IN-DEPTH ANALYSIS OF ROAD TRAFFIC ACCIDENTS RELATED TO CHILDREN AND MEASURES FOR CHILDREN SAFETY IMPROVEMENT IN HO CHI MINH CITY

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Road Traffic Safety Problems in HCMC

- Around the world, an average of 2 minutes, there is a child died in a traffic accident (WHO, 2008).

- In Vietnam, traffic accidents kill nearly 2,000 children a year (NTSC, 2015).

- HCMC has the highest number of RTAs in Vietnam; Of which around 9% relates to children (PC67, 2015).

- Lack of in-depth studies on traffic accidents related to children to support the development of policies and measures to improve traffic safety for children.

**Rate of RTAs related to children/100,000 children**

<table>
<thead>
<tr>
<th>Country</th>
<th>Rate (per 100,000 children)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam</td>
<td>20</td>
</tr>
<tr>
<td>ASEAN</td>
<td>7.4</td>
</tr>
<tr>
<td>OECD</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Source: NTSC 2015

OECD: The Organisation for Economic Co-operation and Development
Research Objective

• Systematic and in-depth analysis on the trend, pattern and cause of road traffic accidents (RTAs) involving children,

• Propose solutions to enhance road traffic safety for children in HCMC.
Analysis Results

Trend, patterns, and causes of RTAs
(Trend, Pattern, Cause, Age, Sex, Location, Time)

RTAs Database in the past
(PC67, HCMC road traffic police, 2010-2015)

Traffic characteristics and traffic violation of children & parents

Camera Survey
(15 schools & 10 roads)

Factors impact on risky behaviours

Interview
(600 parents, 1000 students, 93 teachers)

Propose practical solutions to improve children traffic safety

Review and evaluate solutions
(Domestic and international experience)
While the number of traffic accidents, deaths, injuries are declining, traffic accident involving children tend to increase rapidly.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Accidents</th>
<th>Total Deaths</th>
<th>Total Injuries</th>
<th>Child Accidents</th>
<th>Child Deaths</th>
<th>Child Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>1101</td>
<td>837</td>
<td>432</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2011</td>
<td>1042</td>
<td>887</td>
<td>495</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2012</td>
<td>958</td>
<td>824</td>
<td>388</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2013</td>
<td>941</td>
<td>775</td>
<td>349</td>
<td>36 ↑</td>
<td>35 ↑</td>
<td>15 ↑</td>
</tr>
<tr>
<td>2014</td>
<td>850</td>
<td>701</td>
<td>322</td>
<td>85 ↑</td>
<td>61 ↑</td>
<td>55 ↑</td>
</tr>
<tr>
<td>2015*</td>
<td>771</td>
<td>692</td>
<td>268</td>
<td>104 ↑</td>
<td>111 ↑</td>
<td>54 ↑</td>
</tr>
<tr>
<td>Total 2013-2015</td>
<td>2562</td>
<td>2168</td>
<td>939</td>
<td>225</td>
<td>207</td>
<td>124</td>
</tr>
</tbody>
</table>

Data source: Highway and Railway Police Division, HCMC Police Dept. (PC67), 2015
(*): Accounted until 15/11/2015
**Children Accidents by Age and Gender**

- **Male children** are much more vulnerable than female ones.

- **High school students (16-18 years old)** has the highest rate of accident, death and injury, followed by Secondary school ones.
The fatality rate of high school student is much higher than other student groups and tend to increase rapidly by the year.

Data source: Highway and Railway Police Division, HCMC Police Dept. (PC67), 2015
(*): Accounted until 15/11/2015
Who drove in traffic accidents related to children?

There is more than 80% of self-driving school student in traffic accidents. The accident rate of self-driving high school student account for more than 75%, secondary school is around 20%.
The five main causes of children traffic accidents are **Wrong lane running, dangerous change of direction, over speeding, dangerous overtaking, dangerous road crossing**.
The traffic accidents related to children has different main causes in the 04 student groups.

<table>
<thead>
<tr>
<th>Main Cause</th>
<th>Kinder</th>
<th>Primary</th>
<th>Secondary</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrong lane running</td>
<td>1</td>
<td>1</td>
<td>13</td>
<td>38</td>
</tr>
<tr>
<td>Over speeding</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Dangerous overtaking</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Dangerous change of direction</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Dangerous road crossing</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Not giving way at intersection</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Not keep a safe following distance</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Self accident</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Opposite direction running</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Drunken driving</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Vehicle breakdown</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Red light running</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other (unknown)</td>
<td>2</td>
<td>3</td>
<td>11</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>11</td>
<td>44</td>
<td>160</td>
</tr>
</tbody>
</table>

Children Traffic Accident Causes by Age Group
Distribution of Child-Related RTAs by Time

- RTAs related to **secondary school student** occur from **10am** to **2pm**
- RTAs related to **high school student** happen from **6pm** to **2am of the next day**
- RTAs involving children **increase on weekend**
- RTAs involving children **rise up on summer months**
Distribution of Child-Related RTAs by Location

- Child-related traffic accidents occur **82% on road segments**, and **18% at intersections**.
- Traffic accidents have no difference in the number of cases between regions.

![Child-related traffic accident distribution by locations](image1)

![Child-related traffic accident distribution by zones](image2)

03 Zones of HCMC
# Review of Measures in HCMC

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<thead>
<tr>
<th>No.</th>
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<tr>
<td>1</td>
<td>Road infrastructure improvements</td>
<td>o</td>
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<tr>
<td>2</td>
<td>“Black spot” improvement</td>
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<tr>
<td>3</td>
<td>Surveillance camera system</td>
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<td>4</td>
<td>Bicycle lane</td>
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<td>5</td>
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<td>VEHICLE</td>
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<td>10</td>
<td>Vehicle audit</td>
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<td>Strengthening traffic safety campaign and education</td>
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<td>15</td>
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</tr>
</tbody>
</table>
Conclusion

- The majority of child traffic accidents contributed by high school children (>70%), followed by secondary school ones (nearly 20%), and primary school and kindergarten ones (5% each).
- More than 85% accidents involving Male children.
- 80% accidents occurred while the children were driving by themself, only 20% happened while the parents were driving.
- The top 5 main causes of child accidents:
  - Wrong lane running
  - Dangerous change of direction
  - Over speeding
  - Dangerous overtaking
  - Dangerous road crossing

→ Need to observe other frequent violations.
→ Need to focus the behavioral study of the parents (who carry kinder and primary) and high school and secondary school children.
Analysis Results

- Trend, patterns and causes of RTAs
  (Trend, Pattern, Cause, Age, sex, location, time)
- Traffic characteristics and traffic violation of children & parents
- Factors impact on risky behaviours
- Propose practical solutions to improve children traffic safety

- RTAs Database in the past
  (PC67, HCMC road traffic police, 2010-2015)
- Camera Survey
  (15 schools & 10 roads)
- Interview
  (600 parents, 1000 students, 93 teachers)
- Review and evaluate solutions
  (Domestic and international experience)
Means of Transport to School

(Observed 6,800 students at 15 schools & 10 roads in HCMC)

- Secondary school:
  - Walking: 25.3%
  - Bicycle: 18.5%
  - E-bike: 4.3%
  - Bike: 51.8%
- High school:
  - Walking: 20.9%
  - Bicycle: 16.3%
  - E-bike: 5.8%
  - Bike: 56.3%
- Primary school:
  - Walking: 16.6%
  - Bicycle: 2.1%
  - E-bike: 0.4%
  - Bike: 80.9%
- Kindergarten:
  - Walking: 11.2%
  - Bicycle: 0.4%
  - E-bike: 0.4%
  - Bike: 86.6%
Mode Used By Age Group (1)

(Observed 6,800 students at 15 schools & 10 roads in HCMC)

- Kindergarten: 100% as passenger or walking with parents
- Primary school: 100% as passenger, or walking with parents (57%)
- Secondary school:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Driver</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>1.8%</td>
<td>98.2%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>6.8%</td>
<td>93.2%</td>
</tr>
<tr>
<td>E-bike</td>
<td>45.8%</td>
<td>54.2%</td>
</tr>
<tr>
<td>M-cycle</td>
<td></td>
<td>99.5%</td>
</tr>
</tbody>
</table>

0.5% self driving

Strengthen the patrol, supervision and punishment
High school: significant number of pupils driving motorcycle

- Walking: 99.7%
- Bicycle: 98.8%
- E-bike: 92.4%
- M-cycle: 77.3%

~23% self driving

Strengthen the patrol, supervision and punishment

How to encourage primary & secondary school walking or cycling to school?
Traffic Safety Violations (Observed)

(Observed 6,800 students at 15 schools & 10 roads in HCMC)

- **No helmet** and **No safety belt** are the two safety violations have the very high rate in **Kindergarten group**
- **No helmet** is also the safety violation has the highest rate in the **Primary and Secondary group**
- **No helmet**, No signal while turning direction, Wrong lane are the the three safety violations have the high rate in **high school group**.

![Traffic Safety Violations by Student Groups](chart.png)

**Traffic Safety Violations by Student Groups**
Inadequate Traffic Organization in the School Areas

- **Infrastructure**
  - The pavement is damaged;
  - Parking is not available or limited, causing parents park on road and cause traffic disruption;
  - No waiting area for students around school zones.

- **Traffic organization**
  - No regulator, lacking of signal lights, zebra-crossing, no road humps around school zones;
  - Inadequate planning: the zebra-crossing for students and parents is not reasonable;
  - Encroaching the sidewalk to do business (street vendor) → makes students and pedestrians have to go down the road, ...

Source: VGTRC research group
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Analysis Results

**Trend, patterns and causes of RTAs**
(Trend, Pattern, Cause, Age, sex, location, time)

**Traffic characteristics, traffic violation of children & parents**

**Factors impact on risky behaviours**

**Propose practical solutions to improve children traffic safety**

**RTAs Database in the past**
(PC67, HCMC road traffic police, 2010-2015)

**Camera Survey**
(15 schools & 10 roads)

**Interview**
(600 parents, 1000 students, 93 teachers)

**Review and evaluate solutions**
(Domestic and international experience)
Interview Samples

- **Parents (Kindergarten and Primary): 600 samples**
  - Over speeding: 200 samples
  - Child without helmet: 200 samples
  - Child sitting dangerously: 200 samples

- **Secondary & high school children: 1,000 samples**
  - Over speeding: 200 samples
  - Opposite direction running: 200 samples
  - Wrong lane running: 200 samples
  - Driving a motorcycle without driving license: 200 samples
  - No helmet: 200 samples

- **Teachers: 93 samples**
  - Kindergarten: 23 samples
  - Primary school: 22 samples
  - Secondary school: 24 samples
  - High school: 24 samples
Analysis Steps

Descriptive analysis
- For each behavior and each group
- Comparison between groups:
  - Sex (Male vs Female)
  - Traffic accident in the past (Yes vs No)
  - Type of vehicle used (Bicycle vs Bike) (analysis for student only)

TPB analysis
- For each behavior and each group
- Comparison between groups:
  - Sex (Male vs Female)
  - Traffic accident in the past (Yes vs No)
  - Type of vehicle used (Bicycle vs Bike) (analysis for student only)

Policy meaning
- Education and Encourage
- Enforcement
Parent Sample (N=600)

**GENDER**
- Female: 49%
- Male: 51%

**RESIDENTIAL AREA**
- Urban: 38%
- Suburban: 62%

**OCCUPATION**
- Housewife: 1%
- Business: 17%
- Office worker: 23%
- Teacher: 16%
- Factory worker: 22%
- Farmer: 18%
- Other: 3%
Parent Travel (N=600)

**COMMUTING DISTANCE**
- 0-2 KM: 27%
- 2-4 KM: 23%
- 4-6 KM: 18%
- 6-10 KM: 11%
- >10 KM: 11%

**COMMUTING MODE**
- MC (driver): 89%
- MC (pass.): 2%
- Xe-om: 4%
- E-bike (driver): 2%
- E-bike (pass.): 1%
- Private car: 1%
- Taxi: 2%
- City bus: 1%
- Shuttle bus: 1%
- Walk: 1%
- Bicycle: 1%
Parent Past Accidents (N=600)

GOT AN ACCIDENT(S) IN THE PAST 2 YEARS?

- Yes: 27%
- No: 73%

WHO DROVE?

- Yourself: 97%
- A child: 3%

INVOLVED VEHICLE

- M-cycle: 85%
- E-bike (driver): 11%
- Bicycle: 3%
- Other: 1%
Main Cause of Accident

- Wrong lane running: 18%
- Opposite direction running: 17%
- Over speeding: 17%
- Dangerously crossing the road: 8%
- Red light running: 18%
- Other: 22%

Injured Driver

- Slightly: 93%
- Heavily: 7%

Injured Passenger(s)

- Slightly: 91%
- Heavily: 9%
**Child Samples (N=1000)**

**GENDER**
- Female: 47%
- Male: 53%

**AGE**
- 10: 0%
- 11: 0%
- 12: 1%
- 13: 3%
- 14: 8%
- 15: 9%
- 16: 18%
- 17: 27%
- 18: 28%

**RESIDENTIAL AREA**
- Suburban: 51%
- Urban: 49%

**SCHOOL AREA**
- Suburban: 50%
- Urban: 50%
Child Travel (N=1000)

**DISTANCE TO SCHOOL**
- 0-2 KM: 4%
- 2-4 KM: 17%
- 4-6 KM: 18%
- 6-10 KM: 44%
- >10 KM: 4%

**MODE TO SCHOOL**
- MC (driver): 45%
- MC (pass.): 0%
- Xe-om: 11%
- E-bike (driver): 1%
- E-bike (pass.): 1%
- Private car: 28%
- Taxi: 0%
- City bus: 0%
- Shuttle bus: 0%
- Walk: 10%
Child Past Accidents (N=1000)

- **GOT AN ACCIDENT(S) IN THE PAST 2 YEARS?**
  - Yes: 38%
  - No: 62%

- **INVOLVED VEHICLE**
  - M-cycle: 49%
  - E-bike (driver): 19%
  - Bicycle: 31%
  - Other: 1%

- **WHO DROVE?**
  - Yourself: 63%
  - Parent: 8%
  - Older brother/sister: 8%
  - Younger brother/sister: 8%
  - Friend: 17%
  - Other: 1%
Child Past Accidents (N=1000) (Cont.)

**Injured Driver**
- Slightly: 93%
- Heavily: 7%

**Injured Passenger**
- Slightly: 93%
- Heavily: 7%

**Main Cause of Accident**
- Wrong lane running: 21%
- Opposite direction running: 17%
- Over speeding: 16%
- Dangerously crossing the road: 26%
- Red light running: 11%
- Other: 9%
Theory of Planned Behaviour

Source: Ajzen (1991)
Application TPB in The Study

Behavioral belief
- Perceived outcome

Normative belief
- Motivation to comply

Strength of control power
- Perceived power

Attitude

Norms

Perceived behavioral control

Behavior

H1
H2
H3

Behavioral frequency:
1. Daily
2. Weekly
3. Sometime a month
4. Sometime a year
5. Never

Likert scale (1-2-3-4-5)

Adopted from Ajzen (1991)
Parents Traffic Violations

- Child sitting dangerously: 19%
- Wrong lane running: 17%
- Child without helmet: 15%
- Dangerously crossing the road: 14%
- No safety belt for child: 11%
- Over speeding: 10%
- Opposite direction running: 9%
- Carrying more than two children: 8%
- Parent without helmet: 7%

(% violated Daily and Weekly)
Parents Traffic Violations by Past Accident

- Child sitting dangerously: 14% (No accident in the last 2 yrs), 30% (Got accident(s) in the last 2 yrs)
- Wrong lane running: 15% (No accident in the last 2 yrs), 23% (Got accident(s) in the last 2 yrs)
- Child without helmet: 14% (No accident in the last 2 yrs), 23% (Got accident(s) in the last 2 yrs)
- Dangerously crossing the road: 14% (No accident in the last 2 yrs), 13% (Got accident(s) in the last 2 yrs)
- No safety belt for child: 12% (No accident in the last 2 yrs), 12% (Got accident(s) in the last 2 yrs)
- Over speeding: 8% (No accident in the last 2 yrs), 14% (Got accident(s) in the last 2 yrs)
- Opposite direction running: 8% (No accident in the last 2 yrs), 10% (Got accident(s) in the last 2 yrs)
- Carrying more than two children: 7% (No accident in the last 2 yrs), 10% (Got accident(s) in the last 2 yrs)
- Parent without helmet: 6% (No accident in the last 2 yrs), 11% (Got accident(s) in the last 2 yrs)
# Estimated TPB Models for Parents

<table>
<thead>
<tr>
<th>Factor</th>
<th>Over Speeding</th>
<th>Child sitting dangerously</th>
<th>Child no helmet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>Sig.</td>
<td>Beta</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.427</td>
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<td>0.539</td>
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<tr>
<td>Norms</td>
<td>0.346</td>
<td>0.000</td>
<td>0.308</td>
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<tr>
<td>Perceived behavioral control</td>
<td>0.204</td>
<td>0.000</td>
<td>0.071</td>
</tr>
<tr>
<td>Sample Size (N)</td>
<td>200</td>
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<td>200</td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0.930</td>
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<td>0.884</td>
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</table>

- “Attitude” is the most influential factor
- Followed by “Norms – Social pressure” (2nd influence)
- “Perceived behavioral control” (3rd influence)
General Attitude Toward “Over Speeding”

% “AGREE + VERY AGREE” that over-speeding is sometime acceptable

- Sometime still acceptable: 20%
- Extremely dangerous: 95%
- Absolutely wrong: 94%

Significant number of parents having a biased attitude!
Behavioral Beliefs & Perceived Outcomes

% “AGREE + VERY AGREE” THAT OVER SPEEDING MIGHT HELP ...

- Need to emphasis the bad outcomes!

- Need to make a good plan for family activities

% PERCEIVED THAT THE OUTCOMES FROM OVER SPEEDING WOULD BE “GOOD + VERY GOOD” ...

- Causing an accident to ...
- Reducing stress
- Avoiding uncomfortable feeling
- In the class in time
- At office in time
### Normative Beliefs & Motivation to Comply

#### % “AGREE + VERY AGREE” THAT THE FOLLOWING PEOPLE OFTEN ADVISE...

<table>
<thead>
<tr>
<th>Category</th>
<th>% Agree + Very Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>7%</td>
</tr>
<tr>
<td>The passenger often ask to speed up to be in time</td>
<td>11%</td>
</tr>
<tr>
<td>The passenger always say “don’t do over speeding”</td>
<td>80%</td>
</tr>
<tr>
<td>Child(ren) often say “not commit in over speeding…”</td>
<td>75%</td>
</tr>
<tr>
<td>Husband or wife advices not to commit...</td>
<td>87%</td>
</tr>
<tr>
<td>Husband or wife has no opinion</td>
<td>23%</td>
</tr>
<tr>
<td>Friends advise not to commit...</td>
<td>83%</td>
</tr>
</tbody>
</table>

#### % “FOLLOW AND VERY FOLLOW” THE ADVICES OF THE FOLLOWING PEOPLE

- The passenger: 39%
- Child(ren): 52%
- Husband or Wife: 79%
- Friends: 35%

*Need to strengthen the voice of the husband/wife and children!*
Strength of Control Power & Perceived Power

% “BEING NERVOUS + EXTREMELY NERVOUS” WHILE OVER SPEEDING AND FACE CASES:

- Bad road surface (bumpy & holes) 65%
- The child seems to be jumped out of vehicle 65%
- Dust following into the child’s face, scaring.. 60%
- The child acts dangerously 55%
- A vehicle from a collector road jumps into ... 56%
- A front vehicle suddenly changes direction 49%

% “OFTEN + VERY OFTEN” MEET THE FOLLOWING CASES WHILE OVER SPEEDING:

- Bad road surface (bumpy & holes) 16%
- The child seems to be jumped out of vehicle 15%
- Dust following into the child’s face, scaring.. 15%
- The child acts dangerously 23%
- A vehicle from a collector road jumps into ... 26%
- A front vehicle suddenly changes direction 19%
Children Traffic Violations

- Wrong lane running: 29%
- Driving motorcycle below an age limit: 25%
- Dangerously crossing the road: 21%
- Carrying more than 2 children: 15%
- No helmet: 14%
- Opposite direction running: 13%
- Over speeding: 10%

(%) violated Daily and Weekly
Children Traffic Violations by Past Accident

- Over speeding
  - No accident in the past 2 yrs: 9%
  - Got accident(s) in the past 2 yrs: 12%
- Opposite direction running
  - No accident in the past 2 yrs: 12%
  - Got accident(s) in the past 2 yrs: 13%
- No helmet
  - No accident in the past 2 yrs: 13%
  - Got accident(s) in the past 2 yrs: 15%
- Carrying more than 2 children
  - No accident in the past 2 yrs: 14%
  - Got accident(s) in the past 2 yrs: 15%
- Dangerously crossing the road
  - No accident in the past 2 yrs: 18%
  - Got accident(s) in the past 2 yrs: 27%
- Driving motorcycle below an age limit
  - No accident in the past 2 yrs: 22%
  - Got accident(s) in the past 2 yrs: 26%
- Wrong lane running
  - No accident in the past 2 yrs: 25%
  - Got accident(s) in the past 2 yrs: 35%
Children Traffic Violations by Vehicle

- Wrong lane running: 32% (Bicycle), 28% (E-bike), 25% (M-cycle)
- Driving motorcycle below an age limit: 40% (M-cycle)
- Dangerously crossing the road: 22% (Bicycle), 19% (E-bike), 25% (M-cycle)
- Carrying more than 2 children: 7% (Bicycle), 6% (E-bike), 19% (M-cycle)
- No helmet: 11% (Bicycle), 22% (E-bike), 11% (M-cycle)
- Opposite direction running: 15% (Bicycle), 16% (E-bike), 11% (M-cycle)
- Over speeding: 10% (Bicycle), 11% (E-bike), 11% (M-cycle)

(% violated Daily and Weekly)
## Estimated TPB Models for Children

<table>
<thead>
<tr>
<th>Factor</th>
<th>Over speeding</th>
<th>Wrong lane</th>
<th>Opposite dir. running</th>
<th>Driving below allowed age</th>
<th>No helmet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>Sig.</td>
<td>Beta</td>
<td>Sig.</td>
<td>Beta</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.612</td>
<td>0.000</td>
<td>0.235</td>
<td>0.043</td>
<td>0.329</td>
</tr>
<tr>
<td>Norms</td>
<td>0.216</td>
<td>0.000</td>
<td>0.320</td>
<td>0.006</td>
<td>0.408</td>
</tr>
<tr>
<td>Perceived behavioral control</td>
<td>0.179</td>
<td>0.017</td>
<td>0.267</td>
<td>0.005</td>
<td>0.195</td>
</tr>
<tr>
<td>Sample size (N)</td>
<td>199</td>
<td>193</td>
<td>190</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0.942</td>
<td>0.805</td>
<td>0.892</td>
<td>0.750</td>
<td>0.879</td>
</tr>
</tbody>
</table>

- Different from the parents, for children “Norms - Social Pressure” is the most influential factor (3 out of 5 behaviors)
- Followed by “Attitude” (2nd influence)
- “Perceived behavioral control” (3rd influence)
Need to strengthen the voice of the parents, teachers, and close friends to avoid the risky behaviors of students.
Review of Measures in HCMC

<table>
<thead>
<tr>
<th>No.</th>
<th>Measure</th>
<th>Being implemented</th>
<th>Fully implemented</th>
<th>Implemented, but stop now</th>
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</tr>
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<tbody>
<tr>
<td>I</td>
<td>INFRASTRUCTURE</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>1</td>
<td>Road infrastructure improvements</td>
<td>o</td>
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<tr>
<td>2</td>
<td>“Black spot” improvement</td>
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<tr>
<td>3</td>
<td>Surveillance camera system</td>
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<td>4</td>
<td>Bicycle lane</td>
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<td>o</td>
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<tr>
<td>5</td>
<td>Pedestrian infrastructure (sidewalk improvement)</td>
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<td>o</td>
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<tr>
<td>II</td>
<td>TRAFFIC MANAGEMENT</td>
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<tr>
<td>6</td>
<td>Lane reorganization</td>
<td></td>
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<td>o</td>
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<tr>
<td>7</td>
<td>Signal system adjustment &amp; intersection improvement</td>
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<td>o</td>
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<tr>
<td>8</td>
<td>Traffic management in school area</td>
<td></td>
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<td>o</td>
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<tr>
<td>9</td>
<td>Provision of road facilities (signs, crossing lane, etc.)</td>
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<tr>
<td>III</td>
<td>VEHICLE</td>
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<tr>
<td>10</td>
<td>Vehicle audit</td>
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<td>11</td>
<td>Shuttle bus, school bus services</td>
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<td>12</td>
<td>Public transport</td>
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<td>14</td>
<td>Strengthening traffic safety campaign and education</td>
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<td>16</td>
<td>Traffic safety education in Kindergarten &amp; Primary schools</td>
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No education program for Parents and Secondary School Children
Analysis Results

**Trend, patterns and causes of RTAs**
(Trend, Pattern, Cause, Age, sex, location, time)

**Traffic characteristics and traffic violation of children & parents**

**Factors impact on risky behaviours**

**Propose practical solutions to improve children traffic safety**

---

**RTAs Database in the past**
(PC67, HCMC road traffic police, 2010-2015)

**Camera Survey**
(15 schools & 10 roads)

**Interview**
(600 parents, 1000 students, 93 teachers)

**Review and evaluate solutions**
(Domestic and international experience)
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</tbody>
</table>
### 03 Groups of Solutions to Improve Traffic Safety for Children for HCMC

1. **Strengthen surveillance patrols to dramatically reduce traffic safety violations in children:**
   - Strengthen punishment of risk-taking behaviors of children when riding, especially with the male group of the high school and secondary school.
   - Compulsory helmet using for the 3-5 year-olds children group.

2. **Promote culture of walking and cycling for children, especially primary and secondary school students:**
   - Reestablish the pavement order, to renovate the sidewalk pavement
   - Study and build bicycle lanes so that children can ride bicycles safely and comfortably to school.

3. **Improving traffic safety for secondary and high school children by:**
   - Raising the voice and influential power of Parents, Teachers and Close Friends
   - Raising the voice of husband/wife and children to parents group
   - Increasing perceptions about risks while violating traffic rules
   - Improving traffic law knowledge, skills for safe traffic participation
ACTION TO KEEP KIDS SAFE