The Road is Long, With Many a Winding Turn

CREATING A SAFETY CULTURE AROUND ALL-TERRAIN VEHICLES (ATVS)

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Charles Jennissen, MD
National Impact of ATV Crashes

Each year, U.S. ATV crashes account for over:

- 800 deaths
- 150,000 emergency department visits
- $4.3 billion
- Children/teens <16 years of age:
  - 1 in 4 deaths
  - 1 in 3 non-fatal injuries

More children are killed in ATV crashes each year than in bicycle crashes.
62% of Fatal Crashes Occur on the Road.

<table>
<thead>
<tr>
<th>Year</th>
<th>On-Road</th>
<th>Off-Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>1989</td>
<td>55</td>
<td>120</td>
</tr>
<tr>
<td>1994</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>1999</td>
<td>150</td>
<td>300</td>
</tr>
<tr>
<td>2004</td>
<td>200</td>
<td>400</td>
</tr>
</tbody>
</table>

Increase in Deaths/Year

- On-Road: 48 ± 2.8
- Off-Road: 20 ± 1.8
Adult Injuries Increasing at Higher Rate

What might account for these dramatic increases?
There are More and Bigger ATVs

- Increased exposure:
  - 1998 ~3 million ATVs
  - 2008 ~10 million ATVs

- Increased size:
  - Models > 900 cc
  - Weight > 850 lbs
  - Speed > 80 mph
Children <16 are being killed and injured on adult-sized vehicles.

Bigger Engine + Heavier Vehicle Equals Higher Speed + Crushing Weight
Risk Factors for ATV Crashes

- Vehicle size and speed
- Youth
- Lack of training/experience
- Unpredictable terrain
- Multiple riders
- Alcohol and Drugs
- Riding at night
- Riding on the road
ATV Injury Prevention

People, Resources, and a Plan
Iowa ATV Safety Taskforce

- Iowa Children’s Hospital*
- UI Department of Emergency Medicine*
- UI College of Engineering*
- Injury Prevention Research Center*
- Great Plains Center for Agricultural Health*
- Emergency Medical Services
- Department of Public Health
- Department of Transportation
- Department of Natural Resources
- Safe Kids of Johnson County
- Kohl’s Keeping Kids Safe Program*
ATV Injury Prevention

Injury Surveillance
### ATV Deaths and Injuries by Location

<table>
<thead>
<tr>
<th>Variable</th>
<th>Relative Proportions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males (&gt;80%)</td>
<td>On-road = Off-road = ATV park</td>
</tr>
<tr>
<td>Youths</td>
<td>On-road &gt; Off-road &gt; ATV park</td>
</tr>
<tr>
<td>Passengers</td>
<td>On-road &gt; Off-road &gt; ATV park</td>
</tr>
<tr>
<td>Alcohol</td>
<td>On-road &gt; Off-road &gt; ATV park</td>
</tr>
<tr>
<td>Collisions</td>
<td>On-road &gt;&gt; Off-road = ATV park</td>
</tr>
<tr>
<td>Head injury</td>
<td>On-road &gt; Off-road &gt; ATV park</td>
</tr>
<tr>
<td>Injury severity</td>
<td>On-road &gt; Off-road &gt; ATV park</td>
</tr>
<tr>
<td>Helmet use (%)</td>
<td>On-road (14%) &lt; Off-road (24%) &lt;= ATV park (90%)</td>
</tr>
</tbody>
</table>
ATV Injury Prevention

*Education and Outreach*
School-Based ATV Safety Program

Goal
- Determine ATV exposure, knowledge, and safety habits among Iowa youth (11-15 yrs old)

Methods
- Survey to assess baseline exposure, safety knowledge, and safety habits
- Provide safety program
- Survey to measure post-program knowledge
Safety Program Results

Exposure

- N = 1,889 students, 13 schools
- 86% of youth had ridden on an ATV
- 38% at least once a week
- 61% of youth who had ridden had been in a crash

Safety behaviors

- 94% were on a vehicle with more than 1 person
- 81% had ridden on a public road
- 62% never or almost never wore a helmet
## Safety Program Results

<table>
<thead>
<tr>
<th>Survey Knowledge Question (Clicker Technology)</th>
<th>Student Before Safety Program</th>
<th>Primary Care Providers*</th>
<th>Student After Safety Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Most ATVs are designed to carry how many people? <strong>One</strong></td>
<td>52%</td>
<td>68%</td>
<td>93%</td>
</tr>
<tr>
<td>2. According to guidelines, what is the largest ATV engine size recommended for use by 12-15 year olds? <strong>90 cc</strong></td>
<td>26%</td>
<td>11%</td>
<td>80%</td>
</tr>
<tr>
<td>3. According to Iowa law, when can someone ride an ATV on a public road? <strong>Agricultural purposes</strong></td>
<td>46%</td>
<td>14%</td>
<td>79%</td>
</tr>
</tbody>
</table>

*218 Primary care providers in Iowa (MD, DO, PA, NP)

A 1-year follow-up survey is currently being analyzed (10 of 13 schools).
ATV Injury Prevention

Engineering Research
Simulation

- Platform tilt
- Vibration
- Motion capture
- Pressure sensors

Proposed studies

- Create programmed sequence
- Experienced adult drivers (Controls)
  - Inexperienced adults
  - Youths ± experience
  - Passengers
ATV Injury Prevention

Public Policy
Partnership Successes

- Iowa Department of Transportation (IDOT)
  - Revised DOT crash report form to better identify ATVs and to code for mechanisms

- Iowa Department of Natural Resources (IDNR)
  - Assess initiative to reduce EMS response time in OHV parks

- Iowa Department of Public Health (IDPH)
  - 5-Year Healthy Iowa Plan
  - Surveillance initiative to improve EMS and trauma registry coding related to ATVs
Increase knowledge and enforcement of Iowa’s existing ATV laws:

- Restricting ATV road use to agricultural and other work-related purposes.
- Prohibiting passengers on single-person vehicles (private and public property)

IOWA NEEDS A HELMET LAW!!!!
Questions?
Iowa Needs a Helmet Law!

- Helmet Use
- Brain Injury (Moderate-Severe)

<table>
<thead>
<tr>
<th>Location</th>
<th>Helmet Use</th>
<th>Brain Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Road</td>
<td>14%</td>
<td>26%</td>
</tr>
<tr>
<td>Outside ATV Parks</td>
<td>24%</td>
<td>10%</td>
</tr>
<tr>
<td>Inside ATV Parks</td>
<td>90%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Data from the Iowa ATV Injury Surveillance Database

Off-road
Goal
- To assess the knowledge, attitudes, and practices related to ATV safety anticipatory guidance among primary care providers in Iowa

Methods
- Distributed an on-line survey
- Iowa Chapter of the American Academy of Pediatrics (AAP)
- Iowa Academy of Family Physicians (IAAFP)
- Iowa Physician Assistant Society (IPAS)
- Iowa Association of Nurse Practitioners (IANP)
- Iowa Nurse Practitioner Society (INPS)
ATV Safety Anticipatory Guidance

Results (218 respondents):

- **Exposure**
  - 47% had never ridden on an ATV
  - 40% had ridden on but did not own an ATV
  - 13% own an ATV

- **Practice**
  - Over 80% provided anticipatory guidance <10% of the time
  - Only 15.8% of providers reported being asked by families about ATV safety issues more than once a year.
Anticipatory Guidance

Results (218 respondents):

- Knowledge
  - Knowledge scores were low
  - Differences in knowledge based on ATV experience

- Attitude
  - 61% thought guidance was important
  - Time was the major barrier cited
  - 47% admitted they had insufficient knowledge
  - 63% indicated they had inadequate resources
  - A variety of resources were considered valuable

Primary care providers could play an important role in ATV injury prevention.
If she had been going **10 mph** when she decelerated, she would have lost her grip (Force >350 Newtons) and been ejected.
As the mass of the rider(s) triples, the vehicle must go 3-5 mph slower.
Education and Enforcement

Not working….Stay off the road.

It’s not just safe….It’s the law.

Protect the ones you love.

Don’t give them a ride!

More of this…

EQUALS

More of this…