

A woman with blonde hair tied back is riding a yellow road bike. She is wearing a black sleeveless top with small white hearts and colorful patterned shorts. A large black pannier bag is attached to the back of her bike. She is looking towards the right side of the frame. The background is a blurred city street with other cyclists, cars, and buildings under a clear sky.

# VISION ZERO CHICAGO BRIEFING

TEAM I: CHALLENGER

26.11.2020

- Overview
- Our Approach
- Goal I: Build Safer Streets
- Goal II: Create Safer Speeds
- Goal III: Promote A Culture of Safety
- Goal IV: Improve Data Collection
- Acknowledgements



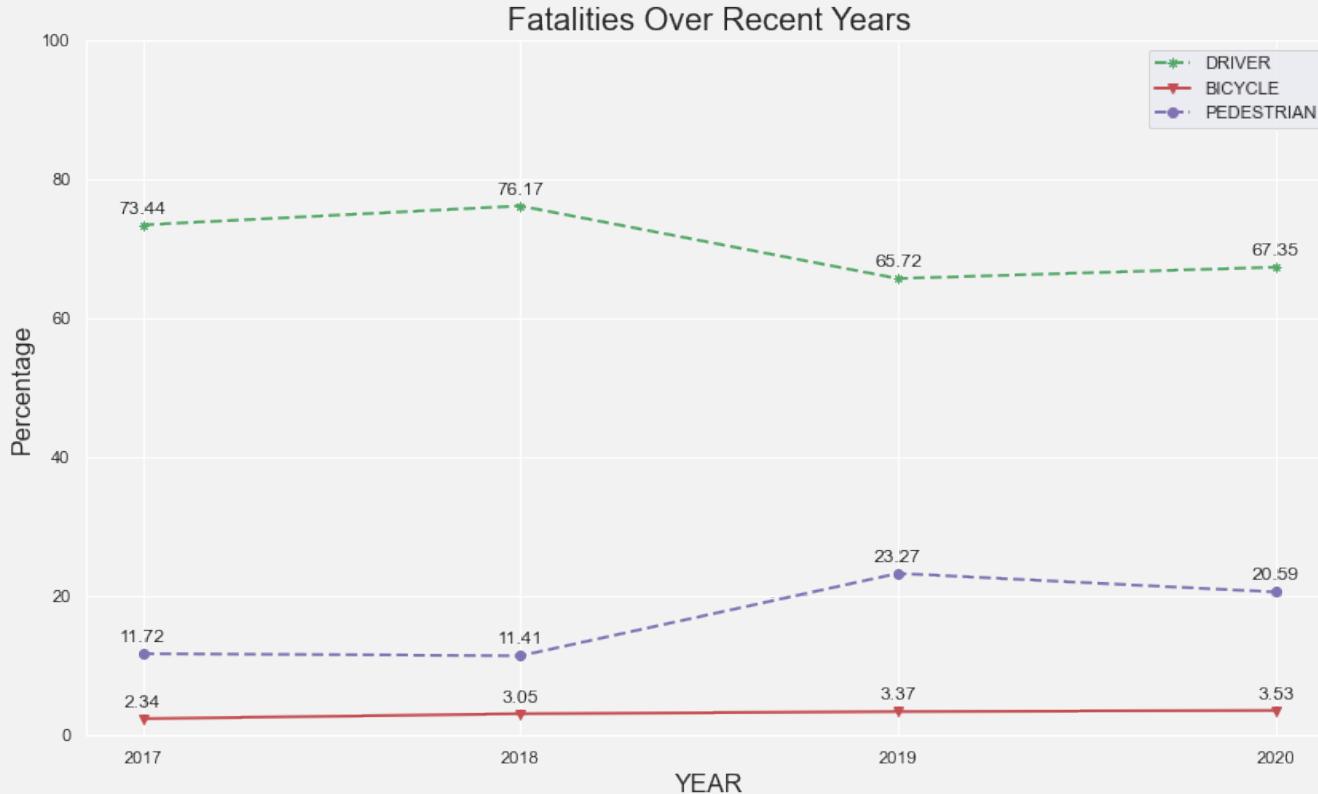


## OVERVIEW

- Inequity in safe mobility
  - Between different mode of transportation
- 2010-2014:
  - 554 deaths (1 death every 3 days)
  - 9480 serious injuries (5 serious injuries every day)
- Costs
  - Significant taxpayer spending
  - Personal economic and emotional trauma
  - No true freedom of mobility



# THE OVERVIEW



- 23% of fatalities happened to pedestrians.
- Cyclists are **6.2 times more likely** to be killed or seriously injured.
- Pedestrians are **7.5 times more likely** to be killed or seriously injured.





- We developed a predictive model with sophisticated algorithms which correctly identify crashes with injuries and deaths.
- Given reliability and strength of our model, we were able to narrow down the most significant factors for further analysis.





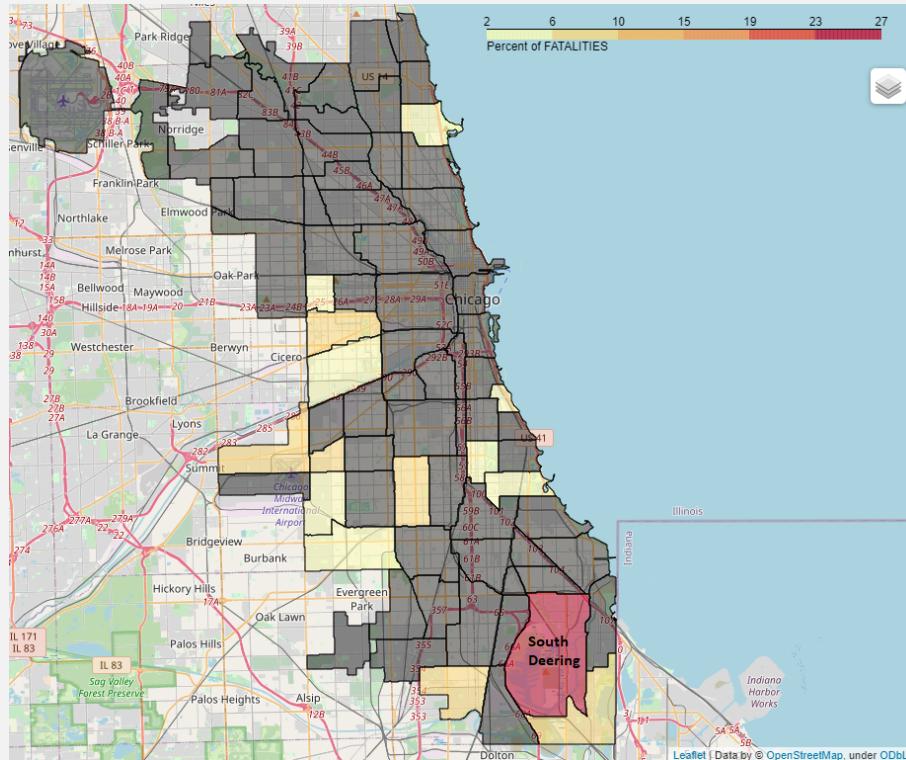
## GOAL I: BUILD SAFER STREETS

- There are areas where more fatalities occur than others.
- Investments should focus on these areas to have concerning crash histories.



# FOCUS AREAS

These 8 community areas form Chicago's ~15% of total areas and ~13% of populations.  
Yet, they collectively account for **65% of fatal crashes!**



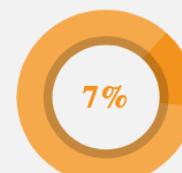
## South Deering

Area size: 10.90 sq mi  
Population: 14,614



## North Lawndale

Area size: 3.21 sq mi  
Population: 35,947



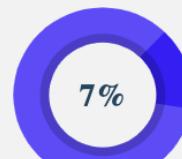
## West Elsdon

Area size: 1.17 sq mi  
Population: 19,237



## Pullman

Area size: 2.12 sq mi  
Population: 6,613



## West Englewood

Area size: 3.15 sq mi  
Population: 29,929



## Lake View

Area size: 3.12 sq mi  
Population: 100,470



## Garfield Ridge

Area size: 4.23 sq mi  
Population: 36,396



## Hegewisch

Area size: 5.24 sq mi  
Population: 9,418



## LEADING FACTORS

- Most of the accidents happen **at night**, the probability of getting fatal injuries during the night is 55% while it is 33% for injuries.
- From 33% of injuries during the night, the crash happening at the lighted road with still **some darkness** is more than 21%
- For fatal injuries of night accidents, 36% is when it somehow involves **intersections**.

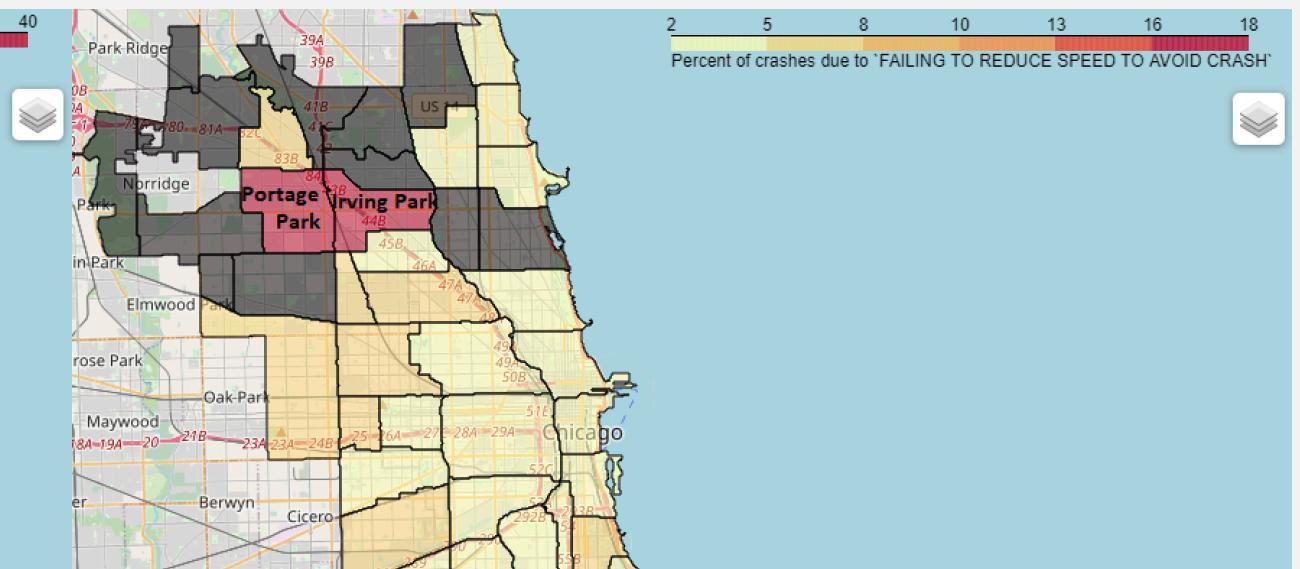
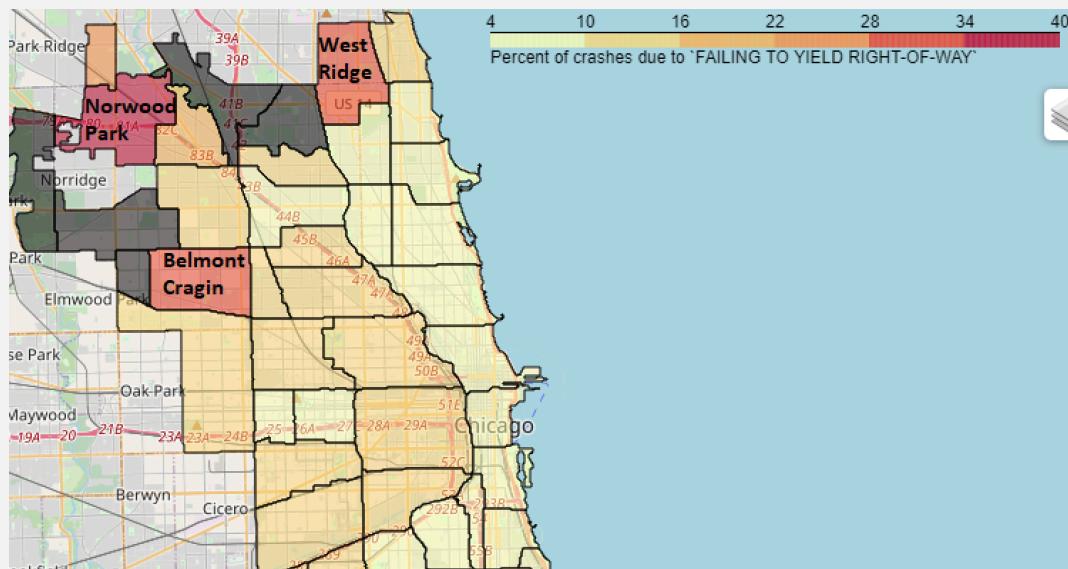


- For early morning crashes, the main cause is **improper lane usage** of the driver which is accountable for 3% of fatal injuries.
- 6% of injuries happened to pedestrians or cyclists **while crossing the road**.



# CONTRIBUTING FACTORS

- And the main reason of the night crash is **failing to reduce speed** to avoid crash which is accountable for more than 22%.
- For afternoon accidents, **failing to yield right-of-way** is the main cause with 6% probability of getting fatal injuries.
- Norwood Park, West Ridge, Belmont Cragin are problematic areas.
- Portage Park and Irving Park are problematic areas.



## PROPOSED SOLUTIONS

- When developing the Capital Improvement, focus first on these **eight high risk areas**.
- Improvement of intersections, lighting conditions for streets, prioritize traffic signal for pedestrian crossing.
- Low-cost project with high impacts, such as **pavement markings, colored pavement treatments, and changes to signage or signal timing**, that promptly improve street safety.





**GOAL II:**  
**CREATE SAFER SPEEDS**



## ARE SPEED LIMITS EXPLICIT?

- In Chicago, there is no signage when the speed limit is 30.



Accidents with injuries in “mid” speed areas (25 – 40 mph) occur almost **twice** as often as than accidents in other areas.

(<25 and >40) and the fatalities **only** occur in the mid speed areas.



## PROPOSED SOLUTIONS

- Speed feedback signs (particularly when there are no speed limit signs)
- Reduced speed limit in these areas to 25 mph.
- Install **speed bumps, raised sidewalks** to help with speed enforcement





- 6% of injuries happened to pedestrians or pedalists **while crossing the road.**
- 25% of fatalities and 13% of injuries happened to cyclers with **no contrasting clothing.**



# PRIMARY CONTRIBUTORY CAUSES

PRIMARY CONTRIBUTORY CAUSE	MALE DRIVERS				FEMALE DRIVERS			
	18 and Younger	19 to 30	30 to 60	60 and Older	18 and Younger	19 to 30	30 to 60	60 and Older
ANIMAL	0,57	0,08	0,11	0,02	0	0,15	0,21	0,14
BICYCLE ADVANCING LEGALLY ON RED LIGHT	0	0,02	0,01	0,02	0	0,02	0,05	0,03
CELL PHONE USE OTHER THAN TEXTING	0	0,29	0,26	0,16	0,2	0,42	0,16	0,21
DISREGARDING OTHER TRAFFIC SIGNS	0,14	0,43	0,52	0,21	0,61	0,32	0,39	0,17
DISREGARDING ROAD MARKINGS	0,14	0,18	0,26	0,3	0	0,07	0,23	0,17
DISREGARDING STOP SIGN	2,16	2,17	1,8	2,25	2,25	2,6	2,41	2,05
DISREGARDING TRAFFIC SIGNALS	3,45	4,59	4,02	3,17	4,71	3,67	3,67	3,03
DISREGARDING YIELD SIGN	0,14	0,04	0,1	0,02	0	0	0,02	0,14
DISTRACTION - FROM INSIDE VEHICLE	1,01	1,11	1,12	0,8	1,02	1,34	1,15	0,63
DISTRACTION - FROM OUTSIDE VEHICLE	0,57	0,88	1,02	0,44	0	0,87	0,69	0,7
DISTRACTION - OTHER ELECTRONIC DEVICE	0	0,12	0,04	0,05	0	0,12	0,16	0,07
DRIVING ON WRONG SIDE/WRONG WAY	1,29	0,94	0,75	0,85	0,61	0,79	0,62	0,56
DRIVING SKILLS/KNOWLEDGE/EXPERIENCE	5,46	4,08	3,96	5,04	6,56	4,51	4,26	4,87
EQUIPMENT - VEHICLE CONDITION	1,58	1,11	1,02	0,71	1,64	1,14	0,97	0,66
EVASIVE ACTION DUE TO ANIMAL, OBJECT, NONMOTORIST	0,29	0,35	0,31	0,16	0	0,17	0,33	0,1
EXCEEDING AUTHORIZED SPEED LIMIT	0,86	0,55	0,56	0,73	0,61	0,37	0,31	0,28
EXCEEDING SAFE SPEED FOR CONDITIONS	0,57	0,59	0,81	0,48	0,41	0,55	0,49	0,35
FAILING TO REDUCE SPEED TO AVOID CRASH	8,62	9,15	7,71	6,95	11,48	8,35	7,64	7,55
FAILING TO YIELD RIGHT-OF-WAY	26,01	21,23	20,16	19,37	25,61	23,57	21,43	22,22
FOLLOWING TOO CLOSELY	14,8	18,36	19,68	20,8	15,37	19,23	22,51	20,51
HAD BEEN DRINKING (USE WHEN ARREST IS NOT MADE)	0,14	0,14	0,15	0,23	0	0,05	0,05	0,1
IMPROPER BACKING	3,88	4,8	6,25	7,64	3,69	4,68	5,51	8,34
IMPROPER LANE USAGE	5,03	5,93	6,52	7,32	4,92	5,87	5,7	6,78
IMPROPER OVERTAKING/PASSING	4,6	6,75	8,37	9,19	5,12	7,31	7,8	9,18
IMPROPER TURNING/NO SIGNAL	7,04	6,6	5,83	5,64	4,51	6,29	5,33	5,32
MOTORCYCLE ADVANCING LEGALLY ON RED LIGHT	0	0,02	0,03	0	0	0	0	0
OPERATING VEHICLE IN RECKLESS, NEGLECTFUL OR AGGRESSIVE MANNER	2,87	2,07	1,32	2,82	2,05	1,36	1,54	1,77
PASSING STOPPED SCHOOL BUS	0	0	0,02	0,02	0	0	0,03	0,03
PHYSICAL CONDITION OF DRIVER	1,29	0,74	0,99	0,94	2,66	0,62	0,93	0,73
RELATED TO BUS STOP	0	0,04	0,1	0,09	0	0,02	0,05	0,17
ROAD CONSTRUCTION/MAINTENANCE	0,14	0,29	0,39	0,25	0,41	0,25	0,2	0,14
ROAD ENGINEERING/SURFACE/MARKING DEFECTS	0,14	0,41	0,51	0,21	0,2	0,5	0,41	0,21
TEXTING	0,43	0,1	0,06	0,02	0	0,12	0,02	0,1
TURNING RIGHT ON RED	0,29	0,08	0,1	0,2	0	0,07	0,16	0,1
UNDER THE INFLUENCE OF ALCOHOL/DRUGS (USE WHEN ARREST IS EFFECTED)	1,01	1,01	1,23	0,43	0,61	0,82	0,72	0,31
VISION OBSCURED (SIGNS, TREE LIMBS, BUILDINGS, ETC.)	2,87	1,07	1,21	0,69	1,64	1,07	1,15	0,87
WEATHER	2,59	3,71	2,7	1,79	3,07	2,68	2,69	1,39



## PROBLEMATIC BEHAVIOURS

- Drivers are the major party involved in the traffic accidents
  - 22% of fatalities happened where drivers were **failed to reduce speed**.
  - 22% of injuries happened where drivers were **failed to yield right of way**.
  - 14% of fatalities and 13% of injuries happened to drivers **failed to use safety equipment**.
  - More than 50% accidents happened when driver driving **straight ahead**
- Different age groups:
  - 41% of fatalities and 30% of injuries happened to people **aged over 60**
  - 27% of fatalities and 25% of injuries happened to people **aged between 19 and 30**



## PROPOSED SOLUTIONS

- Advocate the importance of safe driving behaviors and required preventive actions by co-work with different institutes.
- Age groups
  - **Under 18:** Work with schools to get lectures focusing on the right of road.
  - **Between 30-60:** According to their profession, conduct necessary trainings to advocate safe driving behaviors. Especially for those who include driving in their professor such as taxi driver, truck driver etc.
  - **Older than 60:** Elder house to advocate the importance of walking only on the side walk, wearing reflecting clothes.



## PROPOSED SOLUTIONS

- To promote road safety awareness to all people
  - Advertisement about fasten safety belt, keep safe distances between cars
  - Print brochures to be distributed.

Increase the sentencing by increasing the fine, increasing mandatory community service or even to cancel the license





## GOAL IV: IMPROVE DATA COLLECTION

There are topics that require further information for such as crashes involving cyclists

- Was there a bike lane on the road?
- The bike rented / or city bike?



## MISSINGNESS PATTERNS

- We observed the information about alcohol test are **missing together** with license plate, license class, driver action and physical condition.
  - These are the attributes that may lead to potential charges / fines.
- Set up the process for updating the relevant record after the cause of the accident has been revealed.
- Coordination with forensics to determine actual speed of vehicle at the time of crash.



## PROPOSED SOLUTIONS

- Conduct data quality report on a monthly basis to monitor the quality and completeness of data stored in the system.
- Set-up the quality control standard for each feature, especially important features, which will then be used to cross-check with the data quality report.
- Identify root causes for the missingness of particular features which contain high number of missing values. Then, identify the officers involved in these root causes and provide the guideline.
- Set up the process for updating the relevant record after the cause of the accident has been revealed.



A photograph of a man in a yellow jacket and white hat riding a bicycle on a city street. He is looking back over his shoulder. In the background, there are brick buildings and a tall skyscraper. A large white rectangular box with a black border is overlaid on the image, containing the text.

THANK YOU!  
QUESTIONS?