
SMART
CORE
SAFETY AT THE HEART

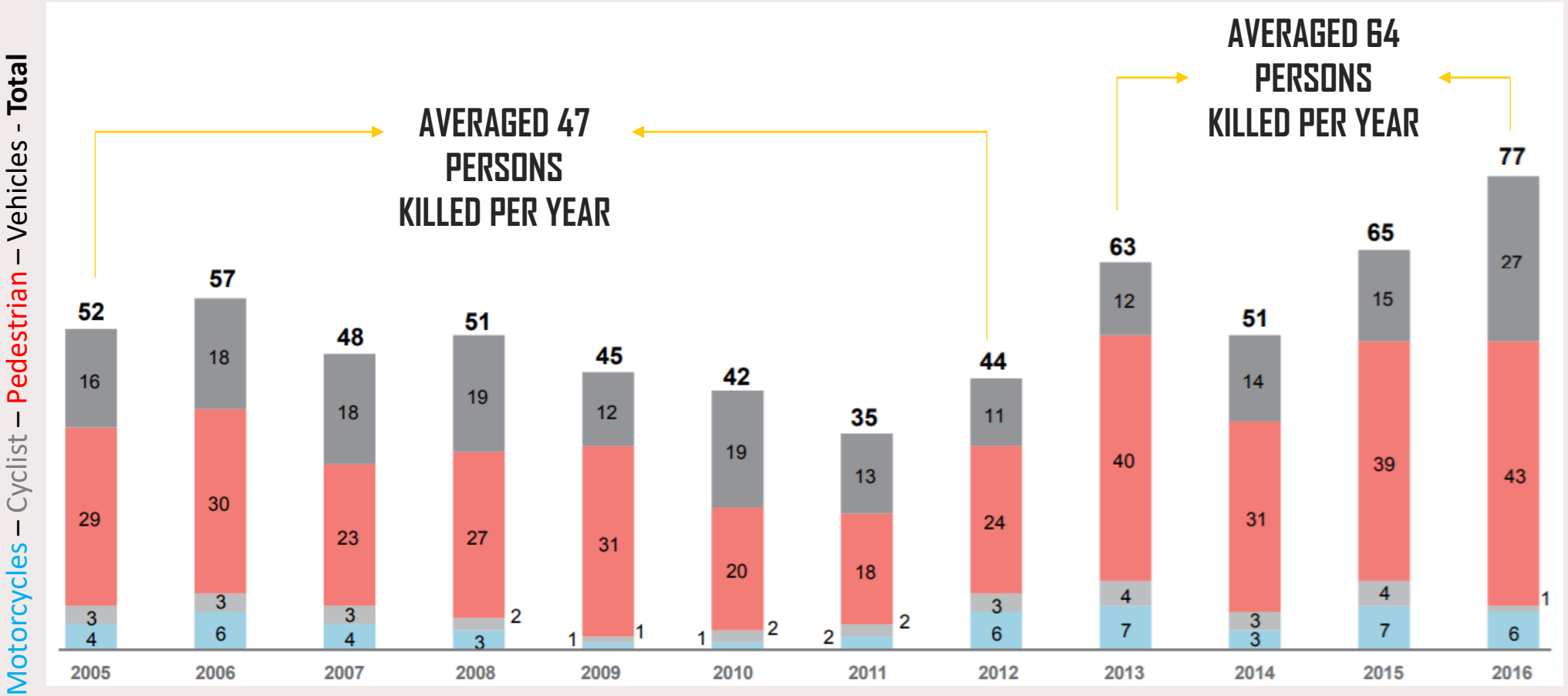
"**68%** of the world population projected to live in urban areas by **2050**" [1]

"The City of Toronto population projection by **2025** is **5,946,000**" [2]

"**4400** road accidents have occurred in the City of Toronto from **2007 - 2017**" [3]

THE PROBLEM

URBAN CENTERS WITH HIGH DENSITY OF POPULATION
ROAD ACCIDENTS EXPECTED TO RISE WITH HIGHER VOLUME OF PEOPLE MOVING ABOUT

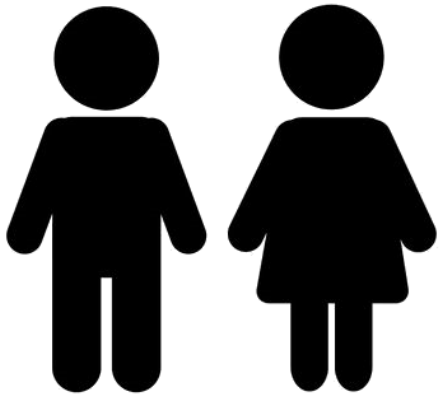


Total Traffic Fatalities in Toronto, Jan. 1, 2005 - Dec. 31, 2016 [4]

31% are **killed or seriously injured** in cars

14% are **killed or seriously injured** on bikes

10% are **killed or seriously injured** on motorcycles



3 MILLON

people move about Toronto everyday

45% are **killed or seriously injured** on foot

WHERE SHOULD RESOURCES BE DEPLOYED TO REDUCE FATALITIES BY MOTOR VEHICLES IN URBAN CENTERS?

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OUR SOLUTION

- DATA DRIVEN APPROACH TO IDENTIFY INTERSECTIONS WITH HIGH RISK OF FATALITIES
- IMPLEMENT PREVENTIVE MEASURES TO REDUCE FATALITIES AT THESE LOCATIONS
- UPDATE THE TOOL WITH HOURLY WEATHER TO QUICKEN RESPONSE TIMES OF EMERGENCY SERVICES

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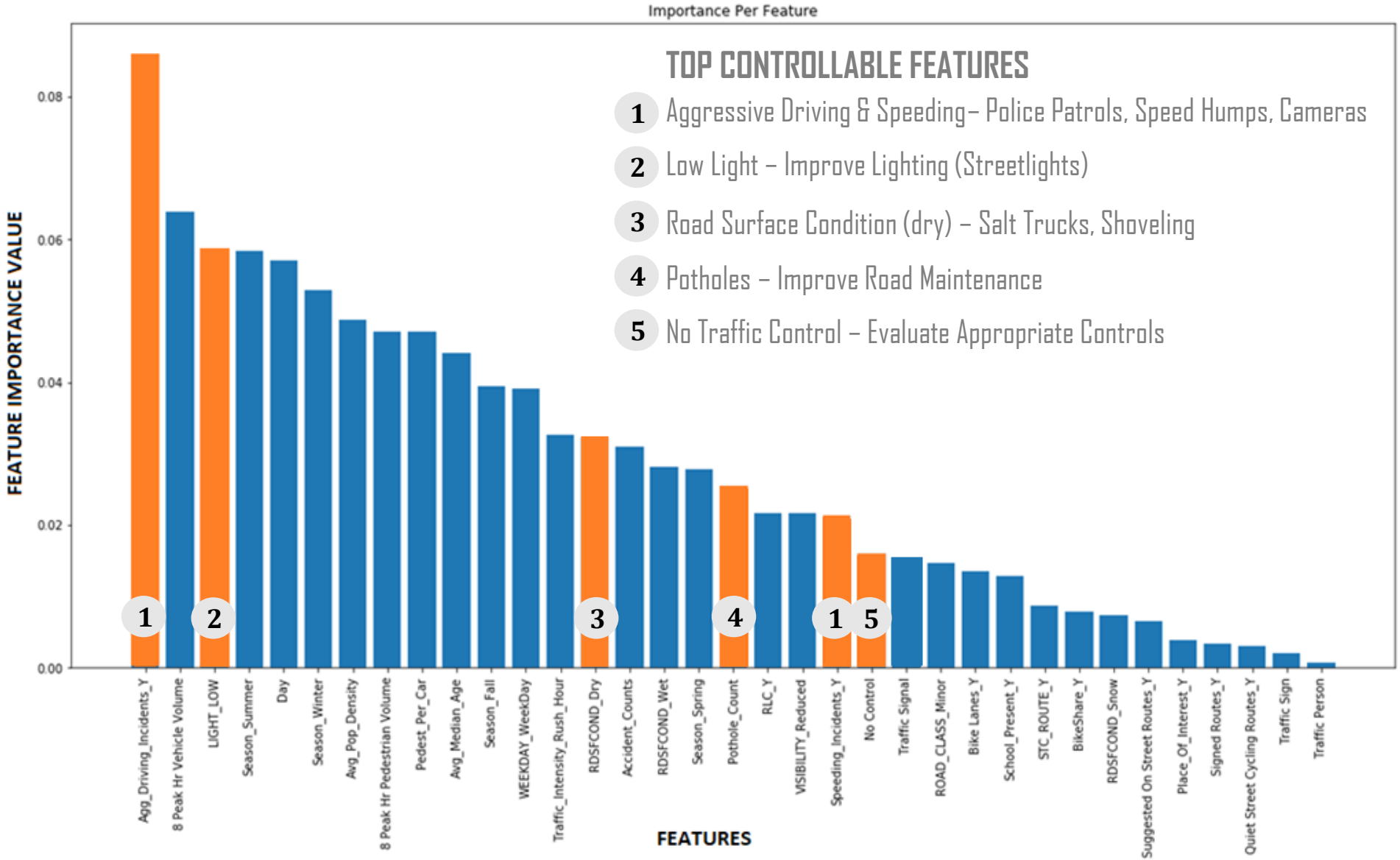
THE DATA

The model runs on a variety of datasets that impact the road safety directly and indirectly.

At its core is the following:

- **Vehicle and Pedestrian Volumes** at Street Intersections
- Road accidents where a person was either **Killed or Seriously Injured (KSI)** from 2007 to 2017

THE FEATURES



THE PROCESS

KSI

DATA

CLASSIFIER

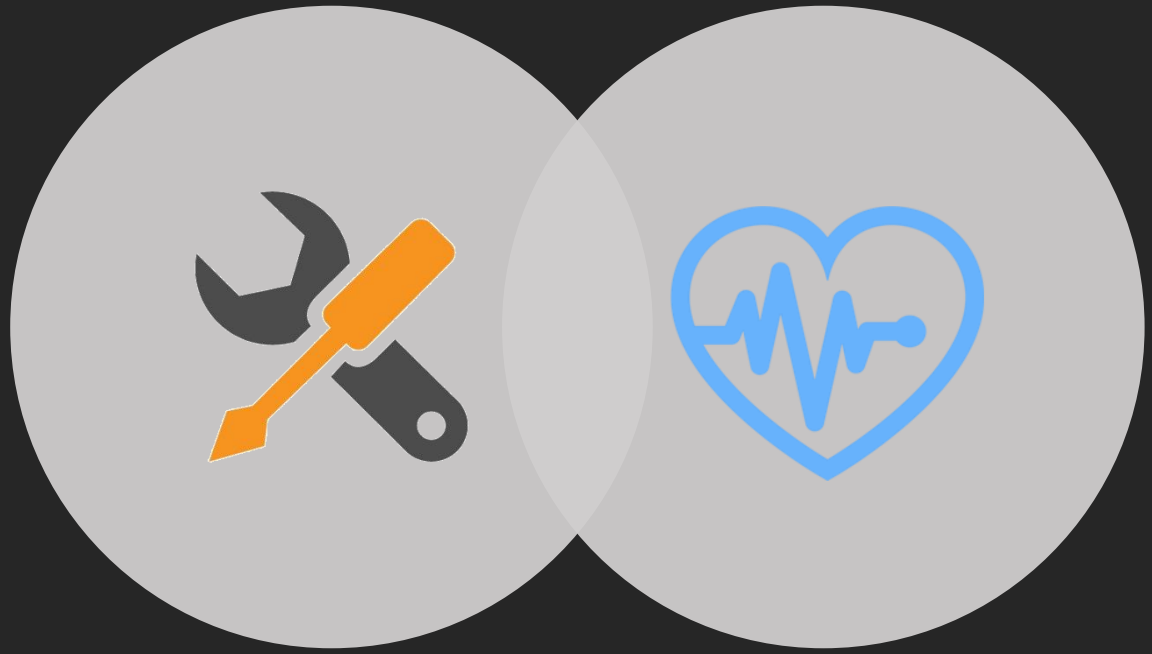
RESULT

TWO STAGE SOLUTION

STAGE 1

PREVENTIVE MEASURES

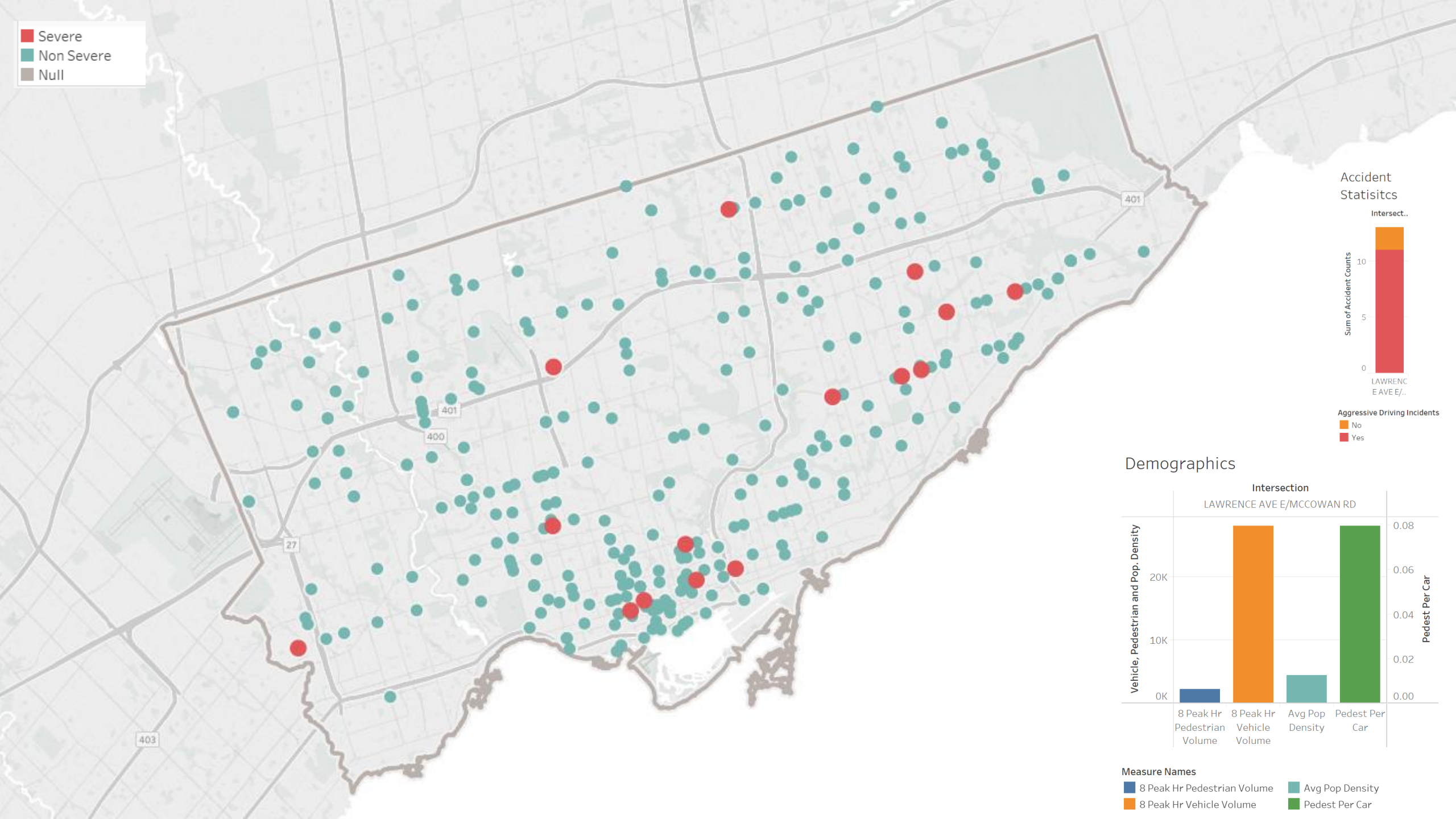
- Identify high risk intersections for fatalities based on existing data
- Implement preventive measures for the most significant controllable factors of the data
- Measure include: speed humps, traffic controls, etc.

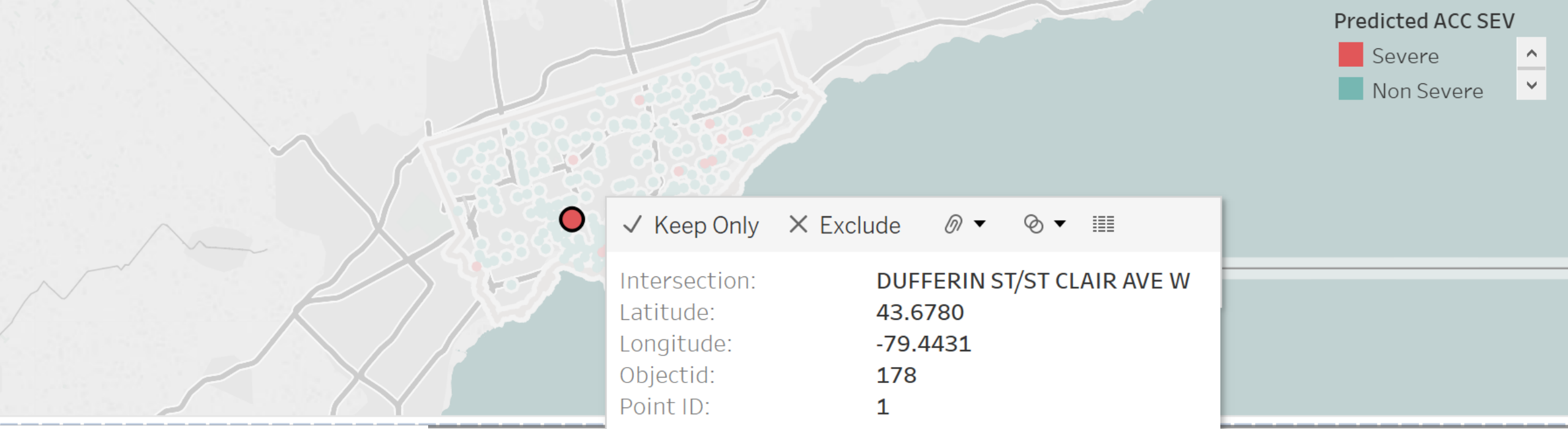


STAGE 2

REACTIVE MEASURES

- Use the tool “Live”
- Upload updated live dynamic data to generate new high risk intersections specific to that given day/hour
- Emergency Services in the area can be made aware of these areas to improve response times


Severe
Non Severe
Null
401
400
27
403
Accident Statisitcs
Intersect..
Sum of Accident Counts
10
5
0
LAWRENCE AVE E/..
Aggressive Driving Incidents
No
Yes
Demographics
Intersection
LAWRENCE AVE E/MCCOWAN RD
Vehicle, Pedestrian and Pop. Density
20K
10K
0K
Pedest Per Car
0.08
0.06
0.04
0.02
0.00
8 Peak Hr Pedestrian Volume
8 Peak Hr Vehicle Volume
Avg Pop Density
Pedest Per Car
Measure Names
8 Peak Hr Pedestrian Volume
8 Peak Hr Vehicle Volume
Avg Pop Density
Pedest Per Car



✓ Keep Only ✕ Exclude

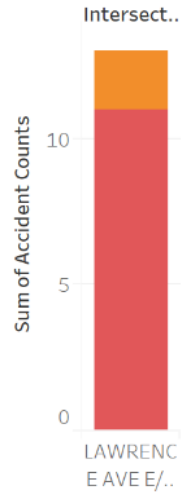
Intersection:	DUFFERIN ST/ST CLAIR AVE W
Latitude:	43.6780
Longitude:	-79.4431
Objectid:	178
Point ID:	1
Predicted ACC SEV:	Severe
Agg Driving Incidents Y:	No
Light Low:	Low Lighting
No Control:	Control Present
RDSFCOND Dry:	Snow or Rain
Speeding Incidents Y:	No

Filter2

Demographics

Measure Names
- 8 Peak Hr Pedestrian Volume
- 8 Peak Hr Vehicle Volume
- Avg Pop Density
- Pedest Per Car

Accident Statisitcs



Aggressive Driving Incidents
- No
- Yes

THE CUSTOMER

TORONTO

CITY OF TORONTO

TORONTO POLICE SERVICES

TRANSPORTATION SERVICES

TORONTO PUBLIC HEALTH

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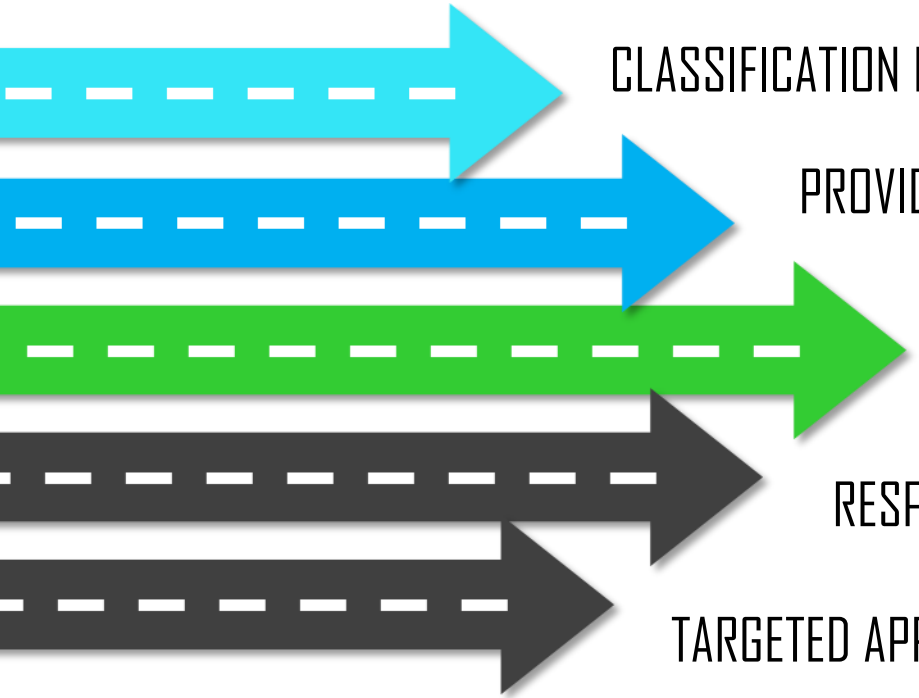
THE BENEFITS



CLASSIFICATION MODEL – HIGH RISK OF FATALITY AT INTERSECTIONS

PROVIDE ROAD USERS & POLICY MAKERS WITH ROAD SAFETY & INTERVENTION INFO

REDUCE THE IMPACT OF ROAD ACCIDENTS & NUMBER OF FATALITIES THROUGH PREVENTIVE & REACTIVE MEASURES

RESPONSE TIME TO ADDRESS ACCIDENTS CAN BE REDUCED

TARGETED APPROACH – COST OF RESOURCES ALLOCATED APPROPRIATELY

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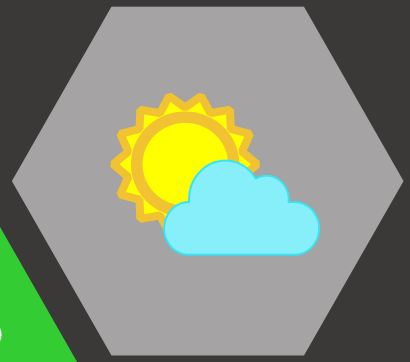
NEXT STEPS

CITY OF TORONTO VISION ZERO



WEATHER

LIVE DYNAMIC FEATURES

IMPLEMENT ON OTHER URBAN CENTERS

TRAFFIC

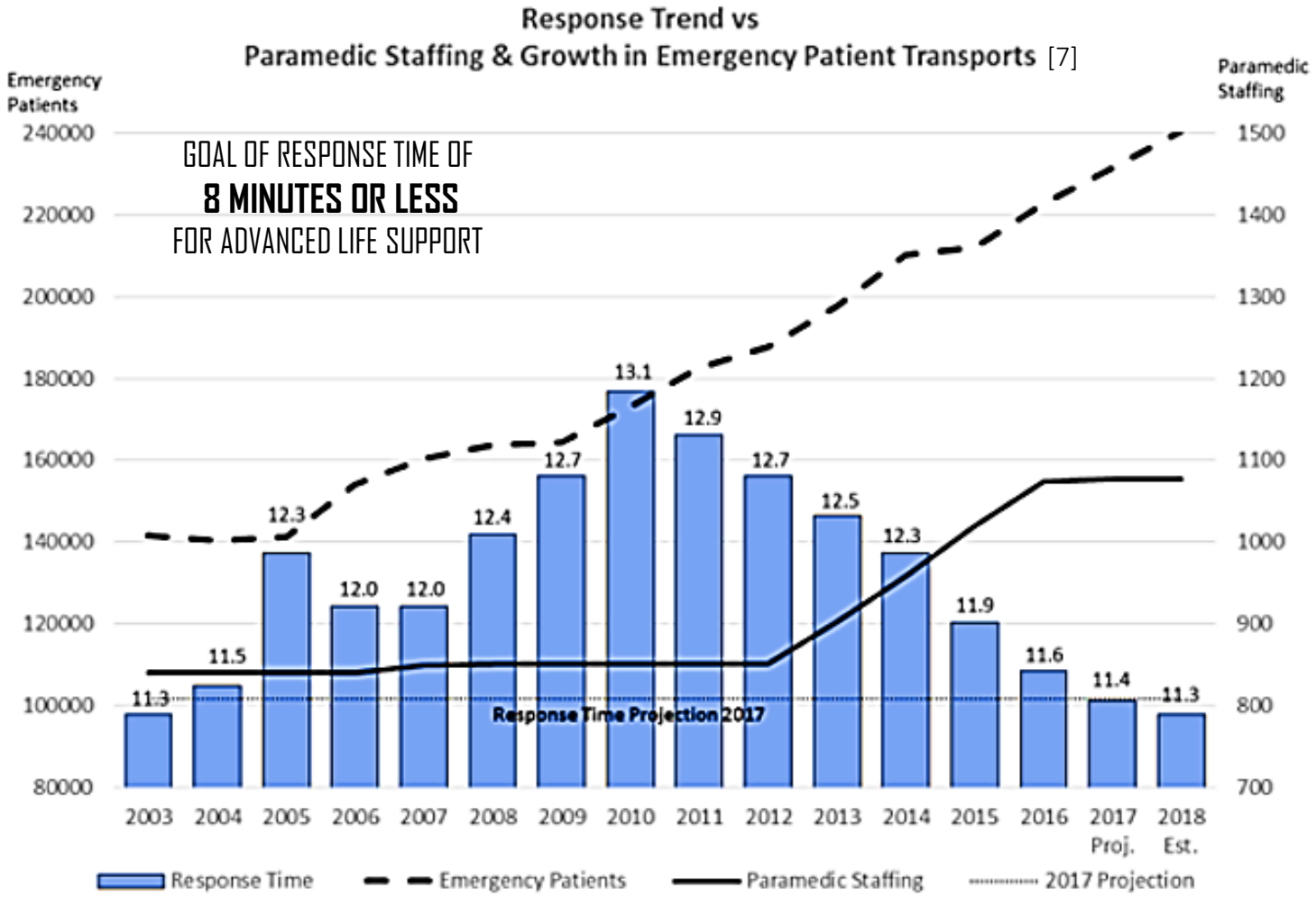
THE NUMBERS

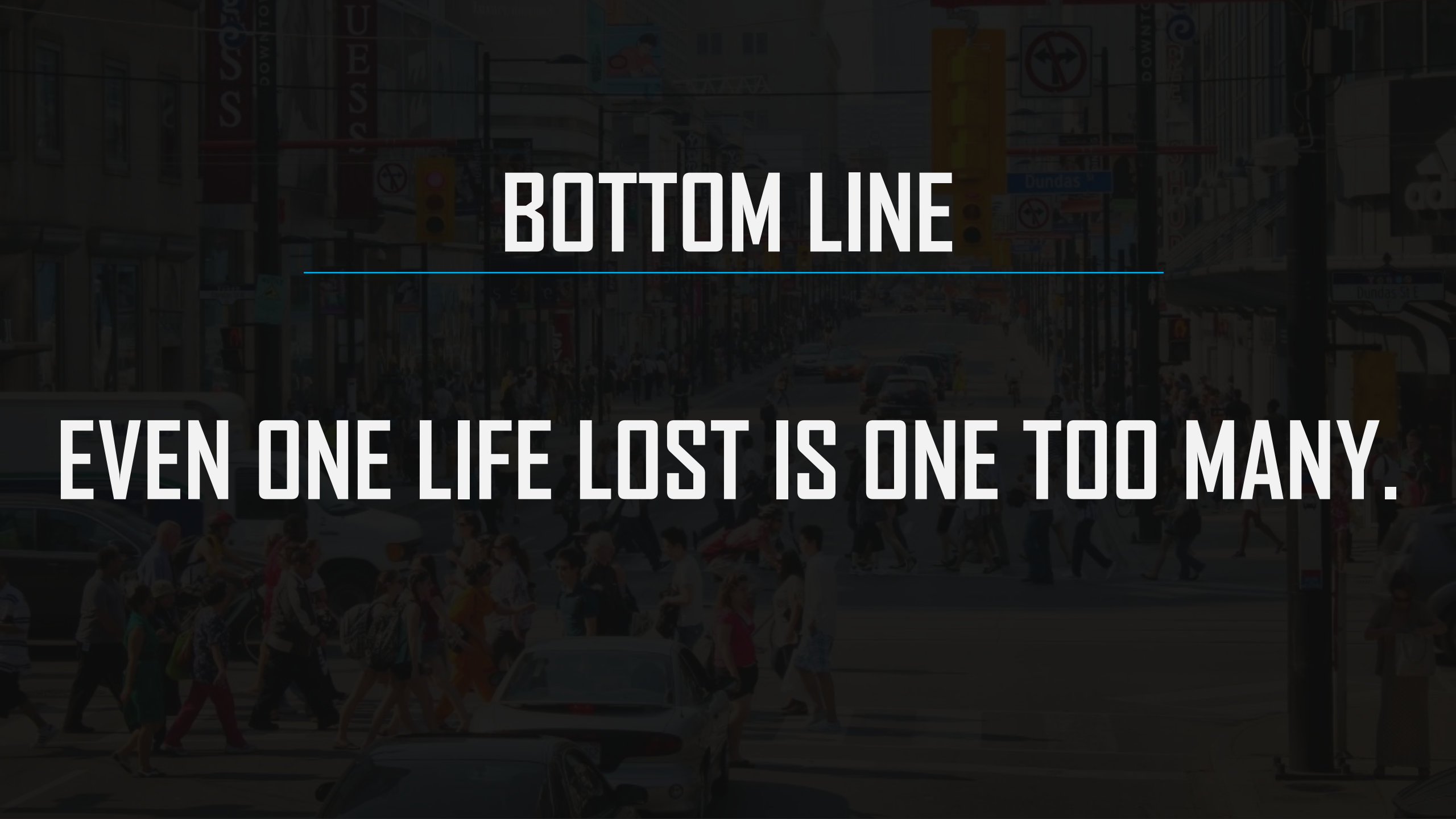
PREVENTIVE MEASURES: [5]

- SPEED HUMPS: $3,000 - $5,000
- STREETLIGHT: $5,000 - $10,000
- REDLIGHT CAMERA: $150,000
- SPEED CAMERA: $70,000

FATALITY COST: [6]

- $3.36 M per fatality
- Amounts to $240 M for 2017





BOTTOM LINE

EVEN ONE LIFE LOST IS ONE TOO MANY.

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MICHELE D'MELLO
PETER NEARING
SAMIR KHONJI

References

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[2] Socioeconomic Pathways and Regional Distribution of the World's 101 Largest Cities, University of Toronto

EMERGENCY MEDICAL SERVICES RESPONSE TIME AND MORTALITY IN AN URBAN SETTING, Ian E. Blanchard et al

[3] Toronto Police Service Public Safety Data Portal. Killed or Seriously Injured (KSI) Data.

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[4] Toronto Police Service Public Safety Data Portal. Traffic Collision Fatalities dashboard (KSI)

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[5] City of Toronto. Transportation Services Vision Zero Road Safety Plan 2017.

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[6] Victoria Transport Policy Institute. Transportation Cost and benefit Analysis II – Safety and Health Costs. http://www.vtpi.org/tca/tca0503.pdf

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