pre-event

Patron Surveillance & Supervision

- Design
- Capacity
- Lifeguard Training
  - Including instinctive drowning response
- Quantity & Positioning of Lifeguards
- Limit Duties
Prevention: Pre-event

Patron Surveillance & Supervision

Risk management plan ("Written Safety Plan")
– Provides site specific details for drowning and injury prevention
– Completed by facility managers
– Reviewed/approved by local health departments
– NYSDOH developed template for operators
  • Content based on known contributing factors
Prevention: Post-event

Incident Response

- Training
- Communication
- Treatment
The Future

Seeking greater precision and resolution of data:

- Additional multi-variable analysis
- Updated field investigation tools
- Future interventions?
Thank You!

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