Lean Six Sigma
DMAIC Improvement Story

Green Belt Project Objective:

To Reduce Marked Police Vehicle Accidents

Last Updated: 03/23/2018

Team: **To Serve and Wreck**

Co-Team Leaders: Captain George Perera & Jose Espinoza

Sergeant Garret Keefe   **Sergeant Jannene Howard**

Carlo Hollis-Brown   **Officer Joandeliz "Lilly" Borges**

Assistant Director Gus Knoepffler (Sponsor)

Director Juan Perez (Process Owner)

Lean Six Sigma Problem Solving Process

The team utilized the 5-Step DMAIC problem solving process.

Process Step		Description of Key Team Activities
Number	**Name**	
1	DEFINE	• Establish Method to Monitor Team Progress • Select Problem and Identify Project Charter and Timeline • Display Process Indicator Performance "Gap" • Construct related Process Flowchart • Identify Stakeholder Process output needs • Identify Costs of Poor Quality (for not meeting output needs)
2	MEASURE	• Develop Data Collection Plan • Stratify Problem (i.e. "Gap") • Develop Problem Statement from remaining data set and finalize target
3	ANALYZE	• Identify Potential Root Cause(s) • Verify Root Cause(s) • Assess Impact of Root Causes on Problem in Measure Step
4	IMPROVE	• Identify and Select Countermeasure(s) • Identify Barriers and Aids • Develop and Implement Action Plans • Confirm / Document Pilot Improvement Plan Effectiveness
5	CONTROL	• Confirm / Document Improvement Results • Standardize Improvements within Operations • Implement New Process Control System (PCS) • Document Lessons Learned • Identify Future Plans for Improvement

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Monitor Team Progress

The team and management used a Checklist to monitor team progress.

DMAIC/ QIC STORY CHECKLIST

Process Step (A/P/C/D)	DMAIC	QIC Story	Process Step Objectives and Checkpoints	Check √	Key Tools
Plan			**Step 1** — Objective: *Demonstrate the importance of improvement needs in measurable terms.*	✓	*Line graph, Cost of Poor Quality, Flowchart*
	DEFINE	Reason for Improvement	1. The stakeholders' needs were identified with the most important problem selected.	✓	
			2. The selected problem is an "object" with a "defect" with unknown cause(s) that need identification.	✓	
			3. A project charter including a project timeline was developed to address the problem.	✓	
			4. A trend indicator was constructed with an appropriate target that measures the performance gap.	✓	
			5. A project related process flowchart was constructed with in-process and end-of-process indicators		
			6. The cost impact of the indicator performance gap was identified.		
			Step 2 — Objective: *Stratify indicator related data and finalize an improvement target.*		*Paretos, Histograms*
	MEASURE	Current Situation	7. The data collection plan developed included indicator related demographics and process milestones.	✓	
			8. Data were stratified from various viewpoints (i.e. what, where, when and who) and a significant data set was chosen.	✓	
			9. A problem statement that descibes the "remaining data set" was developed.	✓	
			10. The target for improvement was finalized based on the most appropriate target setting methodology.		
	ANALYZE	Analysis	**Step 3** — Objective: *Analyze stratified data to identify and verify root causes(s).*	✓	*Single Case Bore, Fishbone, RC Verf Matrix*
			11. Cause and effect analysis was taken to the root level for areas with greatest indicator impact.		
			12. Potential cause(s) identified were either "failed standards" and/or "people failing standards".		
			13. A relationship between the root causes and the problem was verified with data.	✓	
Do	IMPROVE	Counter-Measures	**Step 4** — Objective: *Develop and implement countermeasures to eliminate verified root cause(s).*	✓	*CM Matrix, B7 A, Action Plan*
			14. Countermeasures were selected to address verified root cause(s).	✓	
			15. The method for selecting countermeasures considered both effectiveness and feasibility.	✓	
			16. Barriers and aids were determined for countermeasures worth implementing.	✓	
			17. An action plan reflected both accountability and schedule.		
Check		**Step 5** — Results	Objective: *Confirm countermeasures impacted root causes, indicator, costs and achieved target.*		
			18. Countermeasures effects on root causes were demonstrated with "before and after" summary graphs.		
			19. Countermeasure effects on the indicator were demonstrated with a "before and after" trend graph.		
			20. The countermeasure effects on reducing costs were determined.		
			21. The target was achieved or cause(s) of significant variation were determined and addressed.		
Act	CONTROL	**Step 5 / Step 6** — Standard-ization	Objective: *Maintain gains and prevent root cause(s) from recurring.*	✓	*PCS*
			22. The Process flowchart was revised to incorporate the new countermeasure standards and/or training.	✓	
			23. A Process Control System (PCS) was developed to monitor the revised process indicators on-going.	✓	
		Step 7 — Future Plans	Objective: *Evaluate the team's effectiveness and plan for future activities.*	✓	*Lesson Learned*
			24. Lessons learned documented replication opportunities, effective techniques and team success factors.	✓	
			25. Next steps were identified to monitor the process and address any remaining problems or gaps.		

Identify Project Charter

The team developed a team Project Charter and secured signed off from sponsor.

Project Charter		
Business Case	**Project Name:**	**Reduce Marked Police Vehicle Accidents**
	Problem/Impact:	MDPD has experienced an increase in auto accidents which has adversely affected the department's fleet and expenses. In addition, vehicle accidents involving police vehicles can have other effects, including an increased risk to the safety of officers and the public, a reduction in available vehicles, and the potential decrease in response time if officers are patrolling in two-man units.
	Expected Benefits:	A reduction in the number of accidents would slow down MDPD's fleet attrition and reduce the potential for on the job injuries for police officers.
Objectives	**Outcome Indicator:**	Q1 - Number of Preventable Accidents Involving Marked Police Vehicles
	Proposed Target:	Target = 124 for calendar year 2018 (20% improvement over last 2 years)
	Time Frame:	November 2017 through March 2018
	Strategic Alignment:	Supports the County's Strategic Plan and MDPD's SOP's *(see slide 6)*
Scope	**In Scope:**	Preventable accidents involving marked MDPD patrol vehicles
	Out-of-Scope:	All other accidents involving MDPD vehicles
	Authorized by:	Gus Knoepffler
Team	**Sponsor:**	Gus Knoepffler
	Team Leaders:	Captain George Perera & Jose Espinoza
	Team Members:	Sgt. Garret Keefe, Sgt. Jannene Howard, Ofc. Lilly Borges, and Carlo Hollis-Brown
	Process Owner:	Director Juan Perez
	Mgmt Review Team:	Gus Knoepffler, Juan Perez, Jennifer Moon, Carlos Maxwell, and Lourdes Avalos
Schedule	**Completion Date:**	March 30, 2018
	Review Dates:	Monthly and Final Review in March 2018
	Key Milestone Dates:	See Action Plan

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Develop Project Timeline Plan

The team developed a Timeline Plan to complete their Project.

Legend:
■ = Actual
□ = Proposed

WHAT: Reduce Preventable Accidents Involving Marked Police Vehicles

HOW	WHEN						
	Month 2017-2018						
	Nov	Dec	Jan	Feb	Mar	Apr	May
1. DEFINE		Completed 12/15/17					
2. MEASURE			Completed 1/5/18				
3. ANALYZE			Completed 1/19/18				
4. IMPROVE					3/30/18		
5. CONTROL							5/31/18
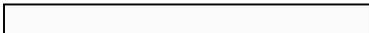
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Project Alignment to Strategy and SOP's

This project supports the following objectives identified in the County's strategic plan:

- **TP 2-1 - Reduce traffic accidents**
- **TP 3-2 - Provide attractive, well-maintained facilities and vehicles**

This project is also governed by the following sections of MDPD's Standard Operating Procedures (SOP):

- **Chapter 5 – Vehicles**
    Part 1 – Vehicles
- **Chapter 30 – Driving Procedures**
    Part 1 – Driving Procedures
    Part 2 - Pursuits

Miami-Dade Police Department

Miami-Dade Police is the 8th largest police organization in the nation and the largest local law enforcement agency in the southeastern United States serving 2.7 million residents in an area of 2,139 square miles.

MDPD provides direct services to 1.2 million residents, and sheriff and specialized services to the remaining 1.5 million community members.

MDPD has nearly 4,100 sworn and non-sworn employees, of which 1,696 are officers in marked police vehicles. We respond to about 700,000 emergency events and routine requests annually, or about 1,900 per day.

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The team identified stakeholder needs for the process outputs.

Stakeholders Needs	
Stakeholders	**Process Output Needs**
Officers	Safe vehicles equipped with the latest safety technology and free from any unnecessary distractions
	Appropriate training to prepare them for safely operating a vehicle while in the performance of their duties
MDPD Administration	A fleet that meets the service needs of their staff and the residents
	A reduction in accidents will allow the department to use those resources towards other initiatives and services
Public at-large	Reasonable response times to routine and emergency calls
	Safe environment maintained during police operations
	Minimize damage to public property, facilities or vehicles
	Reduce unnecessary traffic congestion and delays

MDPD Year End Accidents

After a significant decrease in 2014, accidents involving MDPD vehicles continue to remain at levels that have an ongoing impact on the department's operations.

Miami-Dade Police Vehicle Accidents

Note: 2014 was the last time a departmental driver refresher training was conducted

Total Accidents: 696, 566, 595, 629, 657
Marked Vehicles: 391, 314, 334, 339, 366
Other Vehicles: 305, 252, 261, 290, 291

X-axis (Calendar Year): 2013, 2014, 2015, 2016, 2017

Source: MDPD Traffic Homicide Unit, Monthly Department Vehicle Crash Report
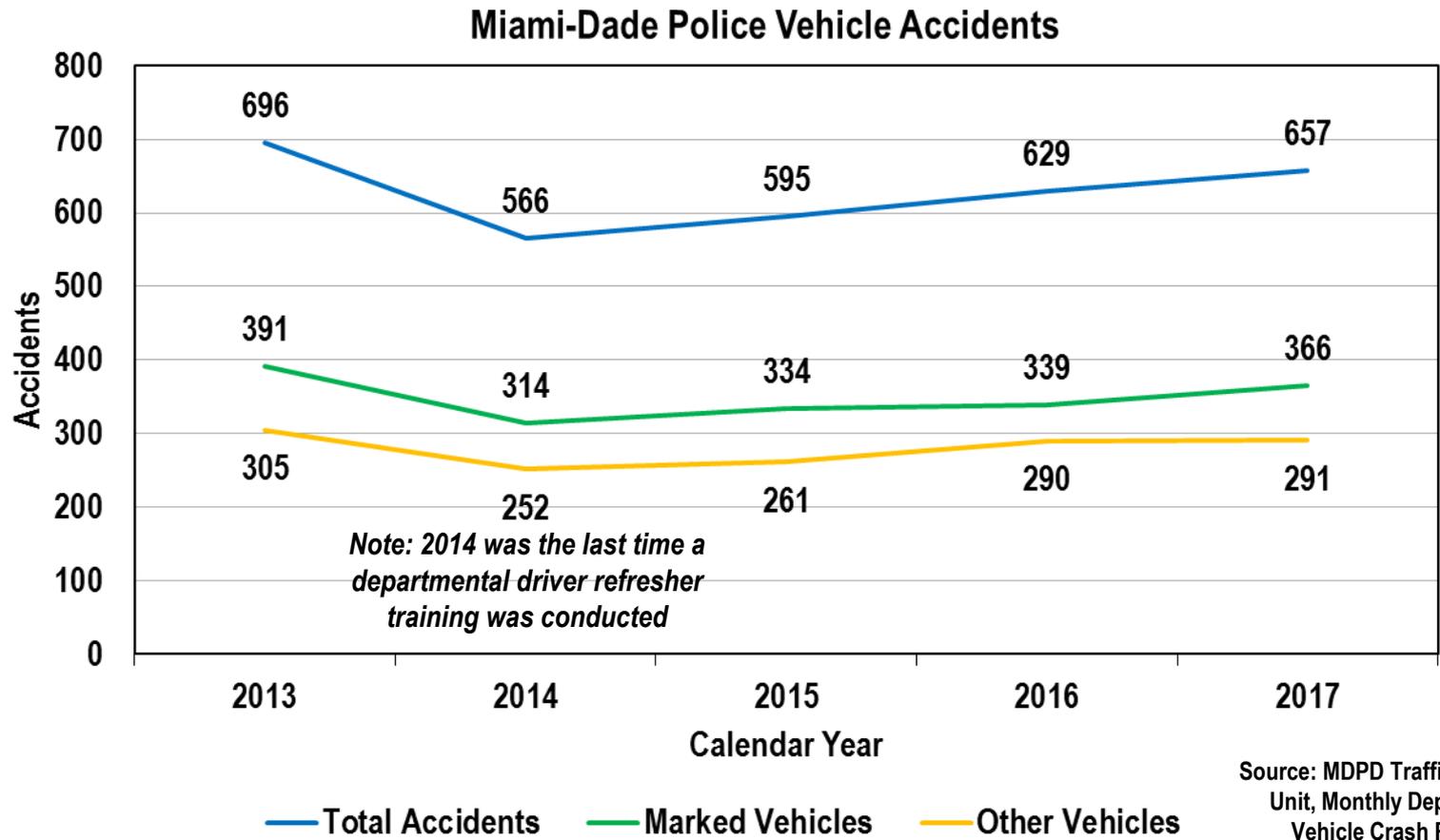
Let's take a look at the financial impact of these accidents

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Cost of Poor Quality

The team identified the costs of all accidents involving marked police vehicles.

Stakeholder	Pain Experienced	Annualized Costs
MDPD	Accidents are leading to a loss of vehicles in the department's fleet	In 2017, 154 marked vehicles were retired from service due to accidents. The cost of 154 new vehicles is **$4,389,000**
MDPD & ISD	Costs to the County as a result of an accident (injuries, 3rd party claims, legal costs)	Claims for accidents in 2017 are estimated at **$979,200**
MDPD & ISD	Body work done to vehicles involved in accidents	Approximately **$564,300** per year
MDPD	Lost officer time while the vehicle is being repaired at the body shop	Approximately **$400,200** per year
MDPD	Cost of investigating marked vehicle accidents and the associated report writing and review process	Approximately **$222,200** per year

These estimates do not include the cost of officer injuries and the impact of having officers double up in vehicles when there are not enough available.

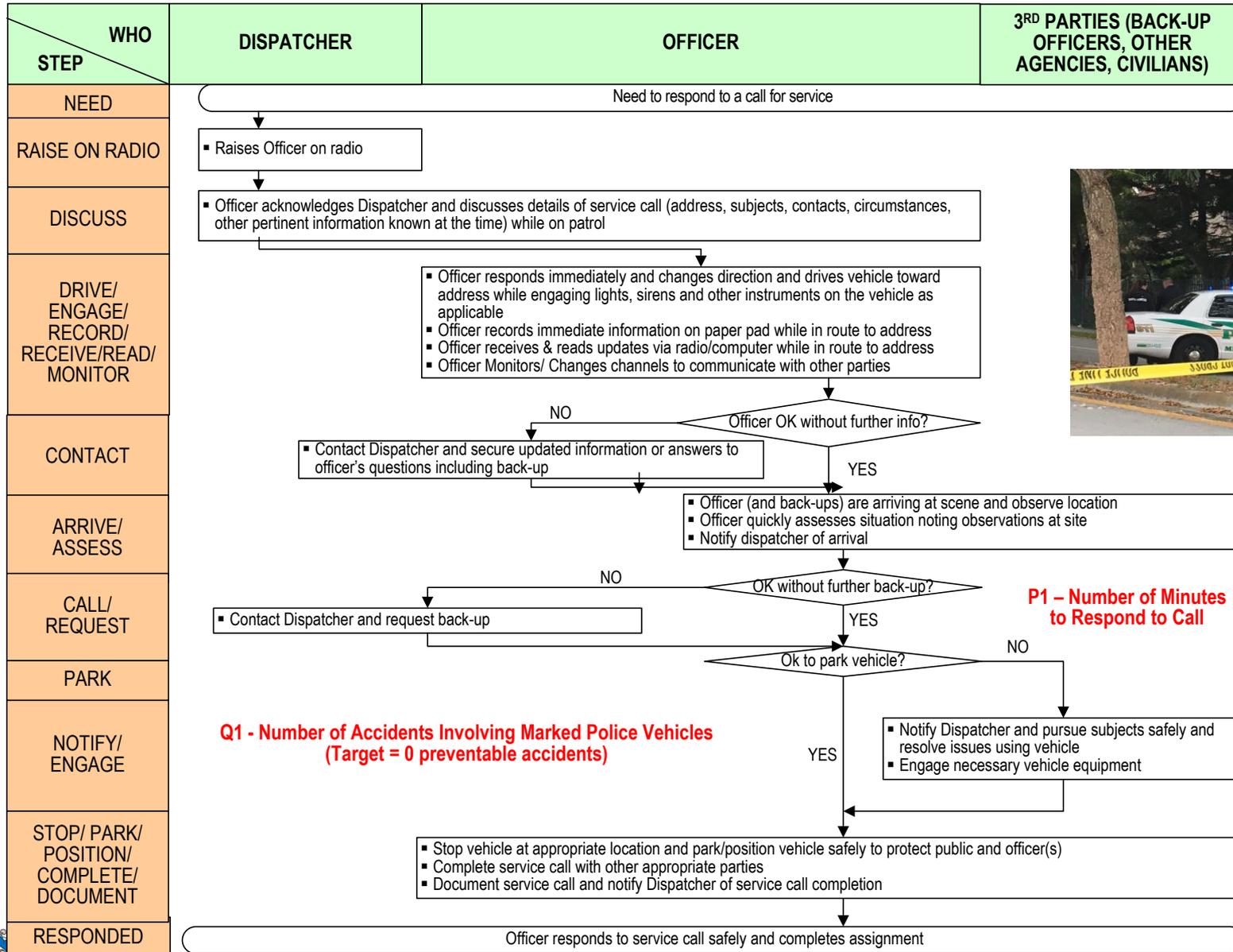**Total Cost of Poor Quality = $6,554,900 annually**

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Construct Process Flow Chart

5. ☑

The team constructed a process flow chart describing the process to respond to a call for service.

Respond to Call for Police Services **Process Owner: Juan Perez, Police Director**

WHO / STEP	DISPATCHER	OFFICER	3RD PARTIES (BACK-UP OFFICERS, OTHER AGENCIES, CIVILIANS)
NEED		Need to respond to a call for service	
RAISE ON RADIO	• Raises Officer on radio		
DISCUSS	• Officer acknowledges Dispatcher and discusses details of service call (address, subjects, contacts, circumstances, other pertinent information known at the time) while on patrol		
DRIVE/ ENGAGE/ RECORD/ RECEIVE/READ/ MONITOR		• Officer responds immediately and changes direction and drives vehicle toward address while engaging lights, sirens and other instruments on the vehicle as applicable • Officer records immediate information on paper pad while in route to address • Officer receives & reads updates via radio/computer while in route to address • Officer Monitors/ Changes channels to communicate with other parties	
CONTACT	• Contact Dispatcher and secure updated information or answers to officer's questions including back-up	Officer OK without further info? **NO** / **YES**	
ARRIVE/ ASSESS		• Officer (and back-ups) are arriving at scene and observe location • Officer quickly assesses situation noting observations at site • Notify dispatcher of arrival	
CALL/ REQUEST	• Contact Dispatcher and request back-up	OK without further back-up? **NO** / **YES**	**P1 – Number of Minutes to Respond to Call**
PARK		Ok to park vehicle? **NO** / **YES**	
NOTIFY/ ENGAGE	**Q1 - Number of Accidents Involving Marked Police Vehicles (Target = 0 preventable accidents)**		• Notify Dispatcher and pursue subjects safely and resolve issues using vehicle • Engage necessary vehicle equipment
STOP/ PARK/ POSITION/ COMPLETE/ DOCUMENT		• Stop vehicle at appropriate location and park/position vehicle safely to protect public and officer(s) • Complete service call with other appropriate parties • Document service call and notify Dispatcher of service call completion	
RESPONDED		Officer responds to service call safely and completes assignment	

Patrol Vehicle Demonstration

Below is a video of an equipped Miami-Dade Police patrol vehicle showcasing the multiple demands that require an officer's attention during the regular operation of a patrol vehicle.
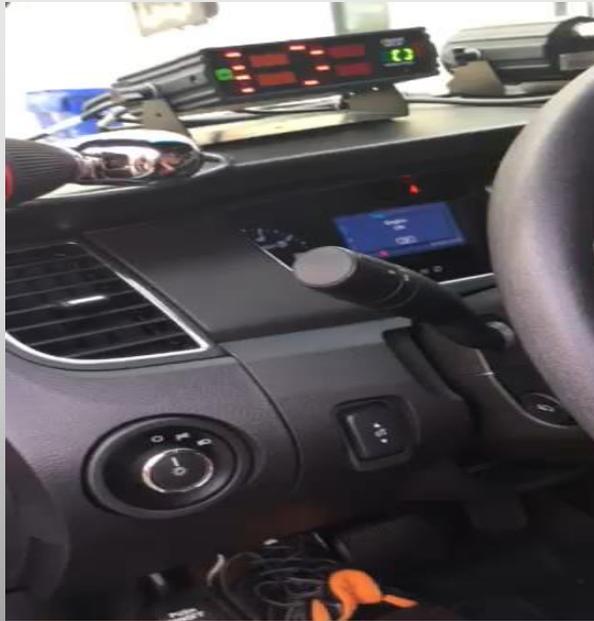
Special thanks to Sgt. George Wilhelm

Identify Data Collection Needs

The team developed a data collection plan that collected all marked police accidents from January 2016 through November 2017. Next, the team secured the Crash Review Panel Memos, collected additional information from each memo, and added information for all 'Preventable' (officer caused) marked accidents for that period.

Police Vehicle Accident Summary

(every row is a preventable accident involving a marked police vehicle)

| Line#	Case Number	Crash Date	Crash Day of Week	Hour of Day	Dist	Resp to Call	Type of Call	Pursuit?	Mode of Travel	Type of Crash	Contributng Cause	Name	Age	Race	Sex	Tenure	Previous crashes	Preventable Crashes	DIP
			%Fr	Mode	% Airport	%Y		%Y	% 1	% Rear End	% W		Avg	% W	% M	Avg Yrs	Avg	Avg	
			18%	14	6%	32%		1%	84%	20%	0%		37.8	80%	76%	10.9	3.1	1.2	
1	151219475128	12/19/2015	Sa	18	Town of Cutle	N	0	N	1	Right Angle	Improper Backing	He	29	W	M	2	2	2	2015

CRASH ADDRESS	TYPE OF INTERSECTION	LIGHT CONDITION	WEATHER CONDITION	MANNER OF COLLISION/ IMPACT	FIRST HARMFUL EVENT	HARMFUL WITHIN INTER-CHANGE	CONTRIB-UTING CIRCUM: ROAD	CONTRIB-UTING CIRCUM: ENV	VEHICLE NUMBER IN CRASH	VEH YEAR	VEH MAKE
	% Not at Intersectn	% DAYLIGHT	% CLEAR	% FRONT TO REAR	Vehicle in Transp	%Y	% NONE	% NONE	% 1		%Ford
	71%	69%	88%	29%	70%	2%	96%	96%	71%		54%
20505 S DIXIE	NOT AT INTERSECTIO	DARK - LIGH	CLEAR	FRONT TO REAR	MOTOR VEHICLE	N	NONE	NONE	1	2000	FORD

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Display Indicator Performance Gap

The team collected Q1 indicator data and reviewed performance trends:

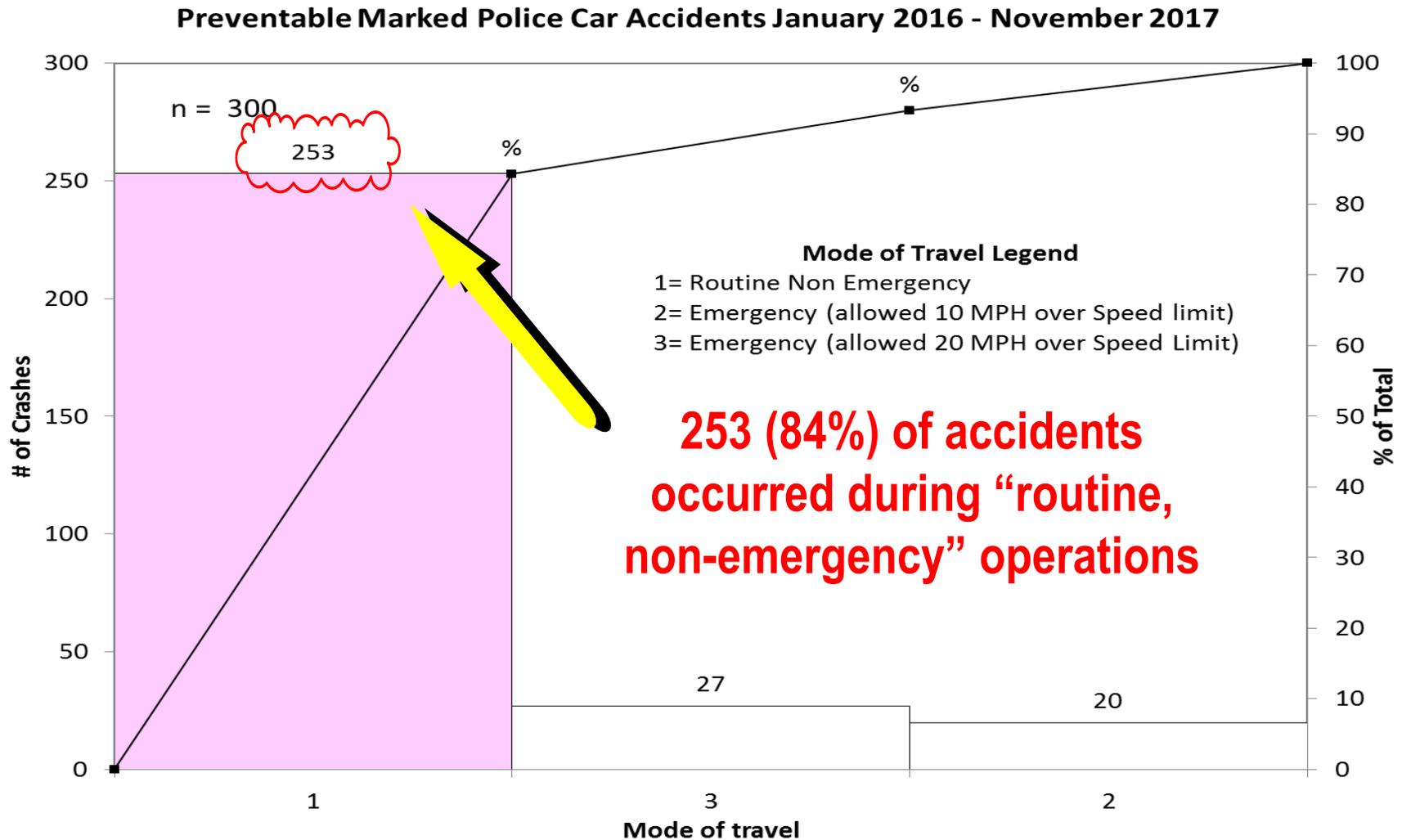## *Q1* - YTD # of Preventable Accidents involving Marked Police Vehicles
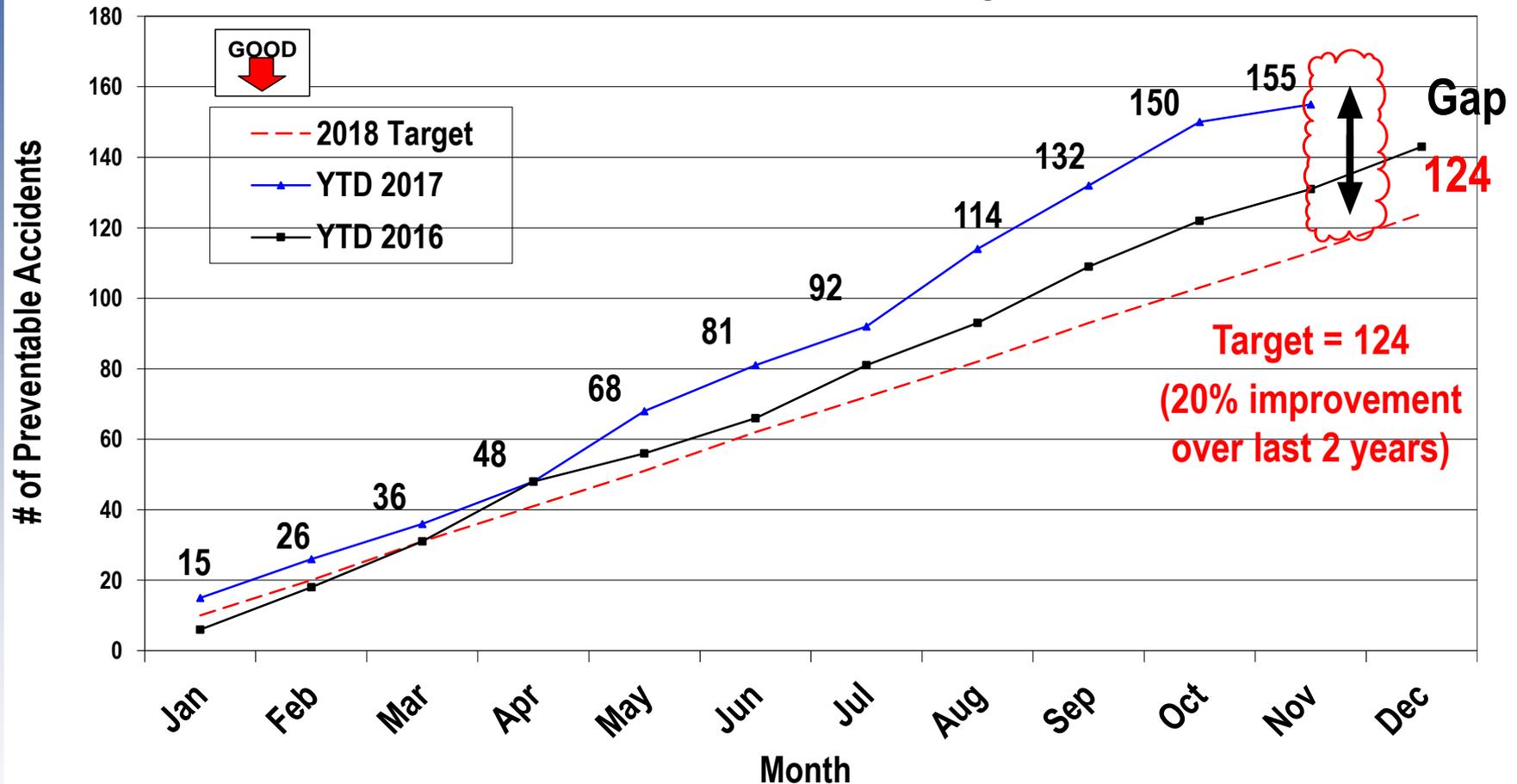
The team was able to secure data on 300 preventable accidents going back to January 2016

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The team stratified 300 Preventable Accidents many ways and found:

Preventable Marked Police Car Accidents January 2016 - November 2017

n = 300

253

Mode of Travel Legend
1 = Routine Non Emergency
2 = Emergency (allowed 10 MPH over Speed limit)
3 = Emergency (allowed 20 MPH over Speed Limit)

253 (84%) of accidents occurred during "routine, non-emergency" operations

# of Crashes / % of Total

27   20

Mode of travel: 1, 3, 2

The team looked closer at the 253 routine, non-emergency related accidents

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The team stratified the 253 accidents many ways and found:

Preventable Marked Police Car Accidents During Routine Non Emergency Travel - January 2016 - November 2017

n = 253

202

202 (80%) of accidents occurred at a time other than responding to a call

51

Y-axis: # of Car Crashes

Right axis: % of Total

X-axis: N | Y — **Response to Call?**
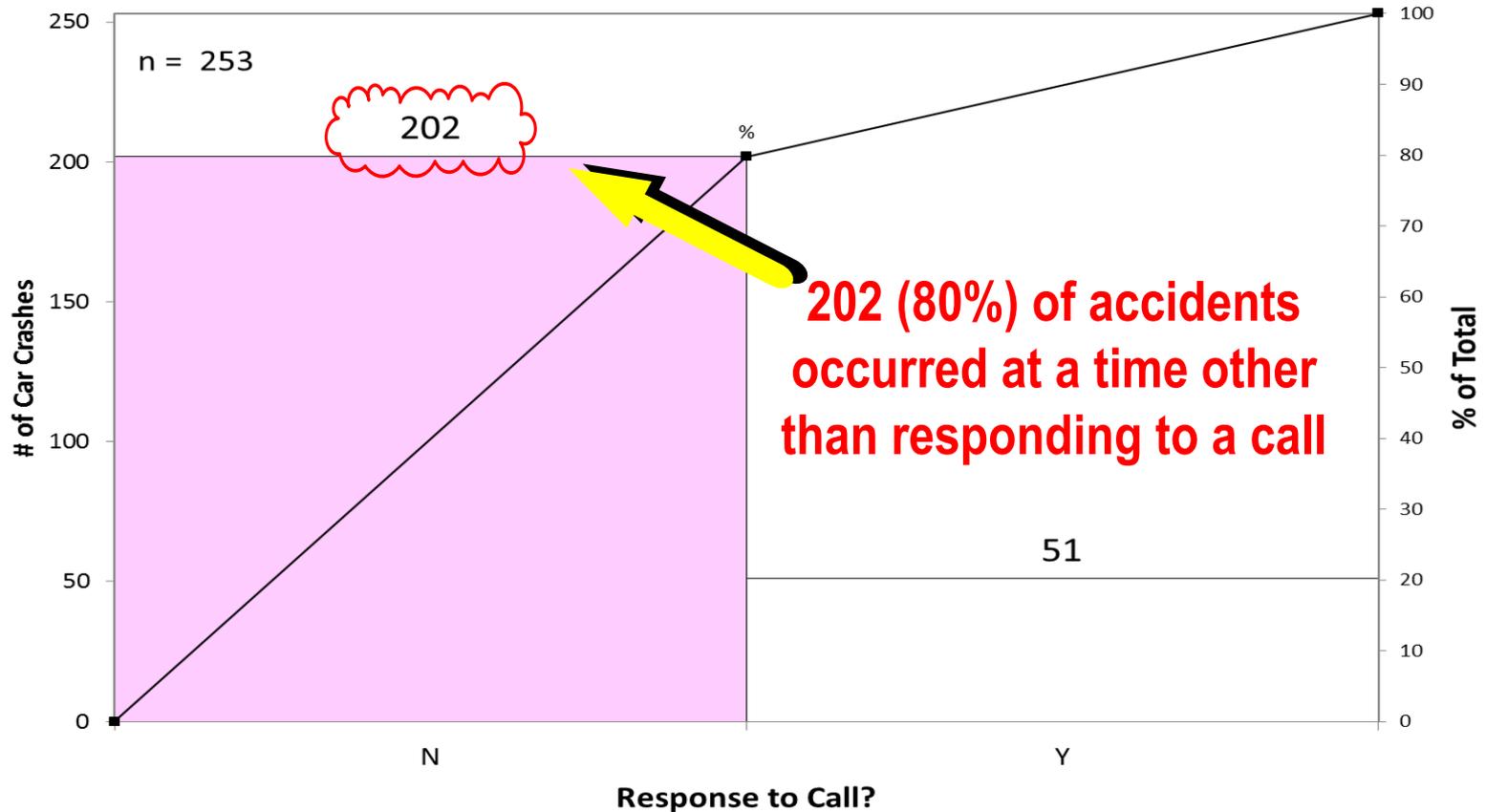
The team looked closer at these 202 accidents that occurred when an officer was not responding to a call

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The team stratified the 202 accidents many ways and found:

Preventable Marked Police Car Accidents During Routine Non-Emergency Travel and NOT Responding to a Call - January 2016 - November 2017
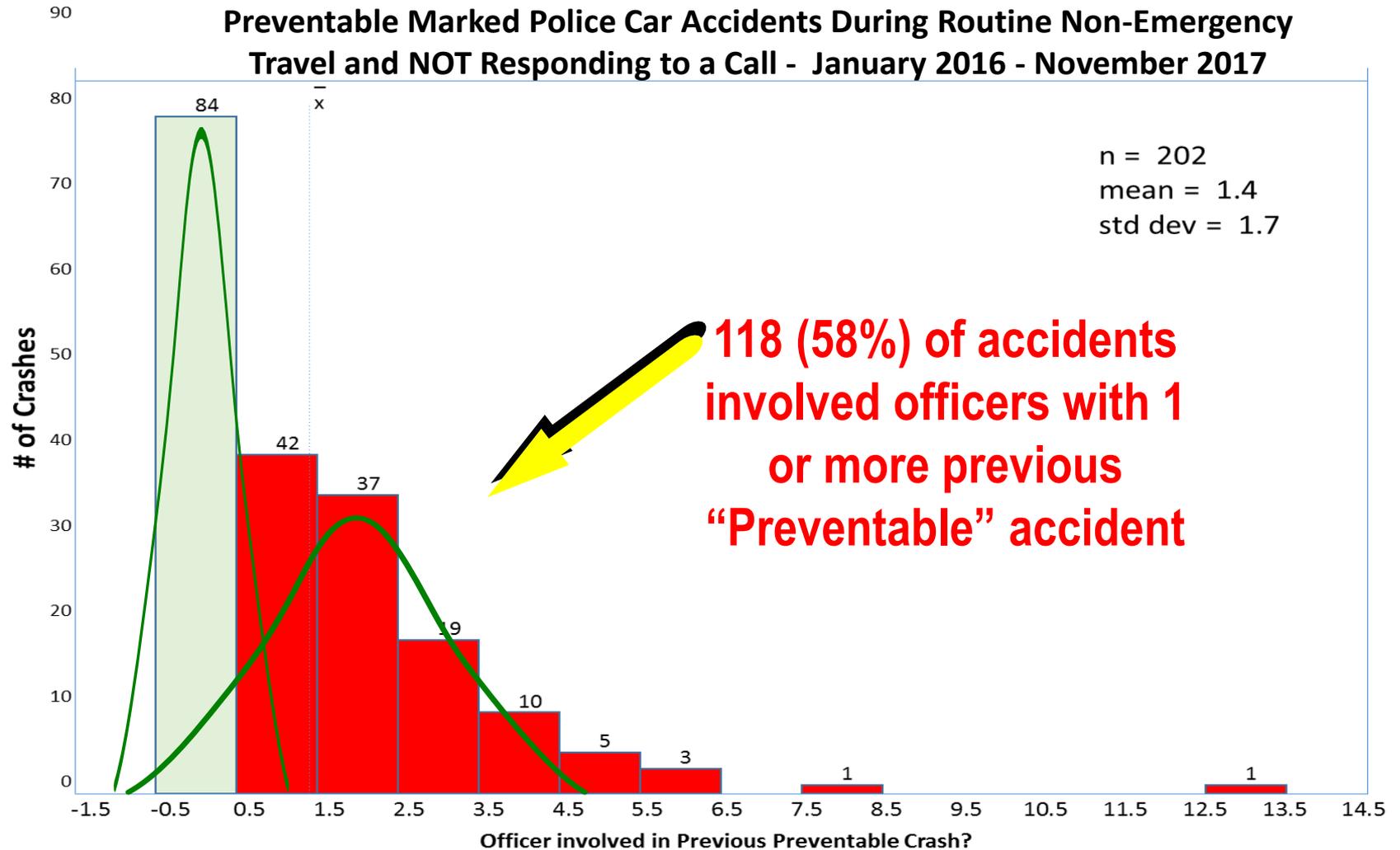

n = 202
mean = 1.4
std dev = 1.7

118 (58%) of accidents involved officers with 1 or more previous "Preventable" accident

(histogram) # of Crashes vs. Officer involved in Previous Preventable Crash?

Bar values: 84, 42, 37, 19, 10, 5, 3, 1, 1

The team looked closer at the 118 accidents

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The team stratified the 118 accidents many ways and found:

Preventable Marked Police Car Accidents During Routine Non-Emergency Travel Involving Officers with previous Preventable Crashes
January 2016 - November 2017

n = 93 (25 accidents did not have info)

90 (97%) of accidents occurred when the officer's vision was not obscured
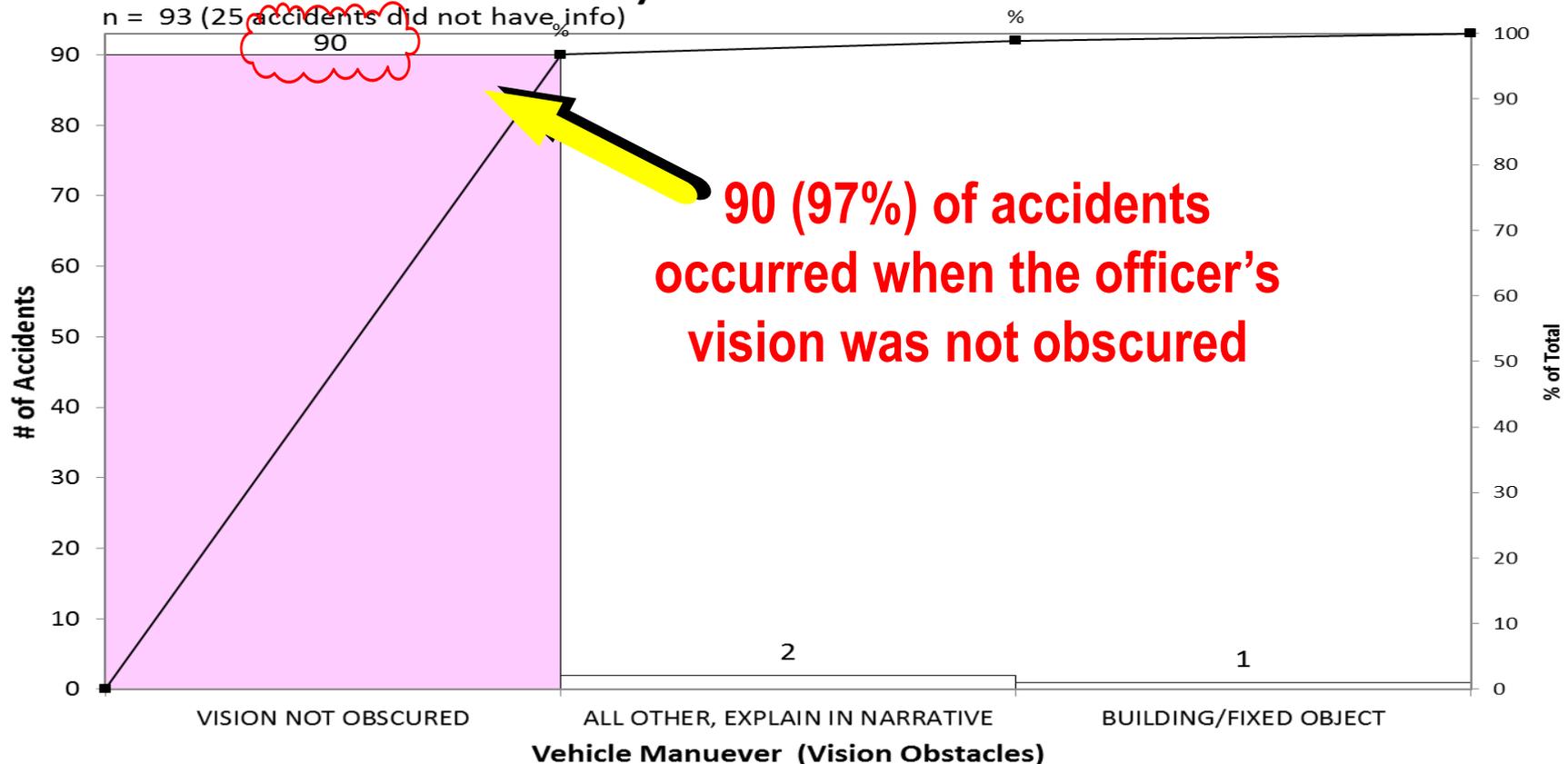
Problem Statement: *90 preventable marked police vehicle accidents between January 2016 - November 2017 occurred during routine non-emergency travel involving officers with previous preventable crashes and with their vision not obscured*

Define › Measure › Analyze › Improve › Control

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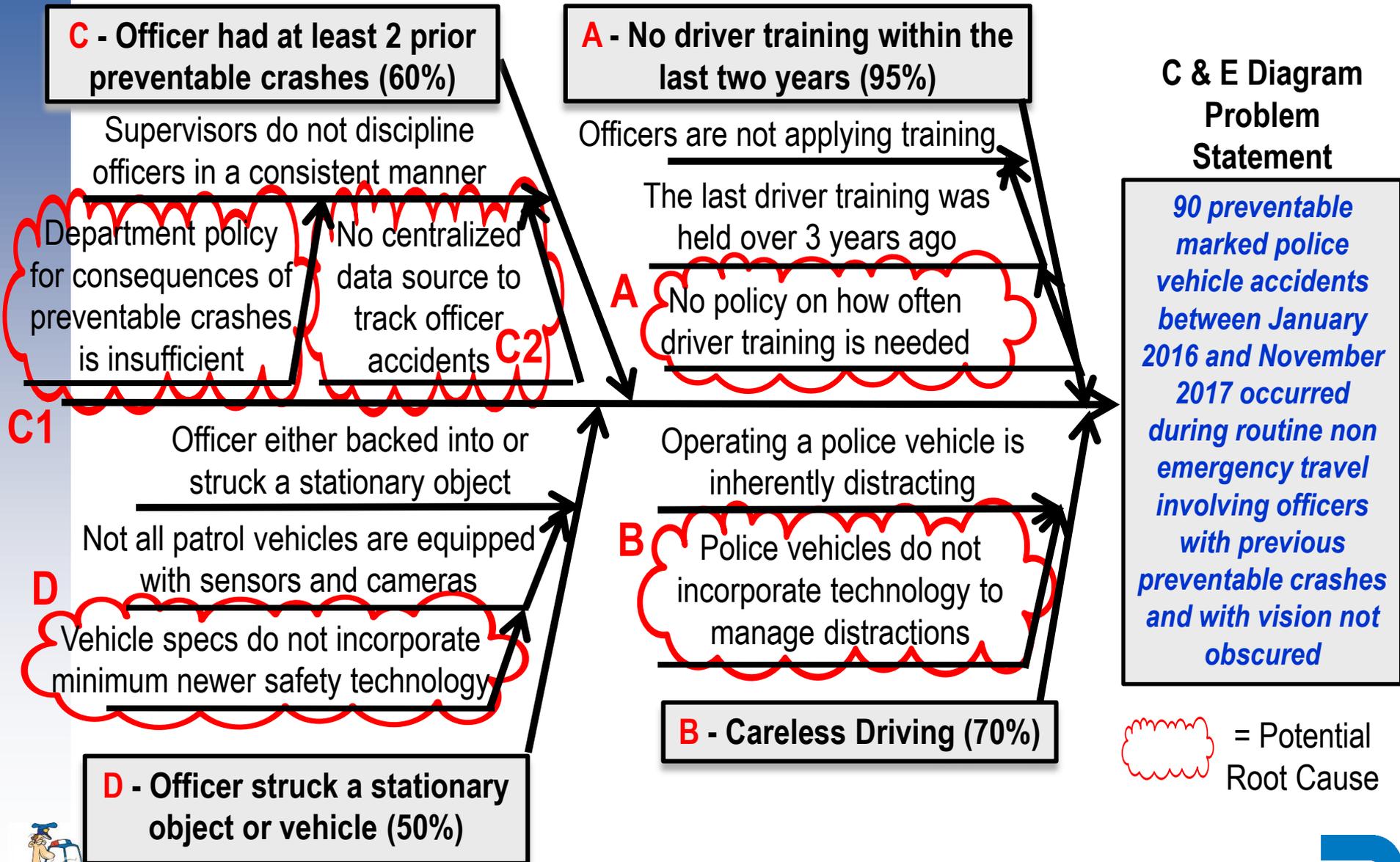## The team completed a Single Case Bore Analysis

Problem Statement: *90 preventable marked police vehicle accidents between January 2016 and November 2017 occurred during routine non-emergency travel involving officers with previous preventable crashes and with vision not obscured*

Most Recent 20 of the 90 Accidents

Reasons or Factors (that contributed to the accident)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Percentage
Area was poorly lit		X																			1	5%
Backing into or pulling out of parked space		X	X		X		X	X								X	X				7	35%
B Careless driving	X	X		X			X	X	X	X	X	X	X	X	X	X				X	14	70%
Civilian vehicle stopped quickly in front	X											X									2	10%
Construction work in roadway	X																				1	5%
Failure to yield														X							1	5%
Following too closely	X						X			X	X	X	X			X		X			8	40%
Improper backing			X		X	X										X	X				5	25%
Improper lane change																			X		1	5%
A No driver training within the last two years	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	19	95%
C Officer had at least 2 prior preventable crashes	X		X				X	X	X		X	X	X			X	X	X		X	12	60%
Officer ran a red light				X																	1	5%
D Officer struck stationary object/vehicle		X	X		X	X	X	X	X				X		X	X					10	50%
Traveling too fast for condition (speed)	X	X		X					X												4	20%

The team completed the Fishbone Analysis:

C - Officer had at least 2 prior preventable crashes (60%)

A - No driver training within the last two years (95%)

C & E Diagram Problem Statement

Supervisors do not discipline officers in a consistent manner

Department policy for consequences of preventable crashes is insufficient — **C1**

No centralized data source to track officer accidents — **C2**

Officers are not applying training

The last driver training was held over 3 years ago

A No policy on how often driver training is needed

90 preventable marked police vehicle accidents between January 2016 and November 2017 occurred during routine non emergency travel involving officers with previous preventable crashes and with vision not obscured

Officer either backed into or struck a stationary object

Not all patrol vehicles are equipped with sensors and cameras

D Vehicle specs do not incorporate minimum newer safety technology

Operating a police vehicle is inherently distracting

B Police vehicles do not incorporate technology to manage distractions

B - Careless Driving (70%)

D - Officer struck a stationary object or vehicle (50%)

= Potential Root Cause

The team collected data to verify the root causes and found:

Root Cause Verification Matrix

|	Potential Root Cause	How Verified?	Root Cause or Symptom
A	No policy on how often driver training is needed	Departmental policies (Chapter 5 & 13) don't identify driving as a job skill that requires annual retraining.	Root Cause
B	Police vehicles do not incorporate technology to manage distractions	MDPD vehicles do not incorporate technology that allows for hands-free use of the computer and other police equipment.	Root Cause
C1	Department policy for consequences of preventable crashes is insufficient	Departmental policy (Chapter 5) does not include a standard that adequately defines the policies and procedures for reducing preventable accidents.	Root Cause
C2	No centralized data source to track officer accidents	Checked with ITSB, MDPSTI, PCB, and THU. None of them collect and maintain a centralized database on officer accidents.	Root Cause
D	Vehicle specs do not incorporate minimum newer safety technology	At least 13 of the 20 vehicles studied in the single case bore did not incorporate minimum newer technology like sensors or backup cameras.	Root Cause

All five were validated as root causes.

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Identify and Select Countermeasures

The team brainstormed many countermeasures and narrowed them down to these for evaluation:

Problem Statement	Verified Root Causes	Countermeasures	Effectiveness	Feasibility	Overall	Take Action? Yes/No
			Legend: 5=Extremely 4 = Very 3 = Moderately 2 = Somewhat 1 = Little or None — Ratings			
90 preventable marked police vehicle accidents between January 2016 and November 2017 occurred during routine non emergency travel involving officers with previous preventable crashes and with vision not obscured	A - No policy on how often driver training is needed	A1 - Conduct driver refresher training once a year for all officers in patrol vehicles	5	4	20	Yes
		A2 - Incorporate driving into annual training policies (Chapter 13)	5	5	25	Yes
	B - Police vehicles do not incorporate technology to manage distractions	B1 - Pilot some form of handsfree or artificial intelligence to manage the vehicle's computer and other police equipment	5	4	20	Yes
		B2 - Research and develop technology that can manage distractions	5	5	25	Yes
		B3 - Conduct benchmarking in order to see what technology other police agencies are incorporating into their vehicles	2	5	10	Yes
	C1 - Department policy for consequences of preventable crashes is insufficient	C1 - Enhance department policy on vehicle crashes that incorporates best practices of other agencies	5	5	25	Yes
		C2 - Enhance departmental policy on use of vehicle monitoring technology to promote safe driving	3	2	6	No
		C3 - Develop specific disciplinary action(s) for vehicle crashes (consistent with other law enforcement policies)	4	3	12	Yes
		C4 - Implement policy to prevent officers who have had their PPVP privileges withdrawn from operating any dept vehicle	5	1	5	No
		C5 - Implement policy that progressively removes PPVP priviliges for time periods after first and subsequent preventable accidents	3	3	9	Yes
		C6 - Conduct benchmarking to study the disciplinary policies of other police agencies for vehicle accidents	2	5	10	Yes
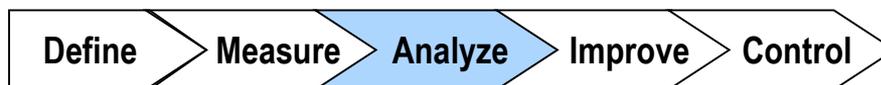
Define → Measure → **Analyze** → Improve → Control

Identify and Select Countermeasures

14., 15. ✓

The team brainstormed many countermeasures and narrowed them down to these for evaluation:

Problem Statement	Verified Root Causes	Countermeasures	Legend: 5=Extremely 4 = Very 3 = Moderately 2 = Somewhat 1 = Little or None			
			Effectiveness	Feasibility	Overall	Take Action? Yes/No
90 preventable marked police vehicle accidents between January 2016 and November 2017 occurred during routine non emergency travel involving officers with previous preventable crashes and with vision not obscured	C2 - No centralized data source to track officer accidents	C7 - Create a centralized database that tracks officer crashes	5	5	25	Yes
		C8 - Monitor crashes like early warning system	5	5	25	Yes
		C9 - Hold districts and bureaus accountable for enforcing and tracking accidents	5	4	20	Yes
	D - Vehicle specs don't incorporate minimum newer safety technology	D1 - Install aftermarket backup cameras and/or sensors into vehicles without that technology	3	3	9	No
		D2 - Implement minimum technological safety requirements	4	5	20	Yes

**The team selected 13 countermeasures to investigate further**

Define > Measure > **Analyze** > Improve > Control

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The team performed Barriers and Aids analysis on the selected Countermeasures.

Countermeasures					
Implement 13 countermeasures to reduce preventable marked police vehicle accidents					
Impact (High, Medium, Low)	**Barriers**			**Aids**	
	Forces against Implementation			**Forces for Implementation**	
M	1	Potential push back from bargaining union and departmental staff *(Supported by Aids: A, E, F)*	A	Management very supportive of efforts to reduce vehicle accidents	
H	2	Software and maintenance costs might escalate *(Supported by Aids: A, B, C, D)*	B	Potential savings are substantial	
H	3	Resources for vehicle improvements are limited *(Supported by Aids: A, B, D, F)*	C	Collaborations with internal and external partners are already in place	
H	4	Locating dealerships and vehicle with the latest technology available in a police package vehicle *(Supported by Aids: D, F)*	D	Use of technology can reduce and even eliminate accidents	
			E	Management is open to discussion and dialogues with bargaining unions	
H	5	Operational impact of implementing stricter driving policies is unknown *(Supported by Aids: A, B, F, G)*	F	Officer safety is a top priority	
			G	Personnel can be resources elsewhere if accidents are occurring less	

The team next sought to incorporate this analysis into the team's Action Plan.

Define 〉 Measure 〉 Analyze 〉 Improve 〉 Control

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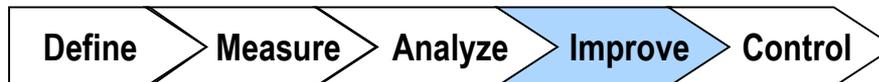
Develop and Implement Action Plan

The team implemented an Action Plan for the team's Countermeasures.

17. ☑

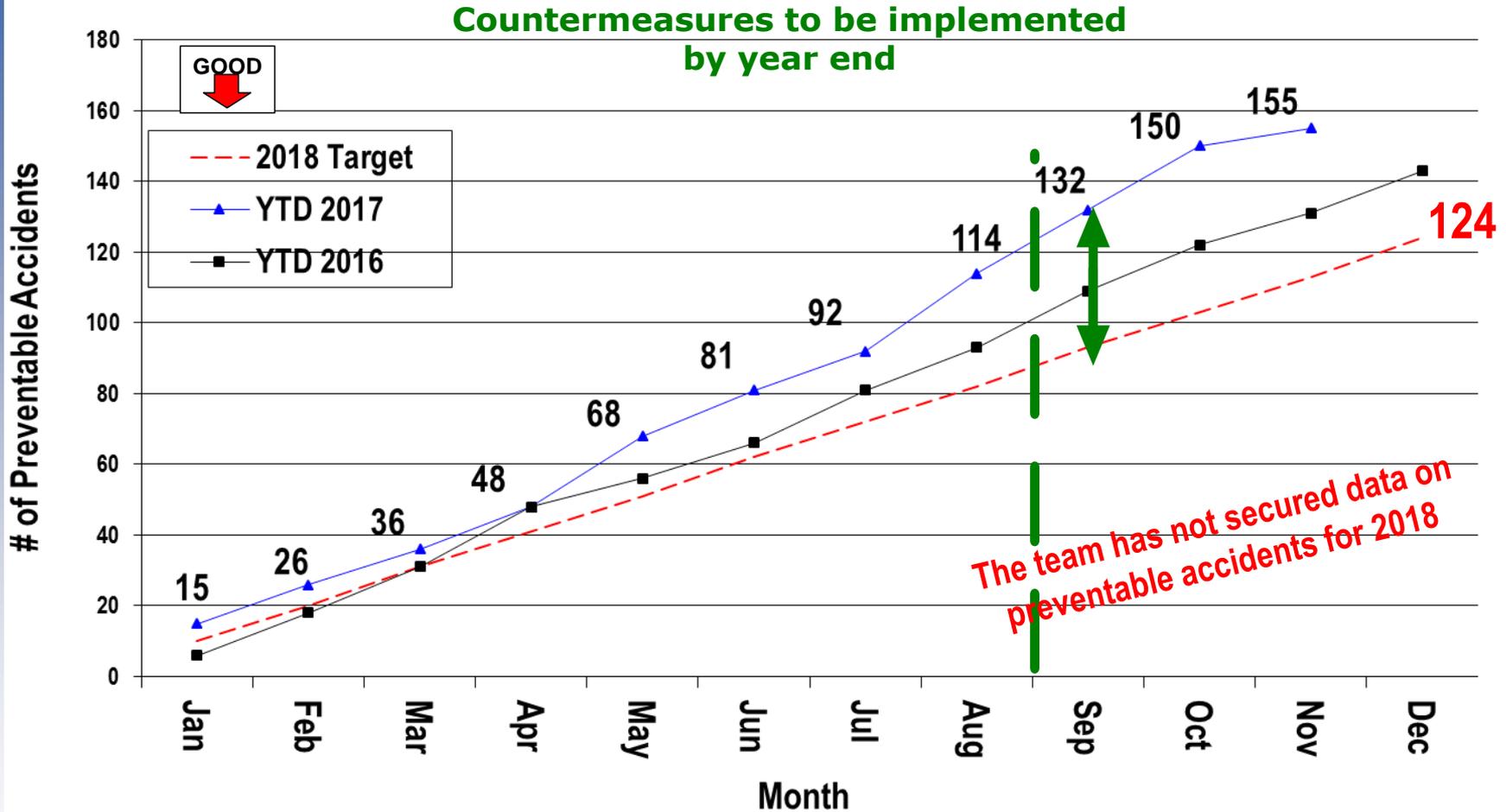|	HOW	WHO	When 2018						
			Jan	Feb	Mar	Apr	May	Jun	Jul
1	**Develop Countermeasures/ Practical Methods:**								
	A1 - Conduct driver refresher training once a year for all officer in patrol vehicles	Jannene		□ ■ 3/5/18					
	A2 - Incorporate driving into annual training policies (Chapter 13)								
	B1 - Pilot some form of handsfree or artificial intelligence to manage the vehicle's computer and other police equipment	George		□ ■ 3/5/18					
	B2 - Research and develop technology that can manage distractions								
	B3 - Conduct benchmarking in order to see what technology other police agencies are incorporating into their vehicles	George & Jose		□ ■ 3/5/18					
	C1 - Enhance department policy on vehicle crashes that incorporates best practices of other agencies	Carlo & Garret		□ ■ 3/5/18					
	C3 - Develop specific disciplinary action(s) for vehicle crashes (consistent with other law enforcement policies)								
	C5 - Implement policy that progressively removes PPVP priviliges for time periods after first and subsequent preventable accidents								
	C6 - Conduct benchmarking to study the disciplinary policies of other police agencies for vehicle accidents	Carlo, Garret & Jose		□ ■ 3/5/18					
	C7 - Create a centralized database that tracks officer crashes	Jannene, Lilly & George		□ ■ 3/5/18					
	C8 - Monitor crashes like early warning system								
	C9 - Hold districts and bureaus accountable for enforcing and tracking accidents								
	D2 - Implement minimum technological safety requirements	Carlo/ Garret		□ ■ 3/5/18					
2	Secure management approval of countermeasures **(share benefits and savings)**	Team				□ 3/30/18			
3	Communicate/Train Staff in Countermeasures and related policies/procedures **(share benefits and Union Advocate)**					□ 4/30/18			
4	Implement Countermeasures in Pilot					□ 5/31/18			
5	Establish ongoing responsibilities and standardize countermeasures into operations						□ On-Going		

The team estimated the net benefits and the potential return on investment.

Itemized Cost	Annualized Cost	Itemized Benefits	Annualized Savings
		Approximately 42% of all marked accidents were deemed preventable. This assumes a 25% reduction in preventable marked accidents.	
A1 - Conduct driver refresher training once a year for all officers in patrol vehicles **A2 -** Implement a clear policy on how often driver training occurs	$142,000	Expected reduction of 25% in vehicle retirements due to preventable marked vehicle accidents from 65 to 49	$460,845
B1 - Pilot some form of handsfree or artificial intelligence to manage the vehicle's computer and other police equipment ($10,000 per vehicle in 10 vehicles)	$100,000		
B2 - Research and develop technology that can manage distractions	TBD		
B3 - Conduct benchmarking in order to see what technology other police agencies are incorporating into their vehicles	$0	A 25% reduction in claims filed against the County as a result of preventable marked vehicle accidents	$102,816
C1 - Enhance department policy on vehicle crashes that incorporates best practices of other agencies	$0		
C3 - Develop specific disciplinary action(s) for vehicle crashes (consistent with other law enforcement policies)	$0	A 25% reduction in body shop repairs as a result of preventable marked vehicle accidents	$59,252
C5 - Implement policy that progressively removes PPVP priviliges for time periods after first and subsequent preventable accidents	$0		
C6 - Conduct benchmarking to study the disciplinary policies of other police agencies for vehicle accidents	$0	A 25% reduction in the officer time spent loading and unloading equipment into pool vehicle while their assigned unit is being repaired	$42,021
C7 - Create a centralized database that tracks officer crashes	TBD		
C8 - Monitor crashes like early warning system	$0	A 25% reduction in the officer time spent investigating and writing reports for preventable marked vehicle accidents	$23,331
C9 - Hold districts and bureaus accountable for enforcing and tracking accidents	$0		
D2 - Implement minimum technological safety requirements	$0		
Total Annualized Costs	**$242,000**	**Total Expected Annualized Benefits**	**$688,265**
Net Benefits =	**$446,265**		
Return on Investment =	**1.84 : to 1 ratio**		

Define 〉 Measure 〉 Analyze 〉 **Improve** 〉 Control

The team collected indicator data and reviewed performance trends:

Countermeasures to be implemented by year end

The team will continue to monitor the countermeasures.
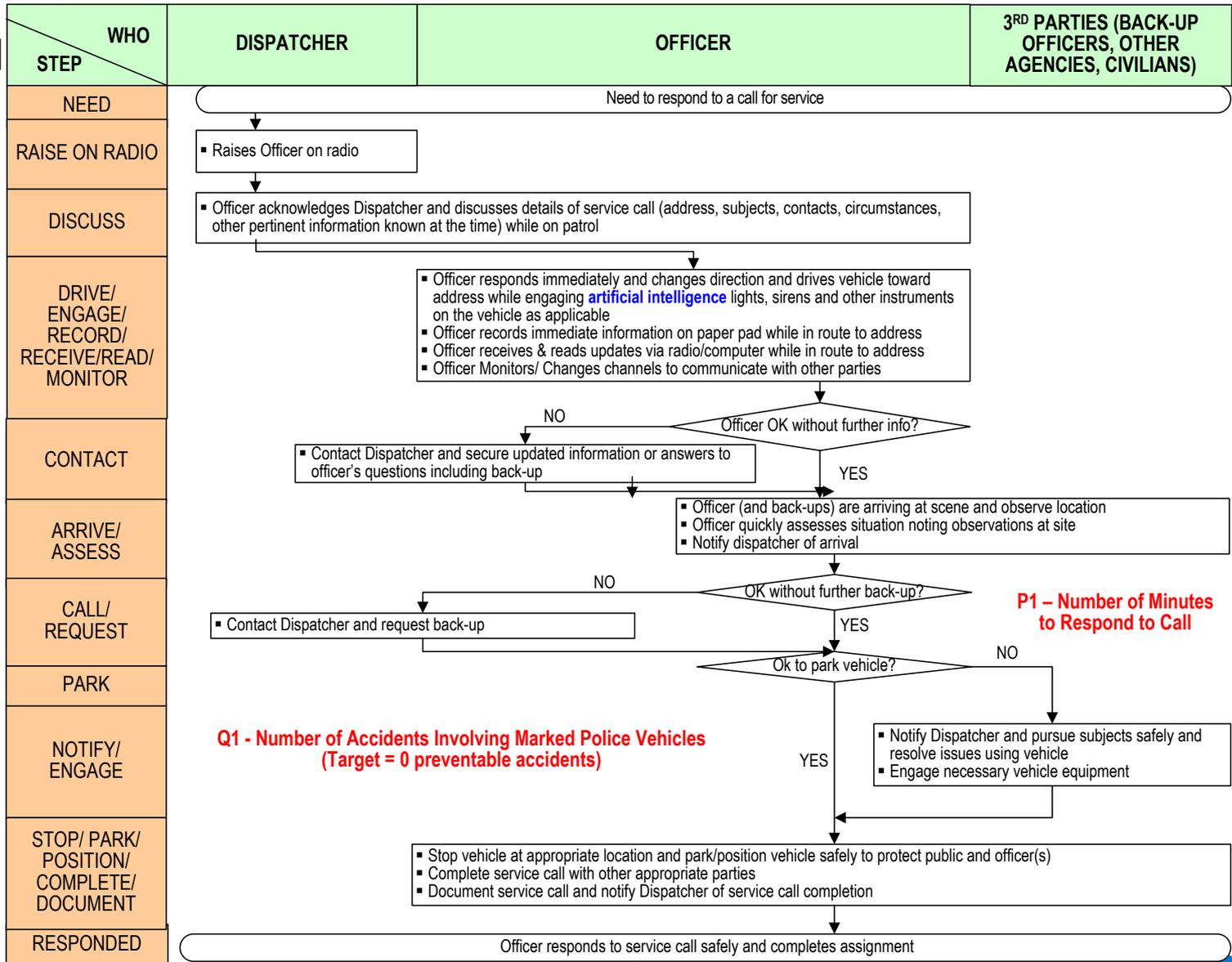
Standardize Countermeasures

The team incorporated their **counter-measures** into their Process Flowchart.

Respond to Call for Police Services

Process Owner: Juan Perez, Police Director

WHO / STEP	DISPATCHER	OFFICER	3RD PARTIES (BACK-UP OFFICERS, OTHER AGENCIES, CIVILIANS)
NEED		Need to respond to a call for service	
RAISE ON RADIO	▪ Raises Officer on radio		
DISCUSS	▪ Officer acknowledges Dispatcher and discusses details of service call (address, subjects, contacts, circumstances, other pertinent information known at the time) while on patrol		
DRIVE/ ENGAGE/ RECORD/ RECEIVE/READ/ MONITOR		▪ Officer responds immediately and changes direction and drives vehicle toward address while engaging **artificial intelligence** lights, sirens and other instruments on the vehicle as applicable ▪ Officer records immediate information on paper pad while in route to address ▪ Officer receives & reads updates via radio/computer while in route to address ▪ Officer Monitors/ Changes channels to communicate with other parties	
CONTACT	NO → ▪ Contact Dispatcher and secure updated information or answers to officer's questions including back-up	Officer OK without further info? — YES	
ARRIVE/ ASSESS		▪ Officer (and back-ups) are arriving at scene and observe location ▪ Officer quickly assesses situation noting observations at site ▪ Notify dispatcher of arrival	
CALL/ REQUEST	NO → ▪ Contact Dispatcher and request back-up	OK without further back-up? — YES **P1 – Number of Minutes to Respond to Call**	
PARK		Ok to park vehicle? — NO	
NOTIFY/ ENGAGE	**Q1 - Number of Accidents Involving Marked Police Vehicles (Target = 0 preventable accidents)**	YES	▪ Notify Dispatcher and pursue subjects safely and resolve issues using vehicle ▪ Engage necessary vehicle equipment
STOP/ PARK/ POSITION/ COMPLETE/ DOCUMENT		▪ Stop vehicle at appropriate location and park/position vehicle safely to protect public and officer(s) ▪ Complete service call with other appropriate parties ▪ Document service call and notify Dispatcher of service call completion	
RESPONDED		Officer responds to service call safely and completes assignment	

Define > Measure > Analyze > Improve > Control

1) Data took much effort to secure, however, those efforts paid
    off as the data led the team to unanticipated root causes

2) Moving the Line graph requires identification and elimination
    of Root Cause(s)

3) Single Case Bore Analysis was very effective because we
    had very detailed data to complete the analysis

4) Research and speaking with other agencies can inform
    analysis and decision making

Next Steps

Continue to implement countermeasures and monitor performance results

Define › Measure › Analyze › Improve › Control

MIAMI-DADE COUNTY