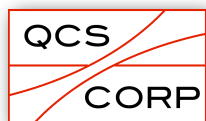


What NHTSA's Data Can Tell Us about Unintended Acceleration and Electronic Throttle Control Systems

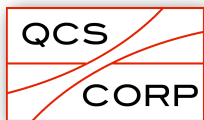
PRESENTED TO
the Transportation Research Board of the National Academies for its
Study of Electronic Vehicle Controls and Unintended Acceleration

PRESENTED BY
R. A. Whitfield, Director,
Quality Control Systems Corporation, Crownsville, Maryland

October 11, 2010



2009 Lexus ES 350 crashed August 28, 2009



Source: NHTSA, Office of Defects Investigation

Toyota announces first recall

November 25, 2009

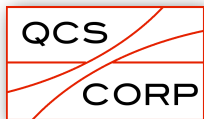
NHTSA 12-09
Wednesday, November 25, 2009

Contact: Karen Aldana
Telephone: (202) 366-9550

Toyota Announces Fix for Accelerator Pedal Entrapment Problem

The National Highway Traffic Safety Administration today announced that Toyota has identified a vehicle-based remedy to fix a sudden acceleration safety issue involving floor mats trapping accelerator pedals in various Toyota and Lexus models. Toyota announced the recall of these vehicles in early October and said it would soon develop a vehicle-based remedy to reduce the risk of a crash due to accelerator pedal entrapment.

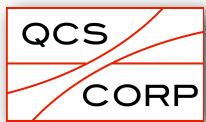
The models involved in the recall are: 2007 to 2010 MY Camry, 2005 to 2010 MY Avalon, 2004 to 2009 MY Prius, 2005-2010 MY Tacoma, 2007-2010 MY Tundra, 2007-2010 MY ES 350, 2006-2010 MY IS 250, and 2006 to 2010 MY IS 350.



Source: NHTSA, Press Release

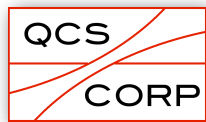
Theory:

The throttle or electronic control system malfunctions in the recalled Toyota vehicles (NHTSA CAMPAIGN ID Number: 09V388000).



Null Hypothesis I:

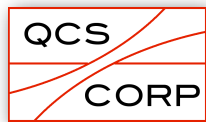
There is no indication in consumer safety complaint data of a throttle or electronic control system malfunction in the recalled Toyota models (NHTSA CAMPAIGN ID Number: 09V388000).



See: Toyota Statement to ABC News, November 25, 2009

Null Hypothesis II:

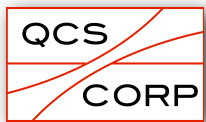
There is no indication in consumer safety complaint data of a throttle or electronic control system malfunction in the related, unrecalled Toyota models.



See: Toyota Statement to ABC News, November 25, 2009

Data tested:

Consumer Safety Complaints to
NHTSA for 3 Toyota Models,
Before the Saylor Family Crash



Source: NHTSA, Office of Defects Investigation,
Accessed August 24, 2009

Makes and models studied – Toyota Camry



With and without ETCS-i

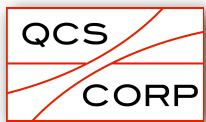


Photo source: Safercar.gov

Makes and models studied – Lexus ES 300 Series



With and without ETCS-i

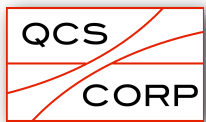


Photo source: Safercar.gov

Makes and models studied – Toyota Tacoma



With and without ETCS-i

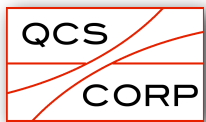
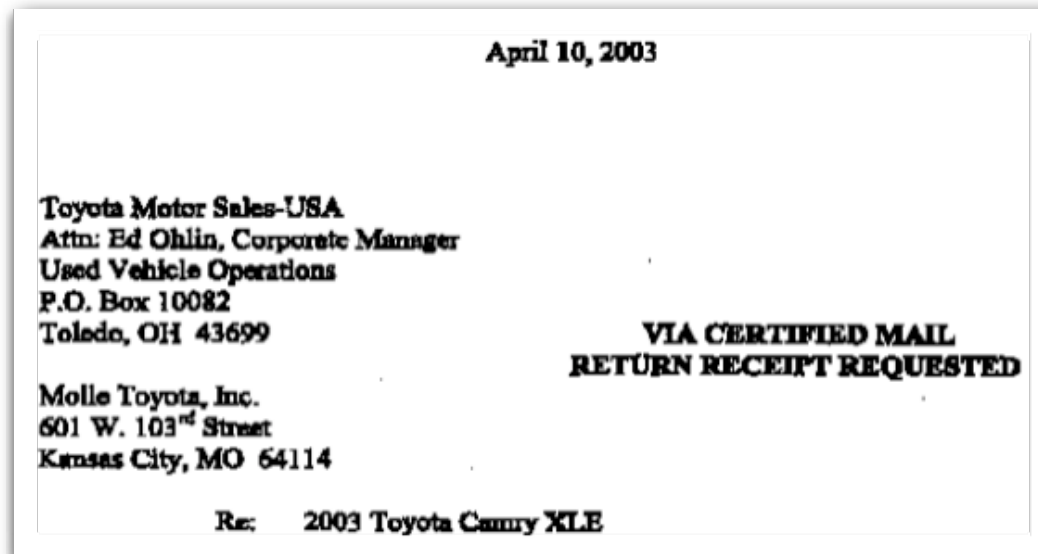
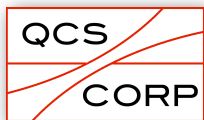


Photo Source: NHTSA

NHTSA's Consumer Safety Complaint database – the raw materials involving unintended acceleration



Just west of the Woods Chapel Road exit on I-70, and as I was driving in the outside lane at about 60 m.p.h. in weekday rush hour (5:50 p.m.) traffic on clear and dry pavement, a green late-model SUV in the center lane that was approximately 1/2 car length ahead of me started to pull over into the lane I was driving in. I braked and swerved to the right to avoid a collision. As I braked and swerved to the right, *the Camry suddenly and unexpectedly accelerated*. As a consequence, my swerve to the right was far more



Source: NHTSA, Office of Defects Investigation

NHTSA's Consumer Safety Complaint database – the raw materials involving unintended acceleration

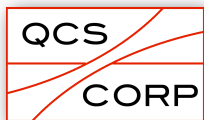
November 19, 2003

Kathleen C. DeMeter, Director
Office of Defects Investigation
National Highway Traffic Safety Administration
400 Seventh Street, S.W., Room 5326
Washington, D.C. 20590

Dear Ms DeMeter:

I am writing to you about a puzzling experience I have had with the National Highway Traffic Safety Administration.

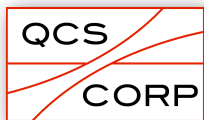
In July I reported to the NHTSA-ODI a very serious problem I had experienced with my 2002 Toyota Camry. My complaint (ODI# 10023329) appears on the NHTSA-ODI website along with quite a few other very similar complaints, all indexed under the "Vehicle Speed Control-" headings.



Source: NHTSA, Office of Defects Investigation,
[ODI Number 10023329](#)

NHTSA's Consumer Safety Complaint database – the raw materials involving unintended acceleration

CONSUMER CALLED COMPLAINING ABOUT THE ACCELERATOR PEDAL. ALSO STATED THE VEHICLE HAS BEEN DRIVEN AT NO MORE OF 2 TO 3 MPH AND THE VEHICLE ACCELERATED BY ITSELF. DEALER WAS CONTACTED AND HAVE NOT FOUND ANYTHING WRONG WITH IT. TS
ALSO:
TOYOTA ZONE MAN INSPECTED VEHICLE AND FOUND NOTHING WRONG. WHEN VEHICLE ACCELERATED, IT SHOT OVER CEMENT STAIRS, SIDEWALK, RAN OVER BUSHES, KNOCKED OVER 7 FOOT PALM TREE, AND STOPPED WHEN IT HIT BUILDING. \$45000 WORTH OF DAMAGE. THERE ARE BURNED TIRE MARKS ON CEMENT WHERE THIS ALL TOOK PLACE. NO INJURYS.

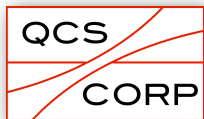


Source: NHTSA, Office of Defects Investigation

NHTSA's Consumer Safety Complaint database – the raw materials involving unintended acceleration

THE VEHICLE EXPERIENCED SUDDEN ACCELERATION WHEN THE GEAR WAS SHIFTED FROM PARK TO DRIVE, AND COLLIDED WITH SEVEN OTHER VEHICLES. *JB

IT BEGAN TO RACE WHEN I ATTEMPTED TO PARK IN FRONT OF A RESTAURANT - I SHIFTED FROM REVERSE (BACKING UP) TO DRIVE - I DELIBERATELY PRESSED ON THE ABS BRAKES - THEY COMPLETELY FAILED AND THE MOTOR KEPT RACING UNTIL I HIT INTO A CAR PARKED AT A LIGHT ON BERARDOT AND N.Y. AVE.



Source: NHTSA, Office of Defects Investigation

NHTSA's Consumer Safety Complaint database – the raw materials involving unintended acceleration

WHILE PARKED, THE ENGINE STARTED RACING AND CRASHED INTO A WALL IN A PARKING LOT. CAUSE OF PROBLEM HAS NOT BEEN DETERMINED. PLEASE PROVIDE FURTHER DETAILS. *PH

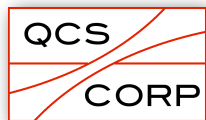
was almost all the way into diagonal pkg. spot, engine started to rev up very quickly, & car lunged forward about 3 ft into wall of pkg. structure. I was not injured but badly shaken up - Toyota just checked acceleration problem yesterday after 2 1/2 days & found no problem they said Burbank Police cannot check and make a decision only -



Source: NHTSA, Office of Defects Investigation

NHTSA's Consumer Safety Complaint database – the raw materials involving unintended acceleration

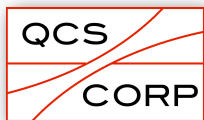
Make : TOYOTA	Model : CAMRY	Year : 2002
Manufacturer : TOYOTA MOTOR NORTH AMERICA, INC.		
Crash : No	Fire : No	Number of Injuries: 0
ODI ID Number : 10008754		Number of Deaths: 0
Date of Failure: January 14, 2003		
VIN : 4T1BE32K22U...		
Component: VEHICLE SPEED CONTROL		
Summary:		
THE CONSUMER EXPERIENCED SUDDEN ACCELERATION WITH THIS VEHICLE AND A NEWLY PURCHASED 2003 CAMRY. *JB SCC THE CONSUMER STATED THAT HE APPLIED THE BRAKES AND THE VEHICLE CONTINUED TO TRAVEL FORWARD. THE CONSUMER CUT OFF THE IGNITION AND THE VEHICLE FINALLY CAME TO A STOP. *TC		



Source: NHTSA, Office of Defects Investigation

Example of a consumer safety complaint with a Vehicle Identification Number

Make : TOYOTA	Model : HIGHLANDER	Year : 2009
Manufacturer : TOYOTA MOTOR CORPORATION		
Crash : No	Fire : No	Number of Injuries: 0
ODI ID Number : 10293809		Number of Deaths: 0
Date of Failure: June 1, 2009		
VIN : JTEES42AX92...	←	
Component: POWER TRAIN		



Source: NHTSA, Office of Defects Investigation

Toyota's VIN decoding system for 2009

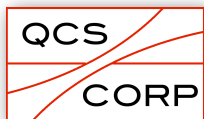
TOYOTA HIGHLANDER
TOYOTA HIGHLANDER Hybrid
VEHICLE IDENTIFICATION NUMBER CODING SYSTEM

Section 1: Manufacturer, Make and Type

1st - 3rd Digits	Code	Manufacturer	Make	Type
	JTE	Toyota Motor Corporation	Toyota	Multipurpose Passenger Vehicle

Section 2: Vehicle Description Section

		Code	Description
4th Digit	Body Type	D	5 Door Wagon Two-Wheel Drive
		E	5 Door Wagon Four-Wheel Drive
5th Digit	Engine Type	S	2GR-FE
		W	3MZ-FE+1JM, 2FM
		A	1AR-FE

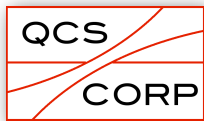


Source: NHTSA, Office of Defects Investigation

Vehicle Identification Number decoded by VINDICATOR (Highway Loss Data Institute)

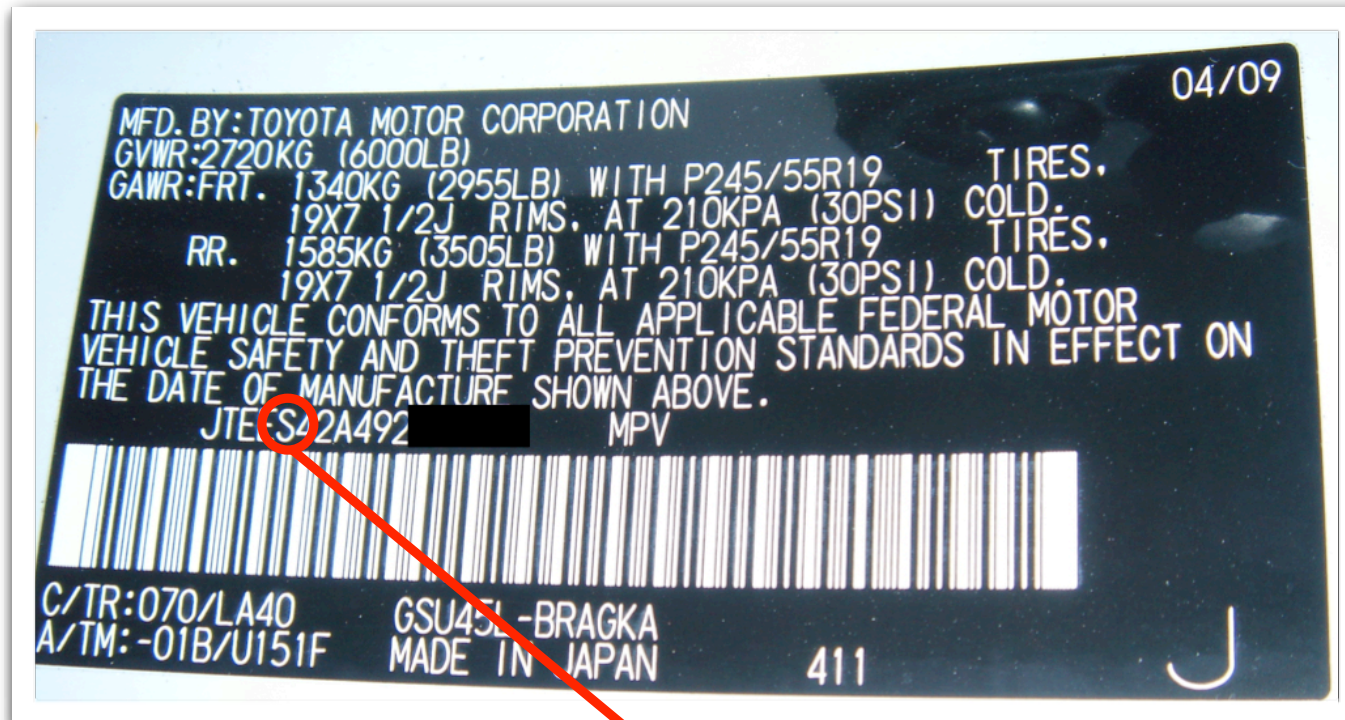


2009 Toyota Highlander

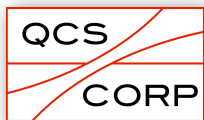


Source: NHTSA, Office of Defects Investigation

Vehicle Identification Number decoded for the 2009 Toyota Highlander



Toyota engine family: 2GR-FE

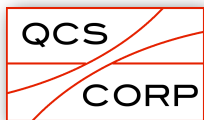


Source: NHTSA, Office of Defects Investigation

Classification of the Toyota engine family by ETCS-i for the 2009 Highlander

	A	B	C	D	E
1	<i>Year</i>	<i>Make</i>	<i>Model</i>	<i>Engine</i>	<i>ETCS-i</i>
2	2009	Toyota	FJ Cruiser	1GR-FE	Yes
3	2009	Toyota	Highlander	1AR-FE	Yes
4	2009	Toyota	Highlander	2GR-FE	Yes
5	2009	Toyota	Highlander HV	3MZ-FE	Yes

With and without ETCS-i

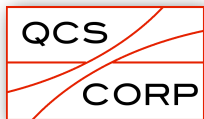


Source: Safety Research & Strategies, Inc.

Examples of consumer safety complaints

2006 Camry

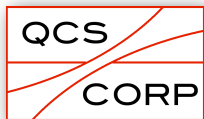
Make : TOYOTA	Model : CAMRY	Year : 2006
Manufacturer : TOYOTA MOTOR CORPORATION		
Crash : No	Fire : No	Number of Injuries: 0
ODI ID Number : 10290231		Number of Deaths: 0
Date of Failure: October 27, 2009		
VIN : 4T1BE32KX6U...		
Component: SEAT BELTS		
Document Search		
☐ Check to Request Research. Submit below.		Get Summary
Make : TOYOTA	Model : CAMRY	Year : 2006
Manufacturer : TOYOTA MOTOR CORPORATION		
Crash : Yes	Fire : No	Number of Injuries: 0
ODI ID Number : 10290122		Number of Deaths: 0
Date of Failure: December 6, 2006		
VIN : 4T1BE32K16U...		
Component: VEHICLE SPEED CONTROL		
Document Search		
☐ Check to Request Research. Submit below.		Get Summary
Make : TOYOTA	Model : CAMRY	Year : 2006
Manufacturer : TOYOTA MOTOR CORPORATION		
Crash : No	Fire : No	Number of Injuries: 0
ODI ID Number : 10290106		Number of Deaths: 0
Date of Failure: October 28, 2009		
VIN : 4T1BE30K86U...		
Component: AIR BAGS:FRONTAL		



Source: NHTSA, Office of Defects Investigation

Examples of consumer safety complaints 2006 Camry

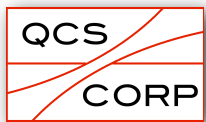
Make : TOYOTA	Model : CAMRY	Year : 2006
Manufacturer : TOYOTA MOTOR CORPORATION		
Crash : No	Fire : No	Number of Injuries: 0
ODI ID Number : 10290231		Number of Deaths: 0
Date of Failure: October 27, 2009		
VIN : 4T1BE32KX6U...		
Component: SEAT BELTS		
Document Search		
☐ Check to Request Research. Submit below.		
Get Summary		
Make : TOYOTA	Model : CAMRY	Year : 2006
Manufacturer : TOYOTA MOTOR CORPORATION		
Crash : Yes	Fire : No	Number of Injuries: 0
ODI ID Number : 10290122		Number of Deaths: 0
Date of Failure: December 6, 2006		
VIN : 4T1BE32K16U...		
Component: VEHICLE SPEED CONTROL ←		
Document Search		
☐ Check to Request Research. Submit below.		
Get Summary		
Make : TOYOTA	Model : CAMRY	Year : 2006
Manufacturer : TOYOTA MOTOR CORPORATION		
Crash : No	Fire : No	Number of Injuries: 0
ODI ID Number : 10290106		Number of Deaths: 0
Date of Failure: October 28, 2009		
VIN : 4T1BE30K86U...		
Component: AIR BAGS:FRONTAL		



Source: NHTSA, Office of Defects Investigation

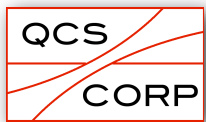
Methodology:

Compare the percentage of consumer safety complaints related to vehicle speed control in 3 groups for each model in the study

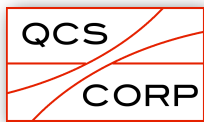
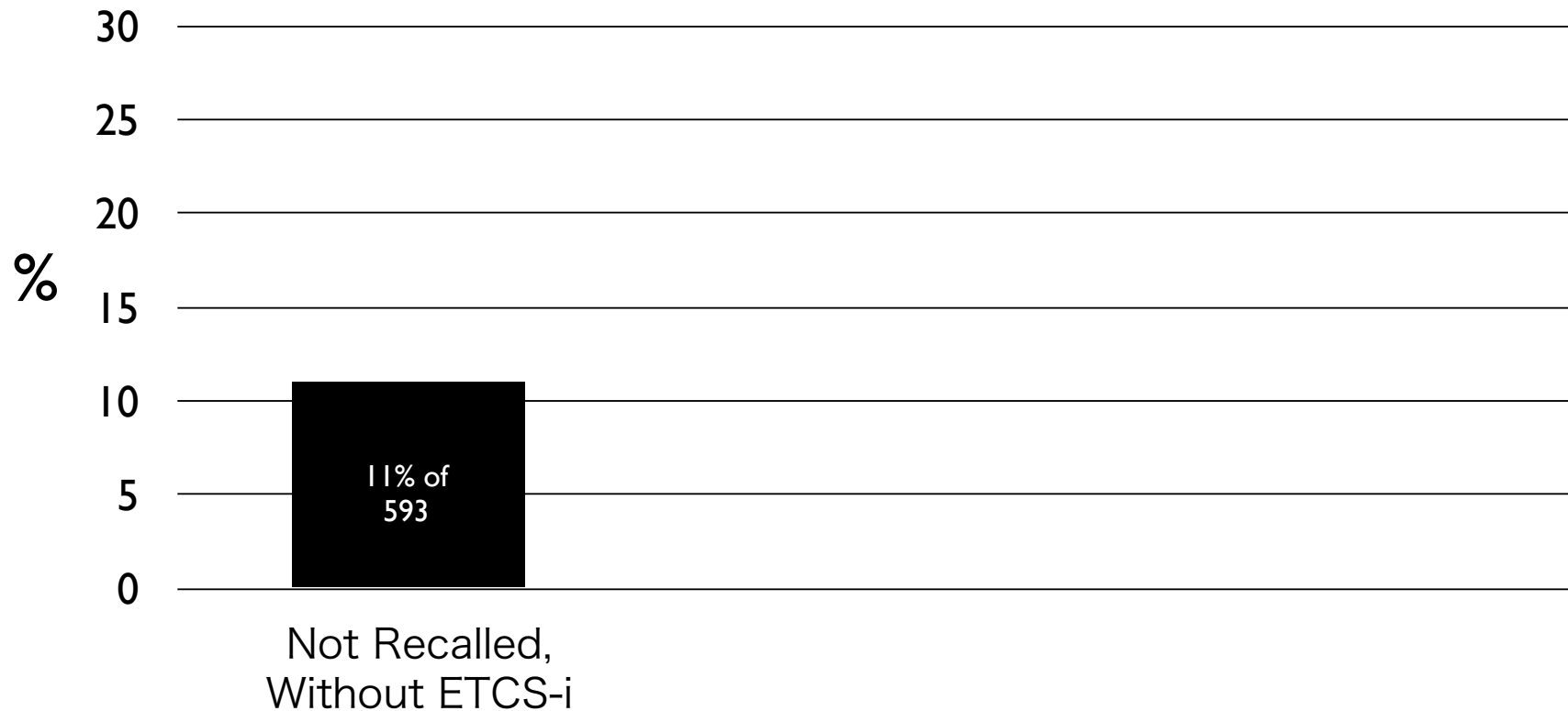


Comparison groups:

- 1) Unrecalled vehicles without Electronic Throttle Control (ETCS-i)
- 2) Unrecalled vehicles with ETCS-i
- 3) Recalled vehicles with ETCS-i



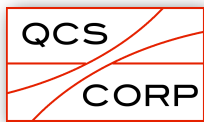
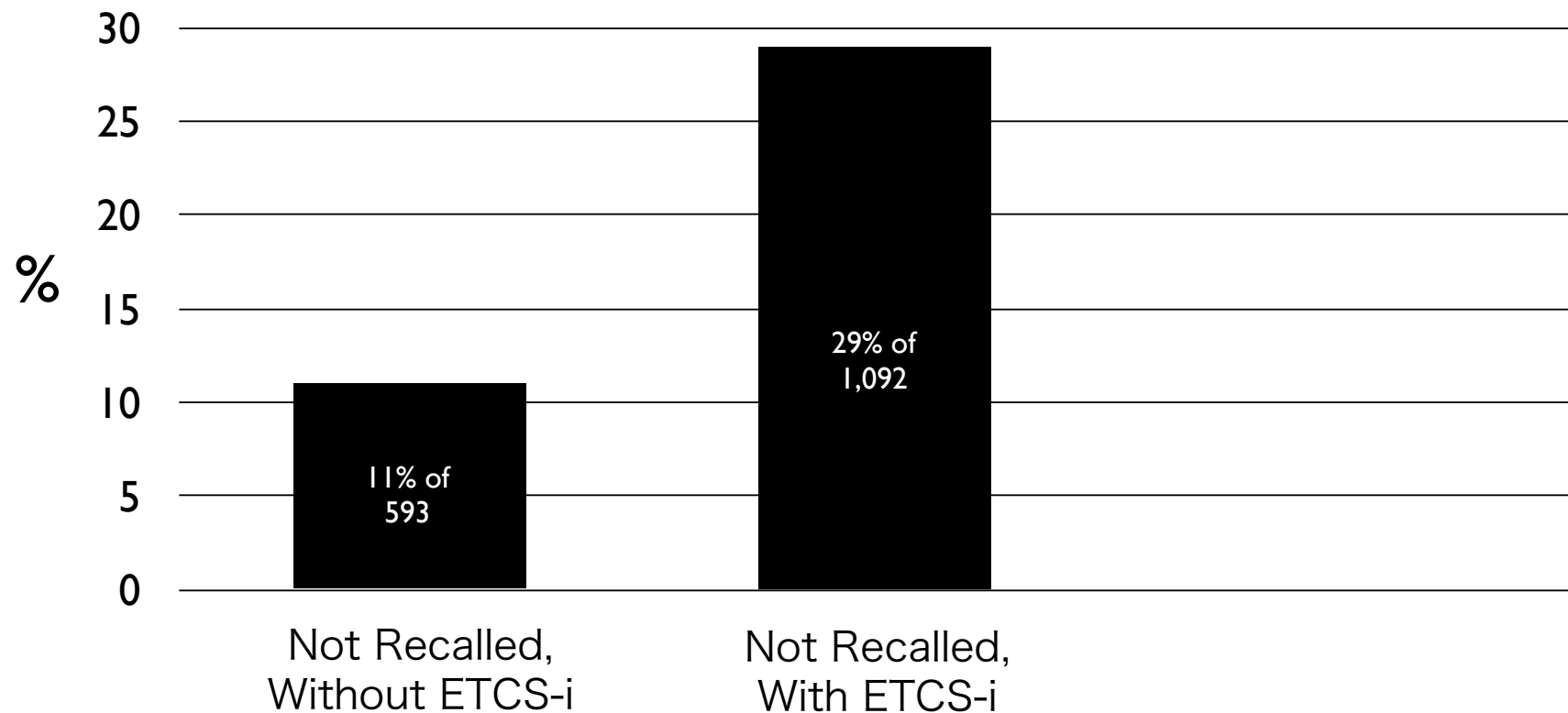
Toyota Camry: Percentage of Complaints Related to Speed Control, Model Years 1999-2005, 2007



Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp., January 26, 2010

* Note that data for model years 2006, 2008, and 2009 are missing
due to inadequate documentation of the engine codes.

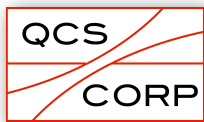
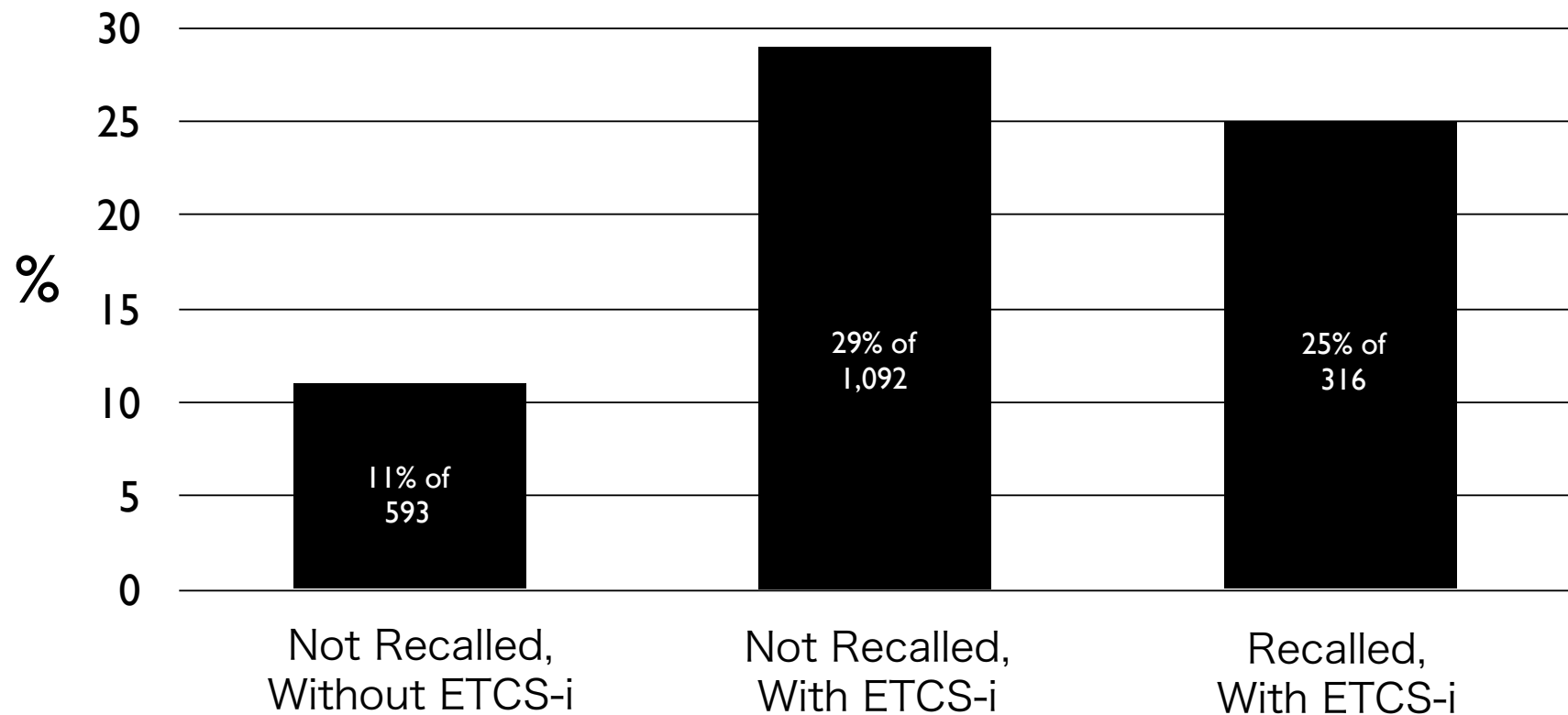
Toyota Camry: Percentage of Complaints Related to Speed Control, Model Years 1999-2005, 2007



Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp., January 26, 2010

* Note that data for model years 2006, 2008, and 2009 are missing
due to inadequate documentation of the engine codes.

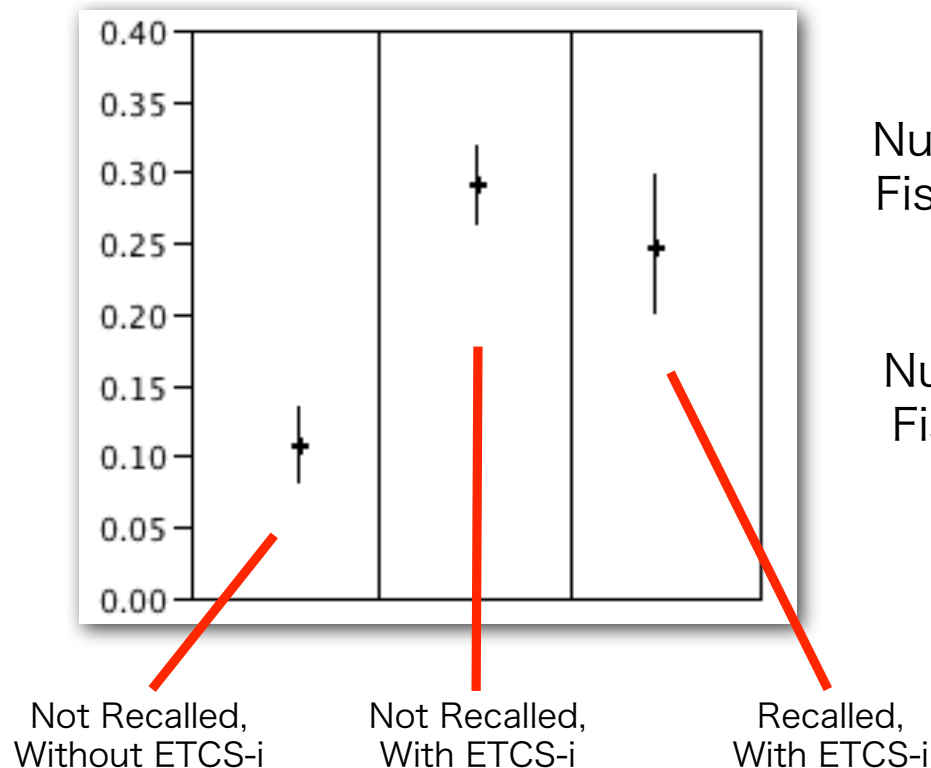
Toyota Camry: Percentage of Complaints Related to Speed Control, Model Years 1999-2005, 2007



Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp., January 26, 2010

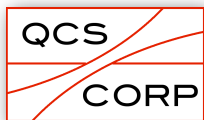
* Note that data for model years 2006, 2008, and 2009 are missing
due to inadequate documentation of the engine codes.

Toyota Camry: Proportion of Complaints Related to Speed Control, Model Years 1999-2005, 2007



Null Hypothesis I Rejected,
Fisher's Exact Test (2-Tail),
 $p < 0.0001$

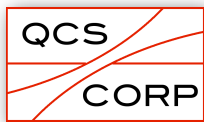
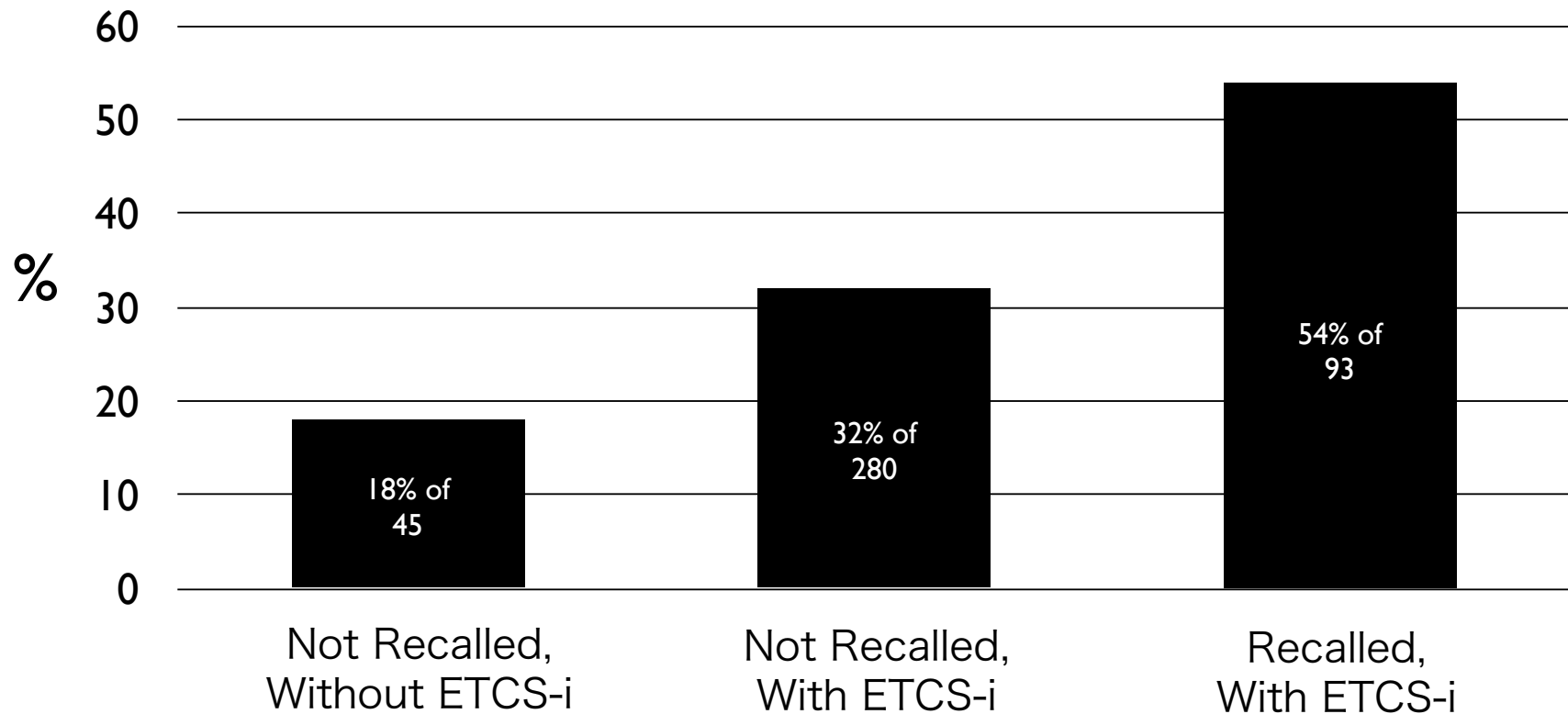
Null Hypothesis II Rejected,
Fisher's Exact Test (2-Tail),
 $p < 0.0001$



Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp., January 26, 2010

* Note that data for model years 2006, 2008, and 2009 are missing
due to inadequate documentation of the engine codes.

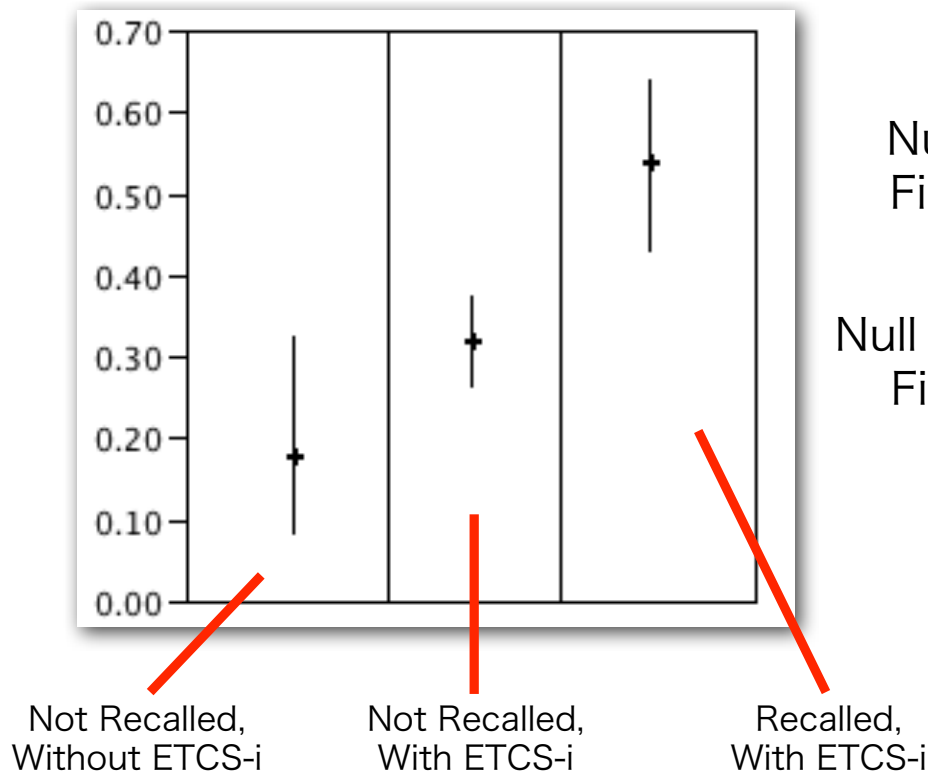
Lexus ES 300 Series: % of Complaints Related to Speed Control, Model Years 1999-2005, 2007



Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp., January 26, 2010

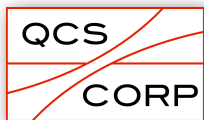
* Note that data for model years 2006, 2008, and 2009 are missing
due to inadequate documentation of the engine codes.

Lexus ES 300 Series: Proportion of Complaints Related to Speed Control, MY 1999-2005, 2007



Null Hypothesis I Rejected,
Fisher's Exact Test (2-Tail),
 $p < 0.0001$

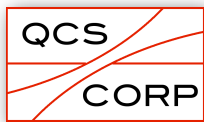
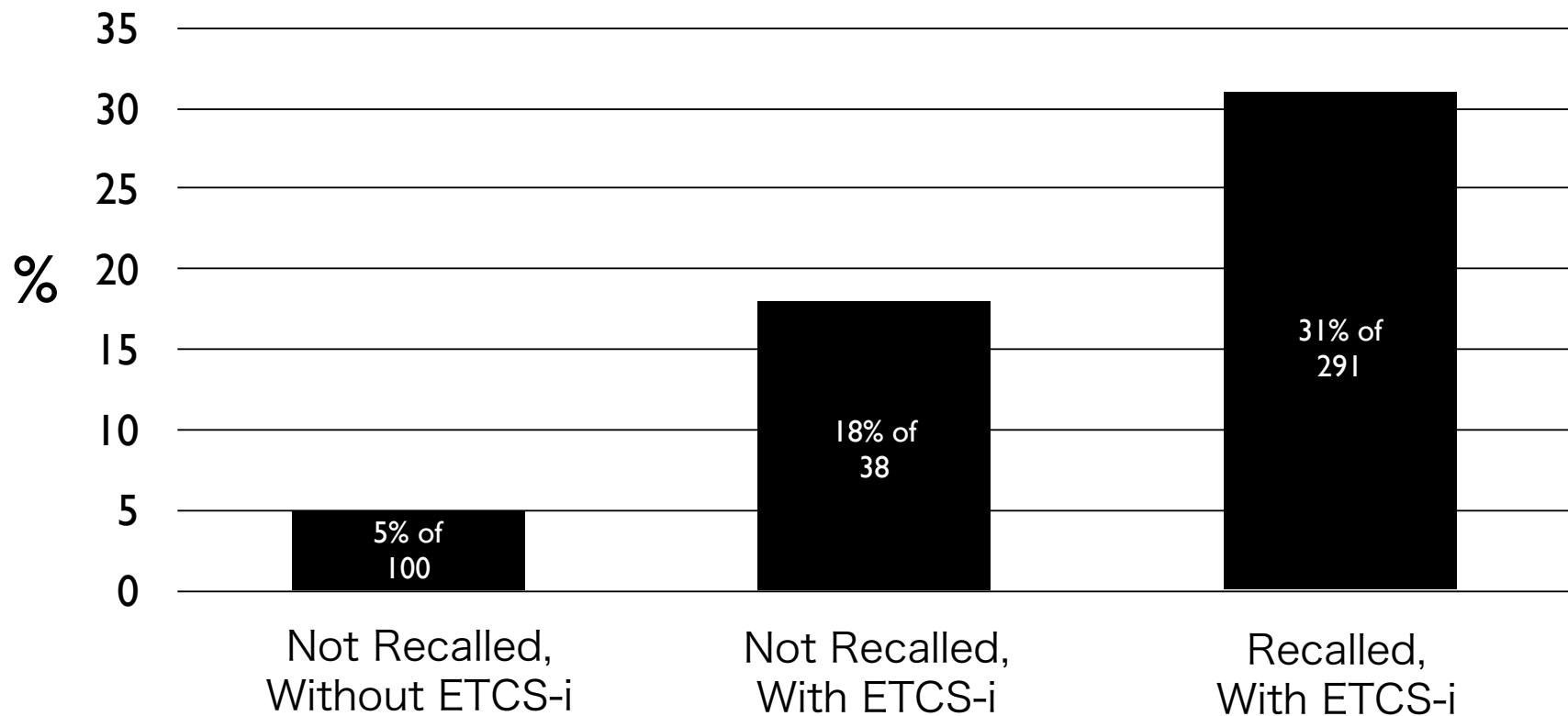
Null Hypothesis II Not Rejected,
Fisher's Exact Test (2-Tail),
 $p = 0.078$



Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp., January 26, 2010

* Note that data for model years 2006, 2008, and 2009 are missing
due to inadequate documentation of the engine codes.

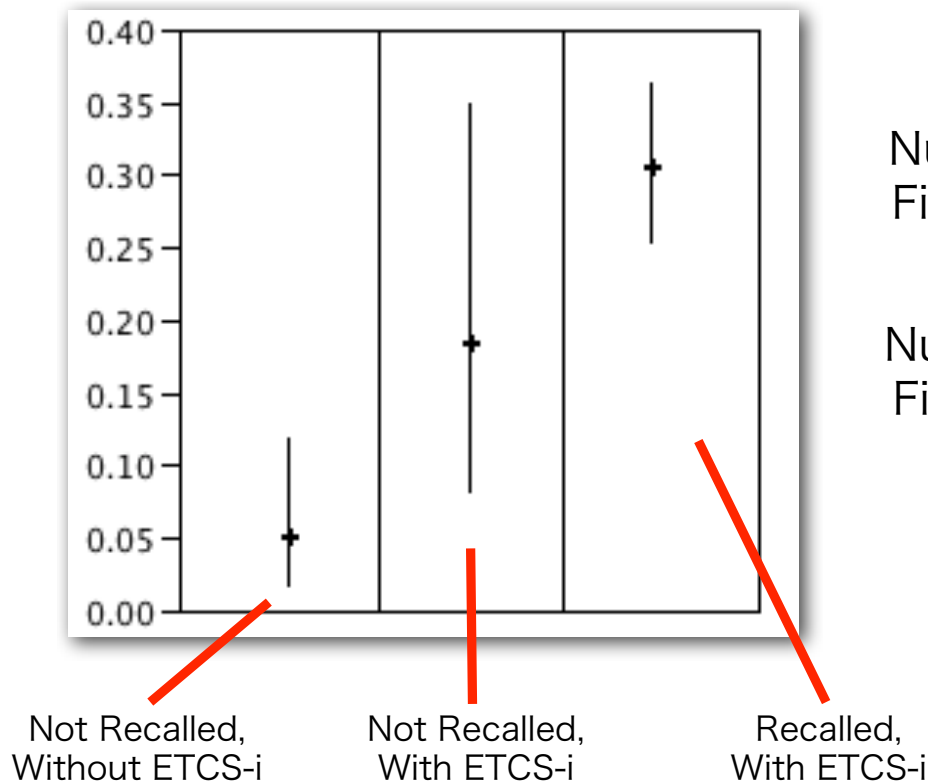
Toyota Tacoma: Percentage of Complaints Related to Speed Control, Model Years 2002-2003, 2005-2007



Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp., January 26, 2010

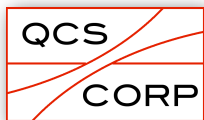
* Note that data for model years 2004, 2008, and 2009 are missing
due to inadequate documentation of the engine codes.

Toyota Tacoma: Proportion of Complaints Related to Speed Control, Model Years 2002-2003, 2005-2007



Null Hypothesis I Rejected,
Fisher's Exact Test (2-Tail),
 $p < 0.0001$

Null Hypothesis II Rejected,
Fisher's Exact Test (2-Tail),
 $p = 0.0192$

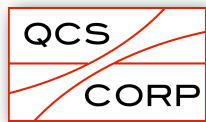


Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp., January 26, 2010

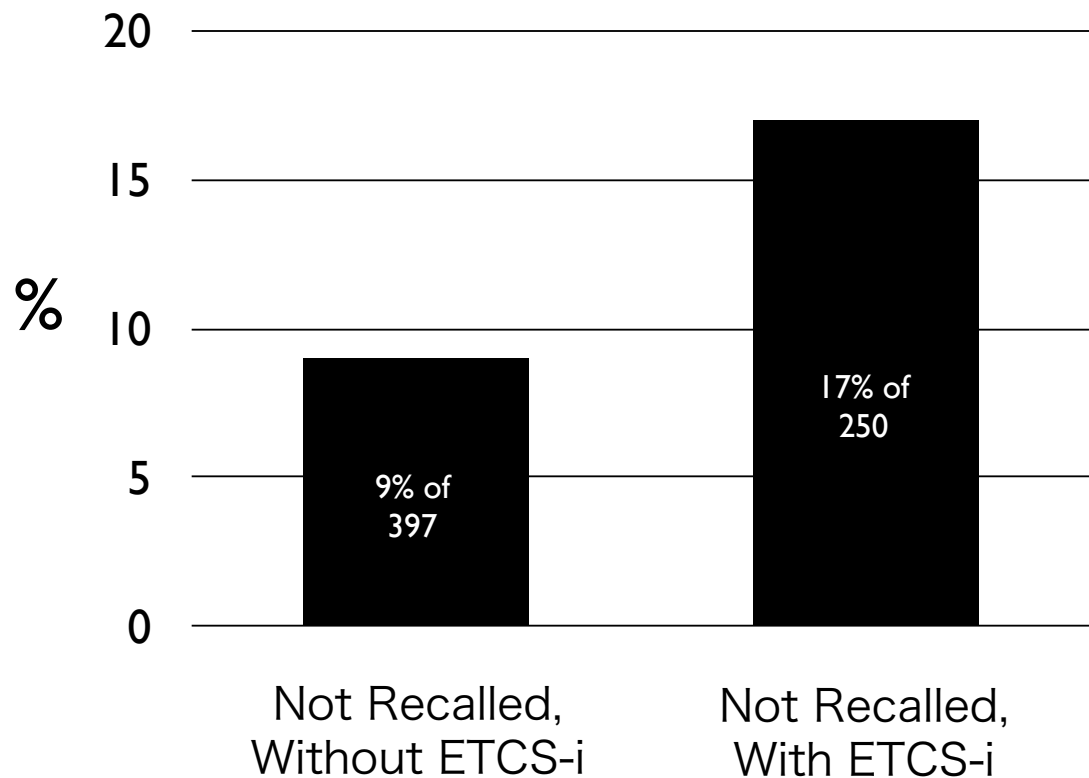
* Note that data for model years 2004, 2008, and 2009 are missing
due to inadequate documentation of the engine codes.

What about the effect of publicity on consumer complaints to NHTSA about related investigations?

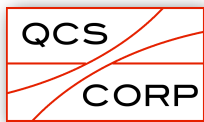
If there was an effect, it can't have influenced complaints before the investigations were announced.



Toyota Camry: Percentage of Complaints Related to Speed Control, Model Years 1999-2003, Before March 3, 2004 (PE04-021 Announced)

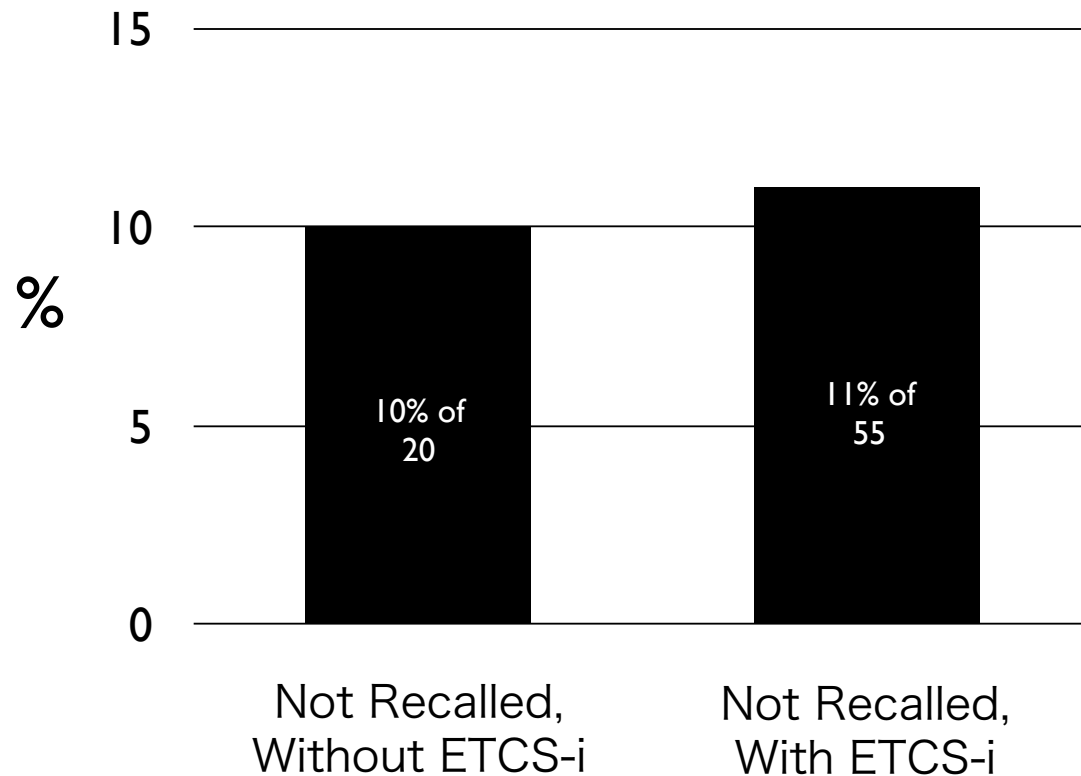


Null Hypothesis II Rejected,
Fisher's Exact Test (2-Tail),
 $p = 0.0018$

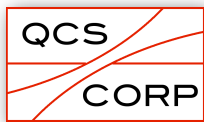


Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp.

Lexus ES 300 Series: % of Complaints Related to Speed Control, Model Years 1999-2003, Before March 3, 2004 (PE04-021 Announced)

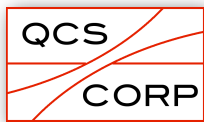
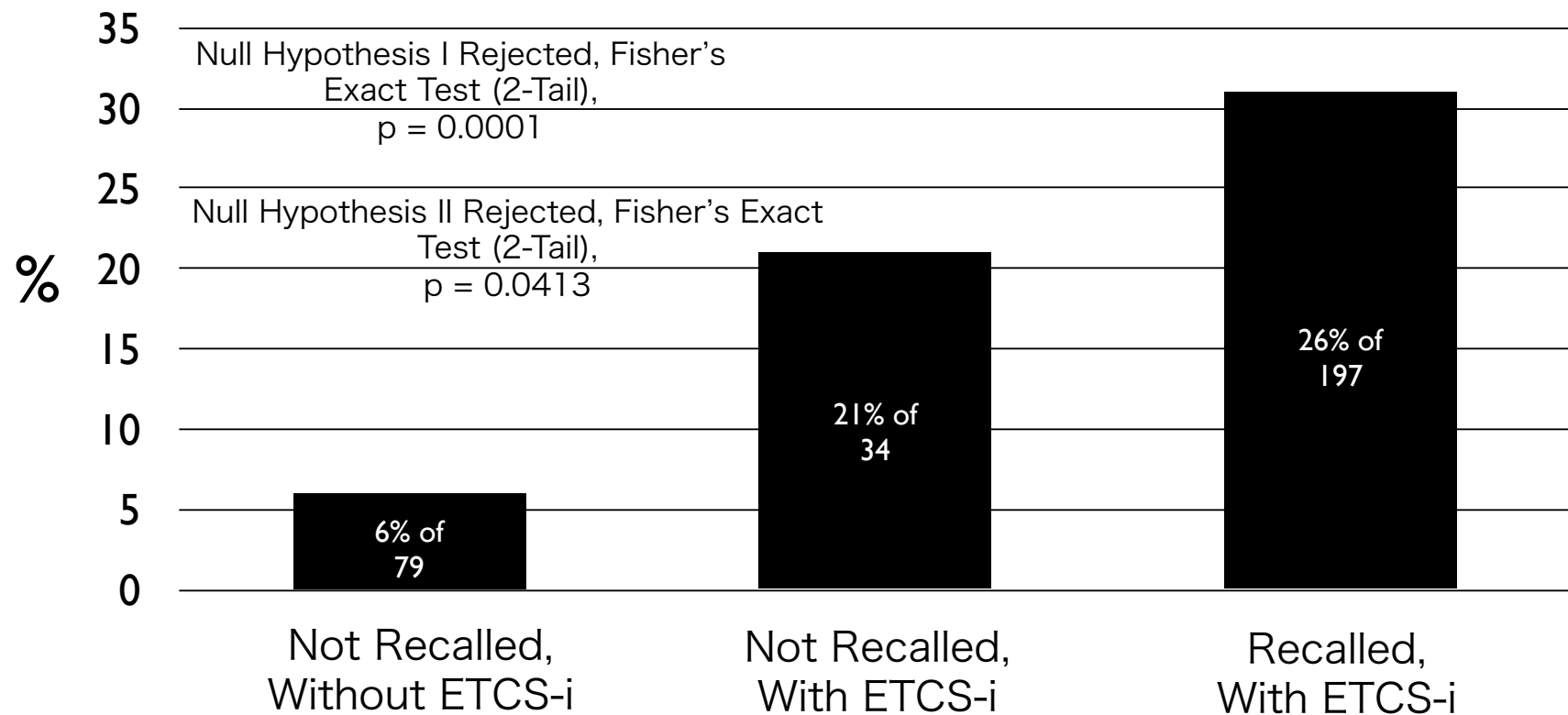


Null Hypothesis II Not Rejected,
Fisher's Exact Test (2-Tail),
 $p = 1.0$



Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp.

Toyota Tacoma: Percentage of Complaints Related to Speed Control, Model Years 2002-2003, 2005-2007, Before January 31, 2008 (DP08-001 Announced)

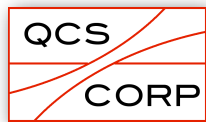


Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 24, 2009
Compiled by Quality Control Systems Corp.

* Note that data for model years 2004, 2008, and 2009 are missing due to inadequate documentation of the engine codes.

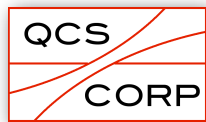
Is a complaint with a “Vehicle Speed Control” component coded really an unintended acceleration complaint?

Certainly not always. Alternative approaches include manual review of the complaint narrative, a computer-based query of keywords, or a combination of these two.



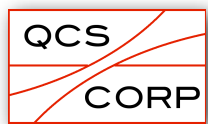
What effect does time in service have?

Control for “years in service.”



What about “normalizing” the data?

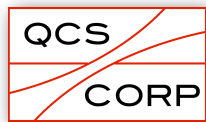
Calculating rates based on production data
is one possibility.



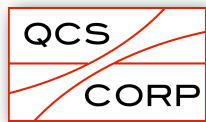
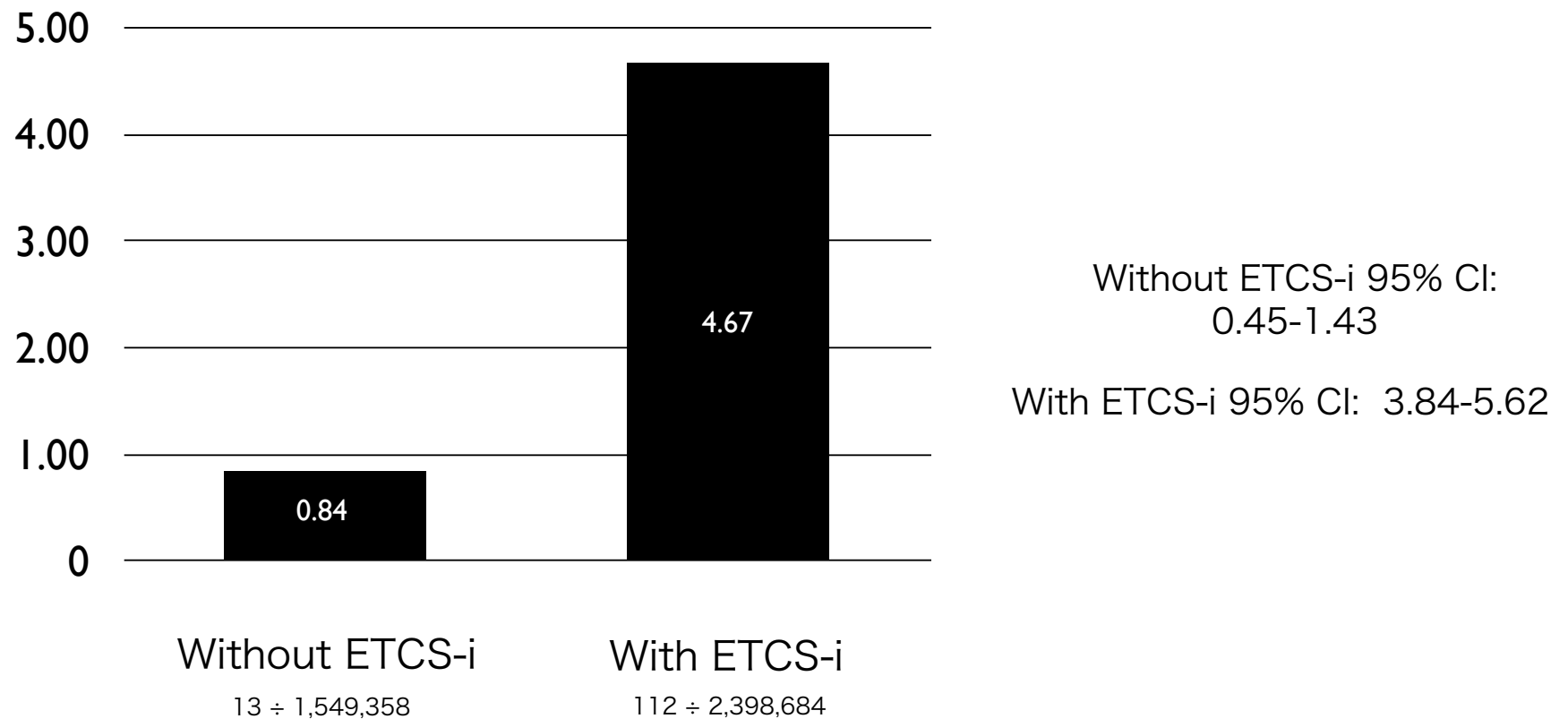
What if you included vehicles without VINs based on the make, model, and model year coded in the complaint?

What if you assumed the Camry and ES 300 series all had ETCS-i beginning in MY 2002?

What if you assumed the Tacomas all had ETCS-i beginning in MY 2003 (even though they don't)?

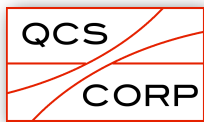
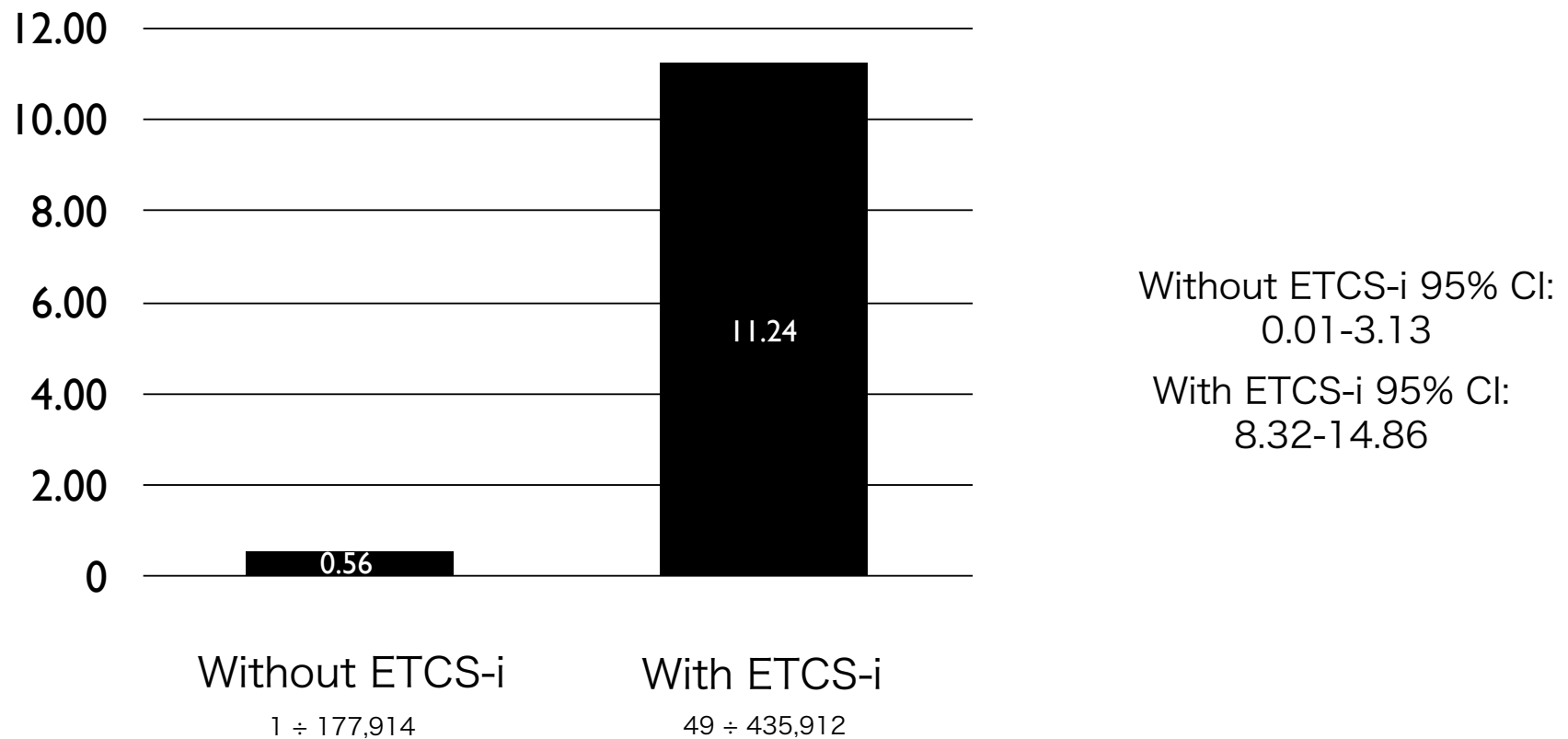


Toyota Camry: Unintended Acceleration Complaint Rates
Per 100K Units Produced. Calculated for First Calendar Year After
Model Year Introduction. MY 1998-2007. Prior to 8/28/2009.



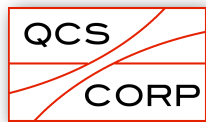
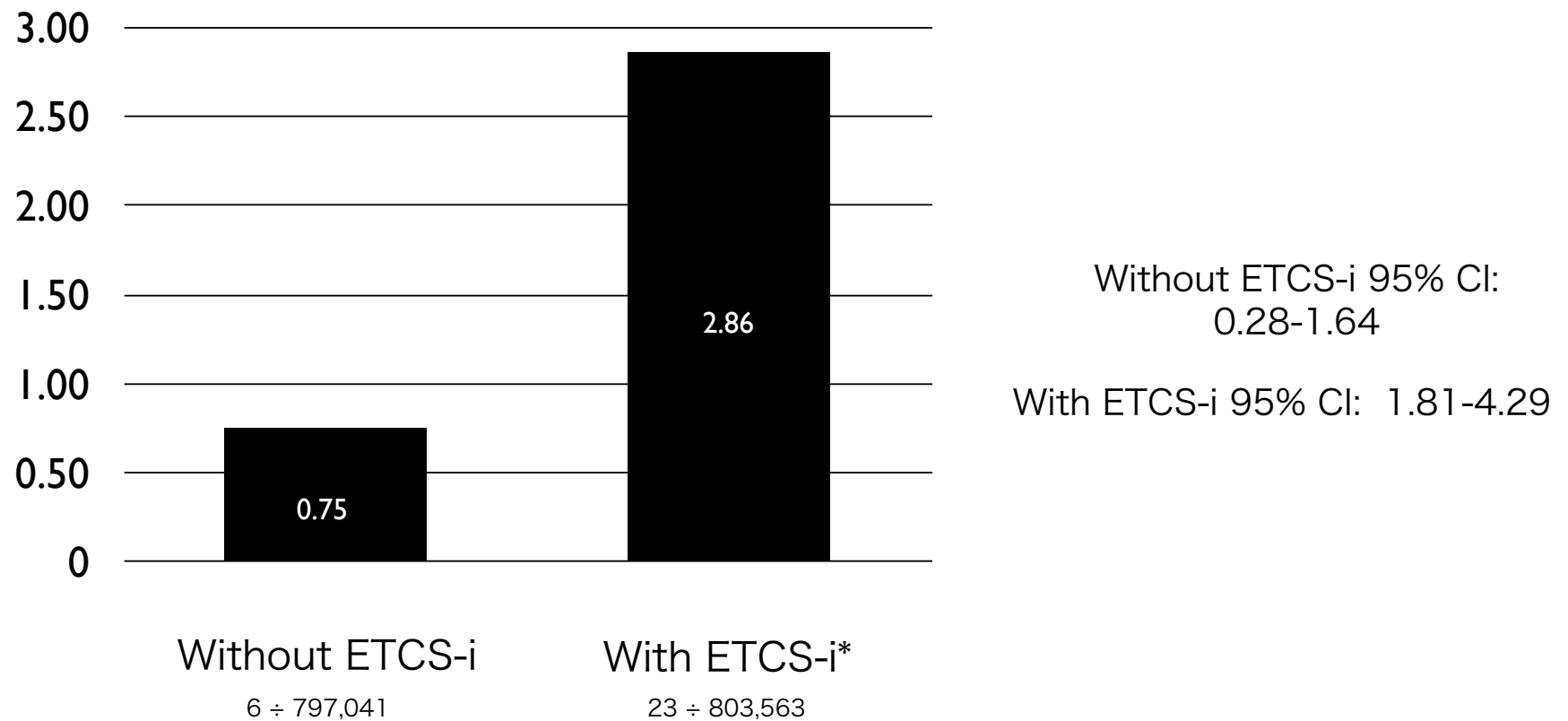
Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 27, 2009
Compiled by Quality Control Systems Corp.

Lexus ES 300 Series: Unintended Acceleration Complaint Rates Per 100K Units Produced. Calculated for First Calendar Year After Model Year Introduction. MY 1998-2007. Prior to 8/28/2009.



Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 27, 2009
Compiled by Quality Control Systems Corp.

Toyota Tacoma: Unintended Acceleration Complaint Rates
Per 100K Units Produced. Calculated for First Calendar Year After
Model Year Introduction. MY 1998-2007. Prior to 8/28/2009.



*Note: this category likely includes some misclassified engines.

Source: NHTSA, Office of Defects Investigation,
Consumer Safety Complaints through August 27, 2009
Compiled by Quality Control Systems Corp.

Some incidents are caused
by floor mats and sticky pedals
based on consumers' descriptions

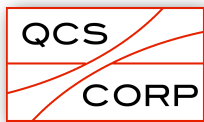
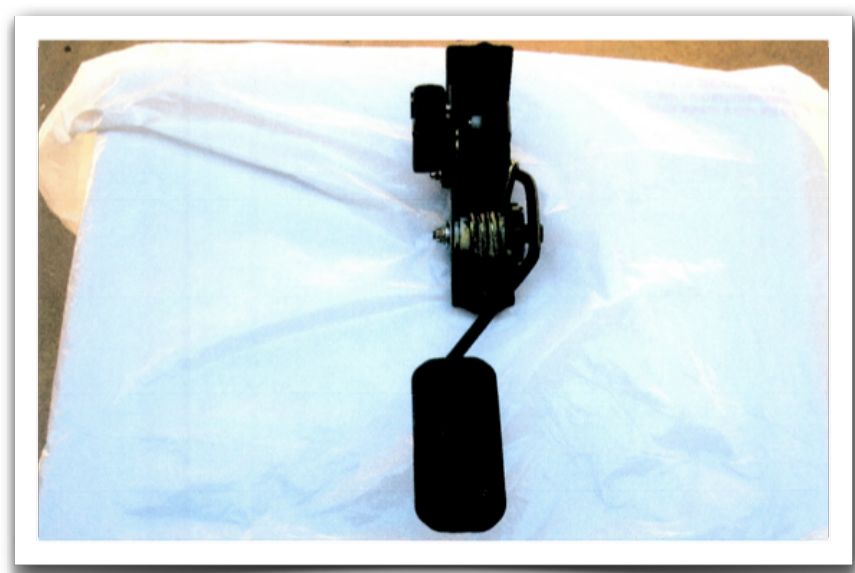


Photo Source: NHTSA, Office of Defects Investigation

Some incidents are also caused
by pedal misapplication
based on consumers' descriptions

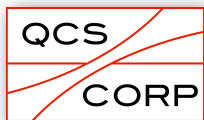
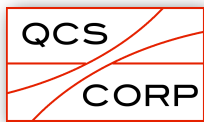


Photo source: NHTSA

Is a complaint with a “Vehicle Speed Control” component coded really an unintended acceleration complaint?

The association of complaints related to unintended acceleration that are coded as “Vehicle Speed Control” has changed since the Saylor Family crash. Narrative analyses are essential and can be based on key words and phrases.

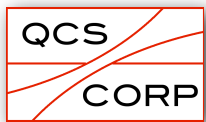


“Unintended acceleration? They all do it.”

In fact, the data show they don't all do it at the same rate.

Rate-based comparisons of UA are helpful when they are based on theories related to actual differences in vehicle design.

Differences in rates of UA may be important clues in focusing engineering analyses on specific problems in design, manufacturing, and testing.



How likely is it that these factors...

Vehicle Factors:

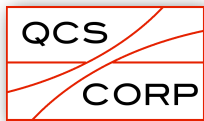
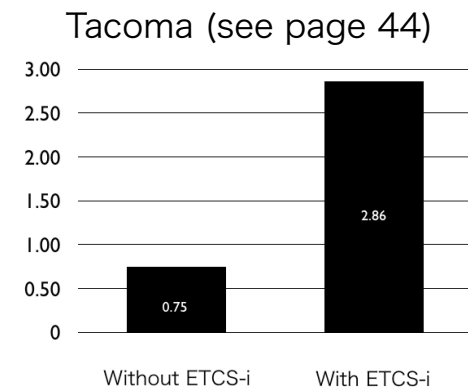
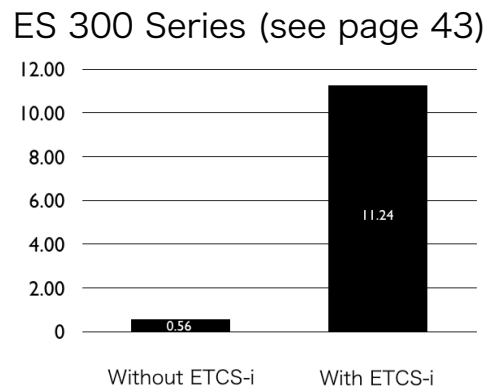
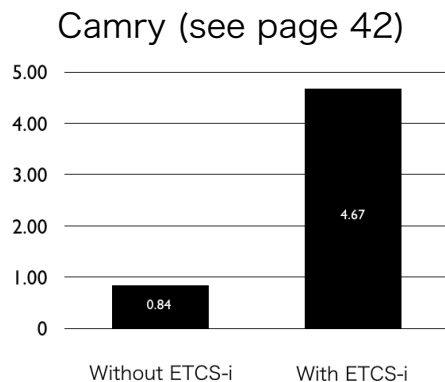
Floor mats
Sticky pedals
Pedal placement
Gated gear shift pattern
Ignition switch design

Driver Factors:

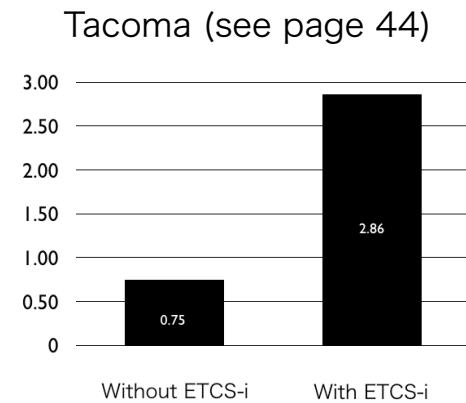
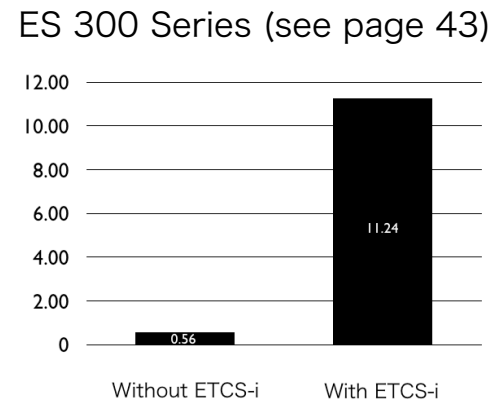
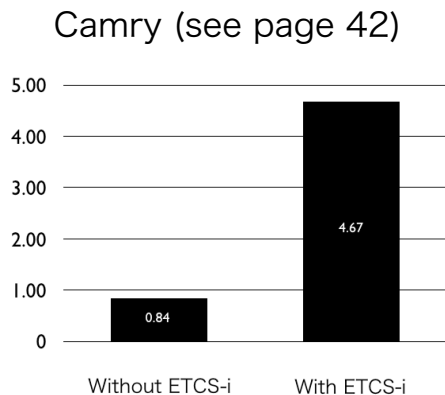
Mass hysteria
Fraud
Old age
Youth
Inexperience
Incompetent drivers

Environmental/Usage Factors

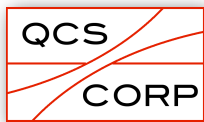
...explain these results when controlling for make/model and years in service?



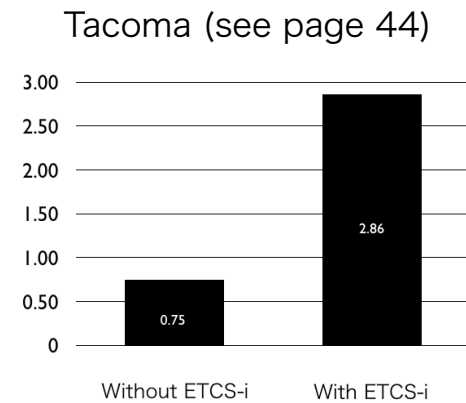
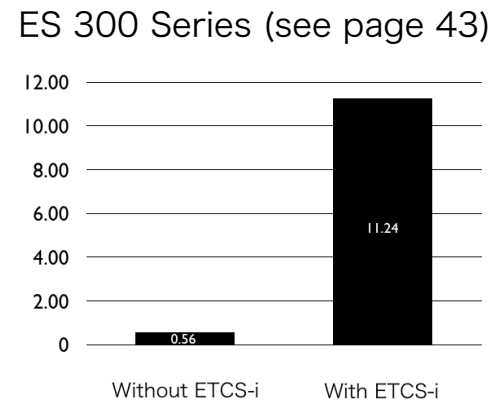
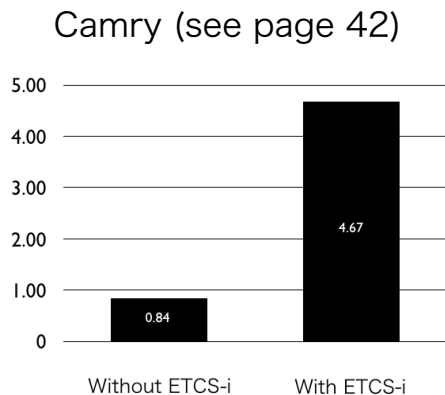
To the degree that electronic control systems explain large differences in rates of unintended acceleration...



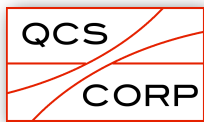
...countermeasures must be directed to the design, manufacture, and testing of these systems.



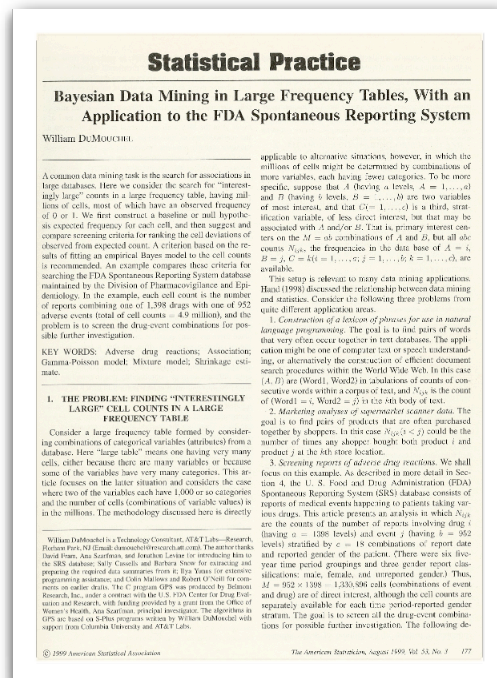
To the degree that electronic control systems explain large differences in rates of unintended acceleration...



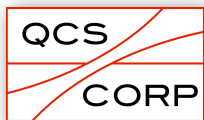
...it is crucial to monitor the performance of these systems for indications of failure.



Guidance for surveillance of “spontaneous reporting systems” is well developed in the scientific literature



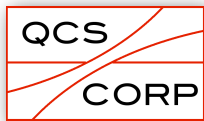
William DuMouchel, “Bayesian data mining in large frequency tables, with an application to the FDA spontaneous reporting system,” *American Statistician*, 1999; 53:177–90.



Guidance for surveillance of “spontaneous reporting systems” is well developed in the scientific literature



William DuMouchel,
“Bayesian
Measurement of
Associations in
Adverse Drug
Reaction Databases,”
SAMS I Workshop on
Data Mining and
Machine Learning,
September 8, 2003.



NHTSA's Early Warning Reporting data allows surveillance for potential motor vehicle defects using statistical techniques for exploratory analysis

DEFECTS & RECALLS



EARLY WARNING REPORTING

Manufacturer Login

INFORMATION	DOWNLOADS	DOCUMENTS
Getting Started FAQ News US State Codes & Foreign Country Names NEW! Search EWR Data	Microsoft® Excel Templates XML Instances XML Schema NHTSA EWR XML Validator Contact EWR Helpdesk (202) 366-3348 mfewrhelpdesk@dot.gov	EWR Manufacturer Account Application Compendiums Confidentiality Requests Legal Interpretations Field Report Submissions WinSCP Instructions PSFTP Instructions

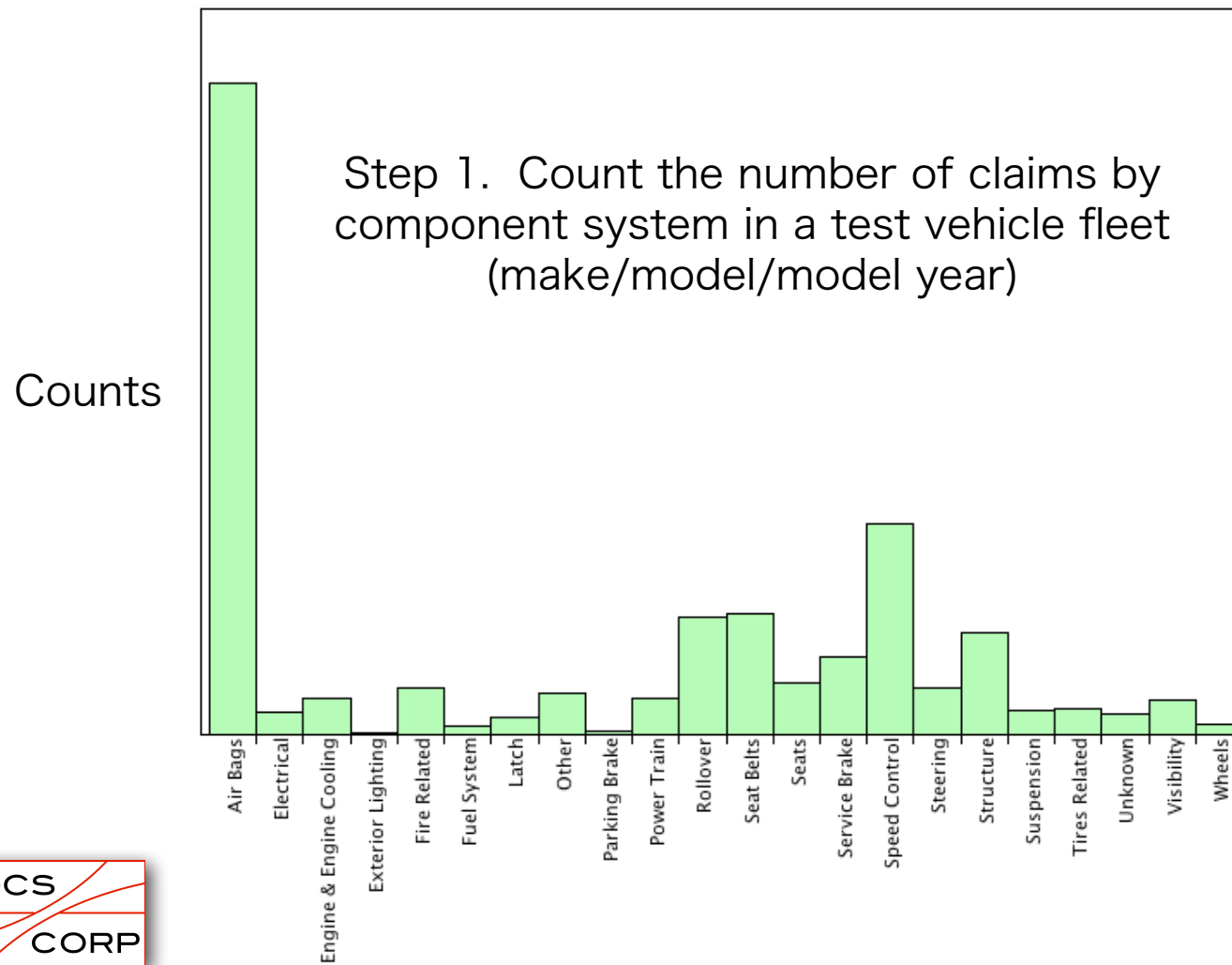
The following table lists the EWR submission time periods for Aggregate data, Death and Injury data, Field Reports, and Substantially Similar Vehicles for the most recent quarter.

Year	Quarter	Report Type	Begin Date	End Date	Days
2010	3	Aggregate	10/1/2010	11/30/2010	60
		Death and Injury	10/1/2010	11/30/2010	60
		Field Reports	10/1/2010	12/15/2010	75
		Substantially Similar Vehicles	8/2/2010	11/1/2010	91

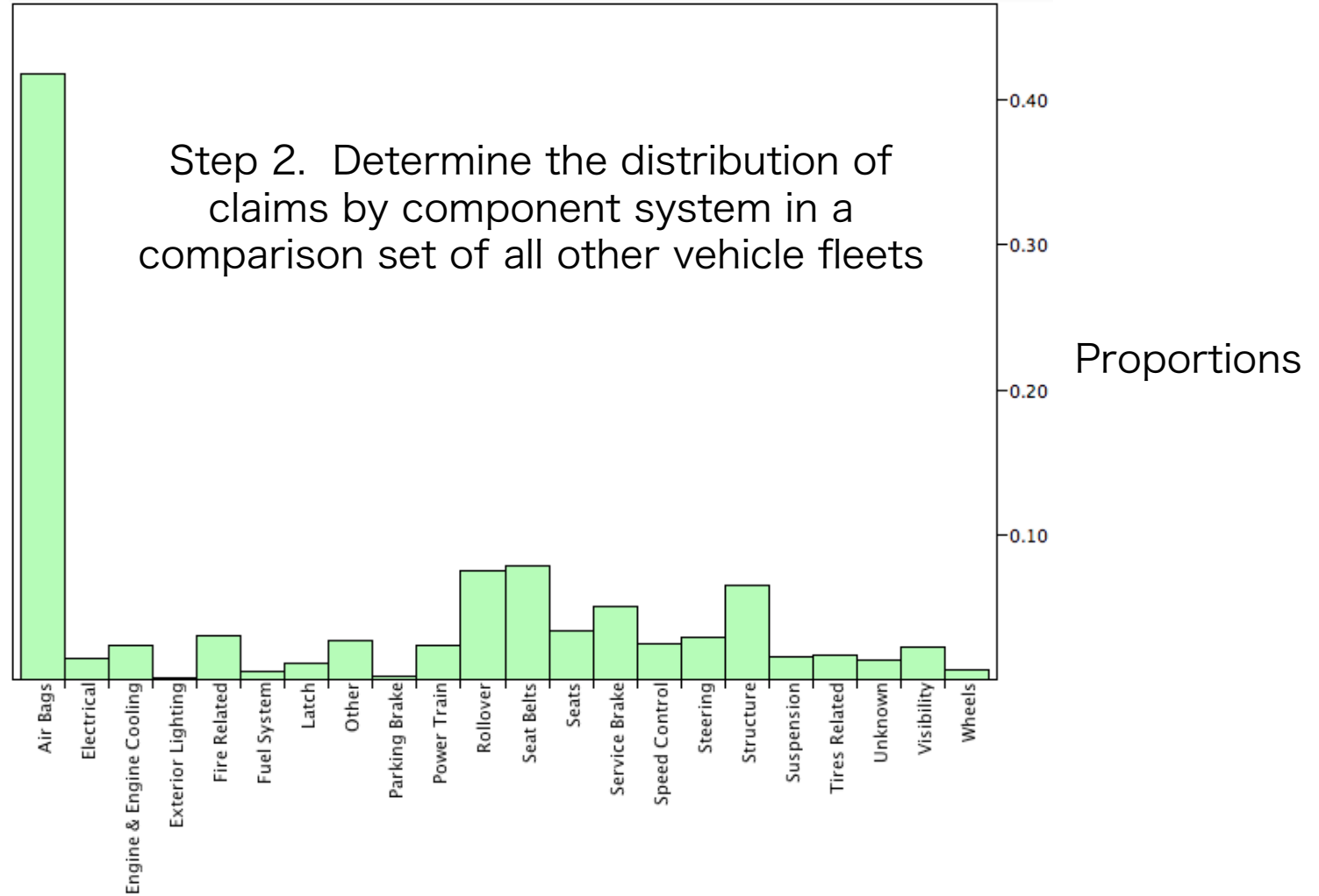
Last updated September 16, 2010



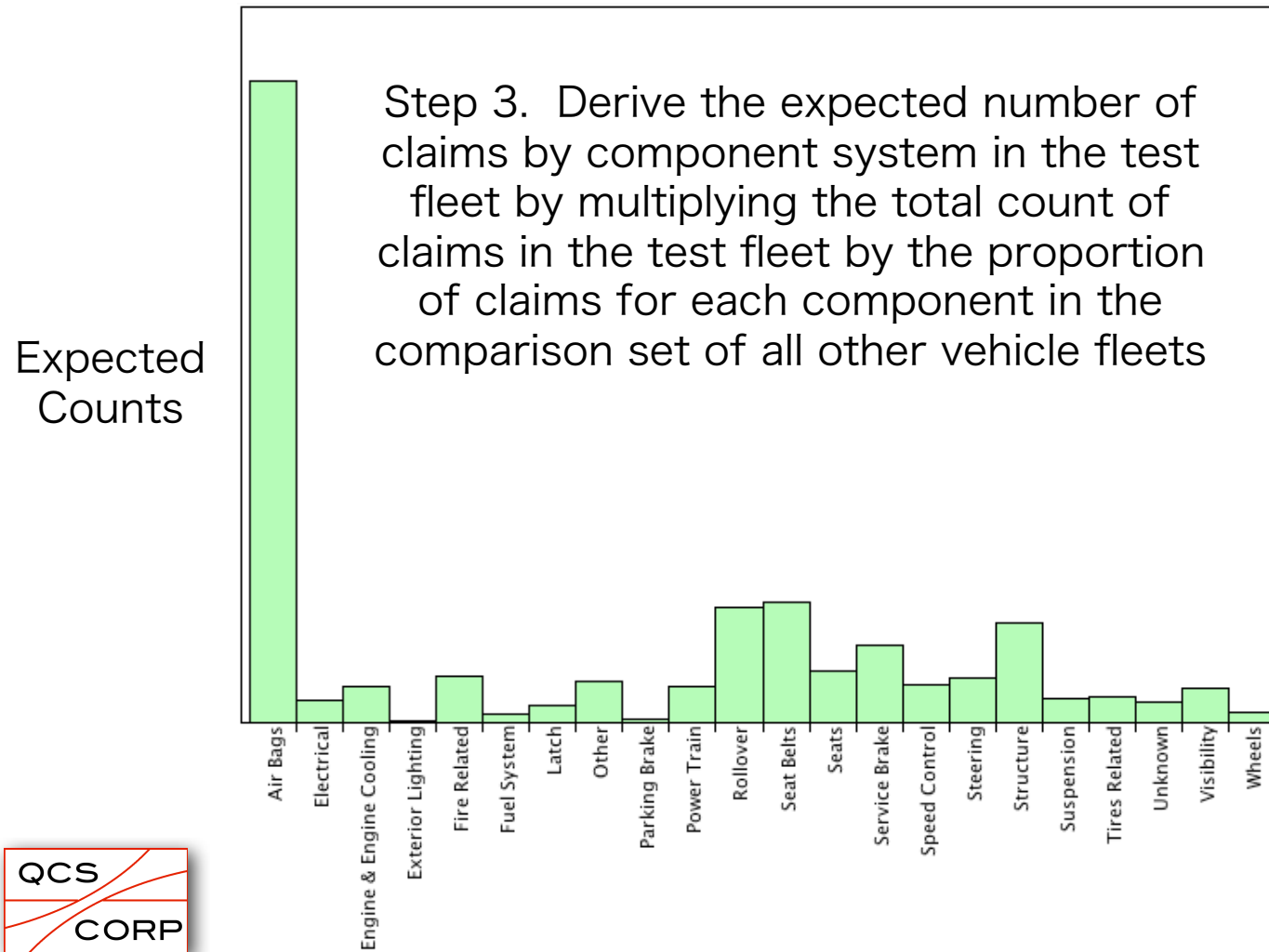
Illustrative example of potential defect surveillance with NHTSA's Early Warning data for injury claims



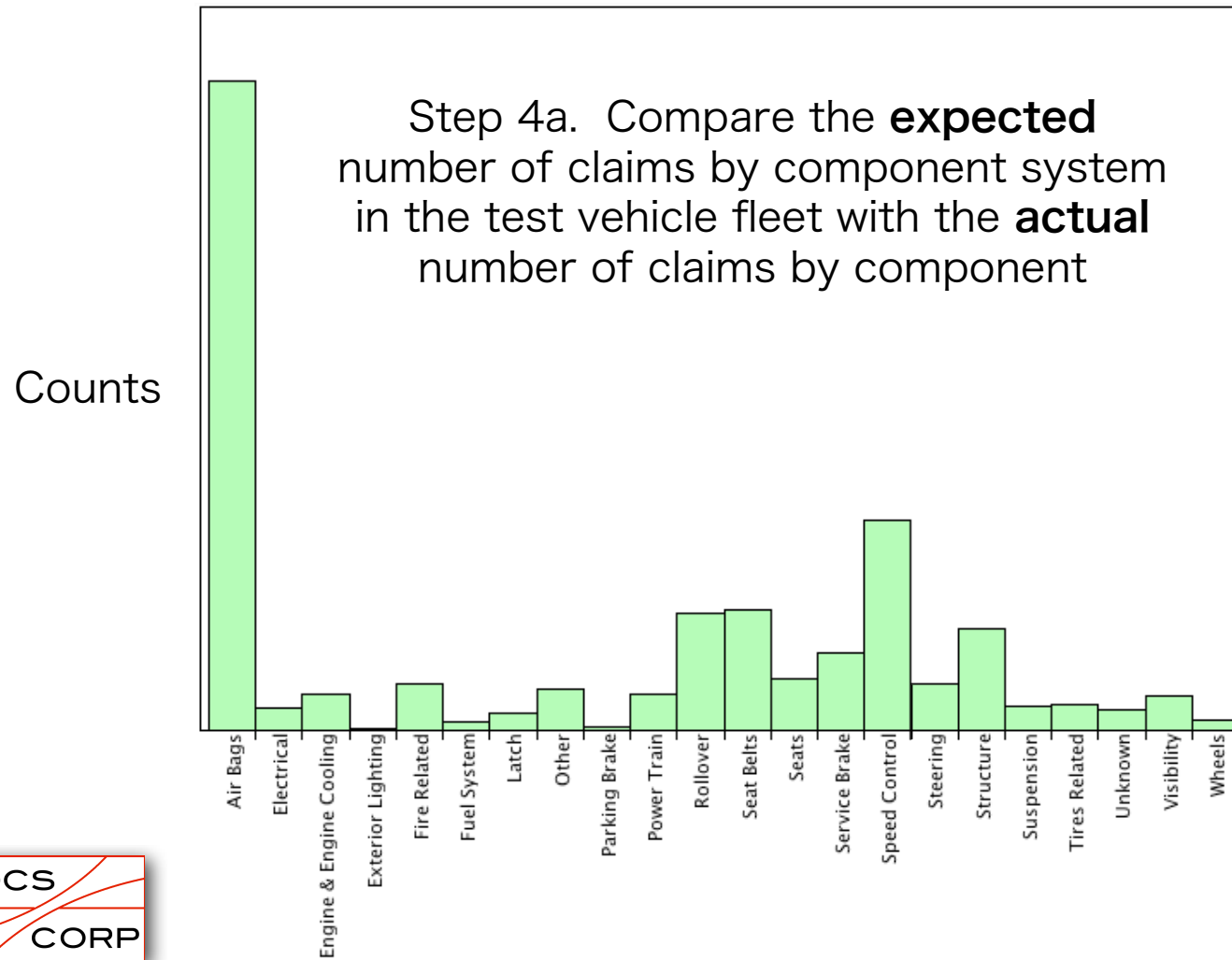
Illustrative example of potential defect surveillance with NHTSA's Early Warning data for injury claims



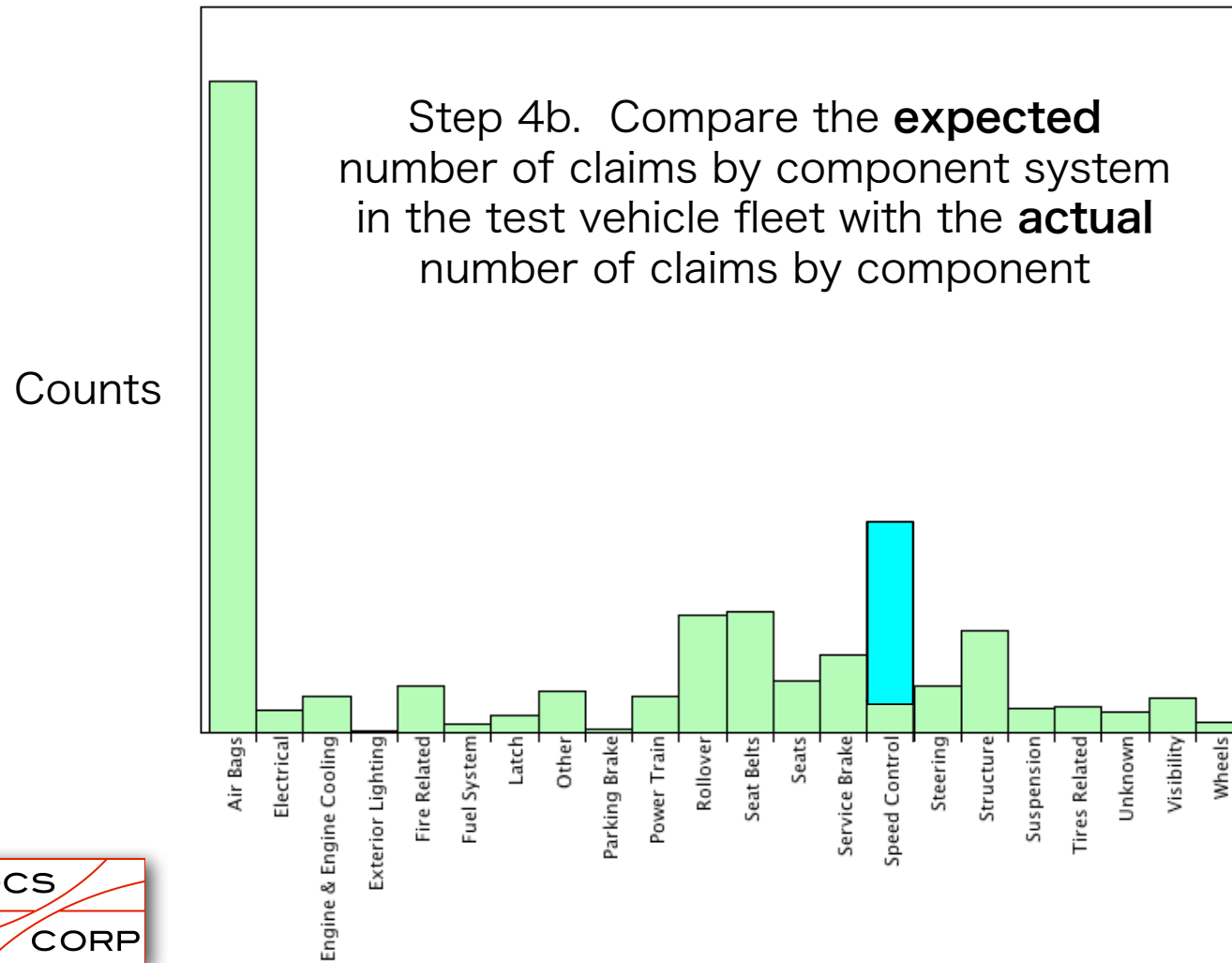
Illustrative example of potential defect surveillance with NHTSA's Early Warning data for injury claims



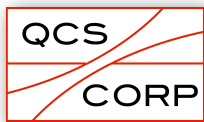
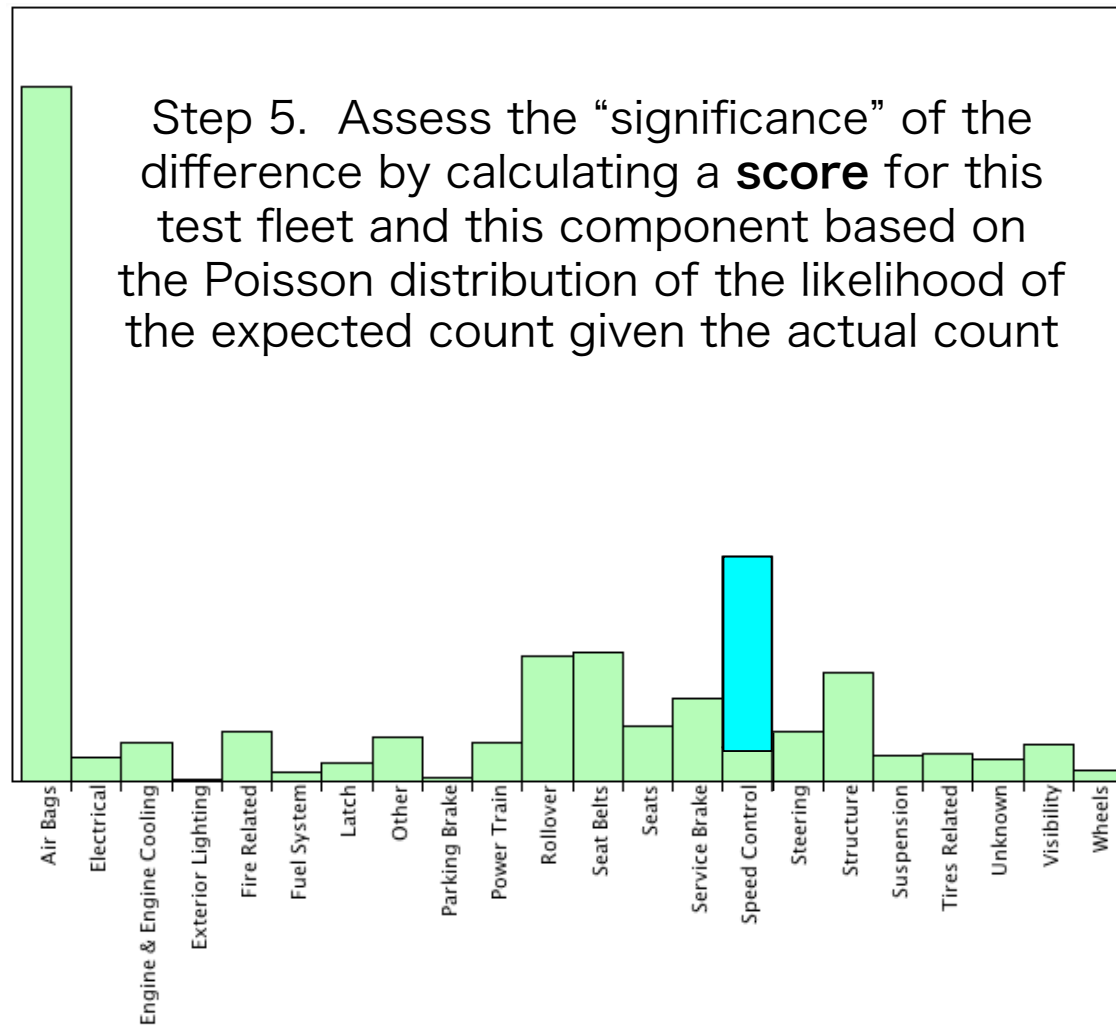
Illustrative example of potential defect surveillance with NHTSA's Early Warning data for injury claims



Illustrative example of potential defect surveillance with NHTSA's Early Warning data for injury claims



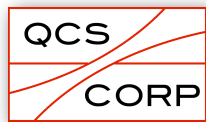
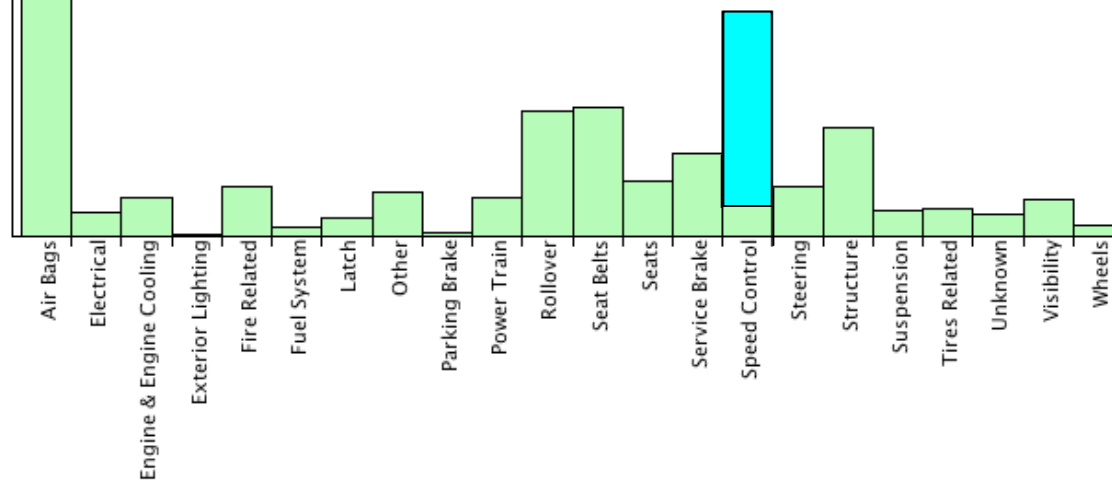
Illustrative example of potential defect surveillance with NHTSA's Early Warning data for injury claims



Illustrative example of potential defect surveillance with NHTSA's Early Warning data for injury claims

Step 6. Calculate similar scores for every component in every fleet in the dataset

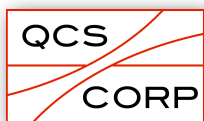
Fleet and Component	Score
FORD TRUCK EXPLORER 4D 4X2 2002 Visibility	4.63635962
FORD TRUCK F350 CREW C PU 4X4 2004 Engine & Engine Cooling	4.18304586
JEEP LIBERTY 4D 4X4 2002 Suspension	4.41496598
LEXUS ES 350 4D 2007 Speed Control	8.34231273
TOYOTA CAMRY 4D 2WD 2007 Speed Control	4.20014243



Example of a potential defect surveillance list based on NHTSA's Early Warning data for injuries

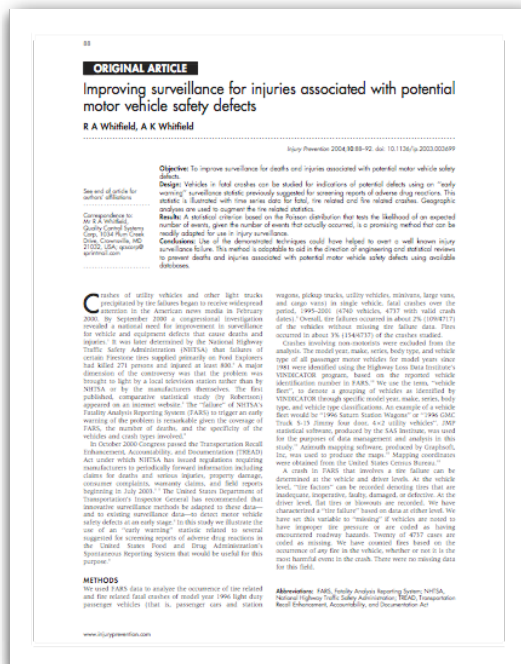
Step 7. Rank the scores in a list

This Period	Fleet - Component	Last Period	Times on List	Notes
1	LEXUS ES 350 4D 2007 - Speed Control	-	3	Possibly related recall <u>07E082000</u>
2	FORD TRUCK EXPLORER 4D 4X2 2002 - Visibility	3	10	Possibly related recall <u>07E104000</u> Possibly related "special service campaign" <u>01I010000</u>
3	JEEP LIBERTY 4D 4X4 2002 - Suspension	-	1	Possibly related recall <u>03V460000</u>
4	TOYOTA CAMRY 4D 2WD 2007 - Speed Control	-	1	Possibly related recall <u>07E082000</u>
5	FORD TRUCK F350 CREW C PU 4X4 2004 - Engine & Engine Cooling	-	1	Possibly related petition, but no recall <u>DP05005</u>

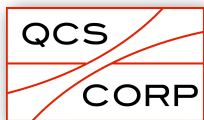


Source: NHTSA, Office of Defects Investigation, Early Warning Reporting data through the first quarter of 2008, Rankings by Quality Control Systems Corp.

Technical details and examples are described here:

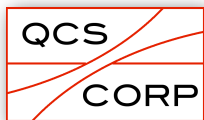


R. A. Whitfield, and
Alice K. Whitfield,
"Improving
Surveillance for
Injuries Associated
with Potential Motor
Vehicle Safety
Defects." Injury
Prevention, April 2004,
10:88-92.



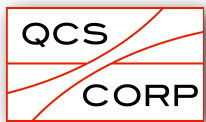
Statistical surveillance techniques are known to work for problems involved in unintended acceleration from NHTSA's Early Warning Reporting injury claims data

This Period	Fleet - Component	Last Period	Times on List	Notes
1	LEXUS ES 350 4D 2007 - Speed Control	-	3	Possibly related recall 07E082000
2	FORD TRUCK EXPLORER 4D 4X2 2002 - Visibility	3	10	Possibly related recall 07E104000 Possibly related "special service campaign" 01I010000
3	JEEP LIBERTY 4D 4X4 2002 - Suspension	-	1	Possibly related recall 03V460000
4	TOYOTA CAMRY 4D 2WD 2007 - Speed Control	-	1	Possibly related recall 07E082000
5	FORD TRUCK F350 CREW C PU 4X4 2004 - Engine & Engine Cooling	-	1	Possibly related petition, but no recall DP05005

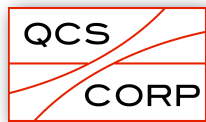


Source: NHTSA, Office of Defects Investigation, Early Warning Reporting data through the first quarter of 2008, Rankings by Quality Control Systems Corp.

There is no certainty that any vehicle / component identified as a candidate for further review by these methods will have a safety related defect.

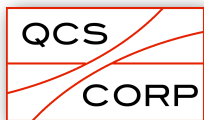


It is unlikely that only vehicles / components with high surveillance scores could have a safety related defect.



Integration with recall data is extremely helpful, especially to recognize possibly ineffective recalls

This Period	Fleet - Component	Last Period	Times on List	Notes
1	LEXUS ES 350 4D 2007 - Speed Control		0	Possibly related recall 07E082000
2	FORD TRUCK EXPLORER 4D 4X2 2002 - Visibility	3	10	Possibly related recall 07E104000 Possibly related "special service campaign" 01I010000
3	JEEP LIBERTY 4D 4X4 2002 - Suspension	-	1	Possibly related recall 03V460000
4	TOYOTA CAMRY 4D 2WD 2007 - Speed Control		1	Possibly related recall 07E082000
5	FORD TRUCK F350 CREW C PU 4X4 2004 - Engine & Engine Cooling	-	1	Possibly related petition, but no recall DP05005



Source: NHTSA, Office of Defects Investigation, Early Warning Reporting data through the first quarter of 2008, Rankings by Quality Control Systems Corp.

Integration with related complaint data is also helpful to understand the context of identified issues

This Period	Fleet - Component	Last Period	Times on List	Notes
1	LEXUS ES 350 4D 2007 - Speed Control	-	3	Possibly related recall 07E082000
2	FORD TRUCK E 2002 - Visibility			
3	JEEP LIBERTY - Suspension			
4	TOYOTA CAMR Speed Control			
5	FORD TRUCK F 2004 - Engine &			

SEARCH FOR COMPLAINTS

You are here: [Home](#) / [Vehicle Owners](#) / [Search Complaints](#) [Help](#)

The **Safety Complaints Search Engine** allows searches of safety-related complaints about motor vehicles and motor vehicle equipment by make, model and year.

If known, enter the complaint ODI number(s) in the text box on the left below. Otherwise select Vehicle, Equipment, Child Restraint or Tires from the list on the right below. Then use the appropriate Search button to continue.

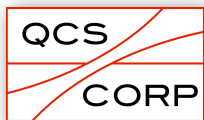
Select » **1** Type **2** Year **3** Make **4** Model **5** Component

Select the TYPE of Search

NHTSA ODI Number(s):
(e.g. 1038567,1039464)

(Multiple ODI numbers must be separated by commas)

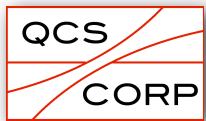
☒ Vehicle
☐ Equipment
☐ Child Restraint
☐ Tires



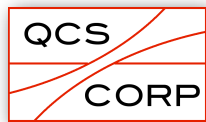
Source: NHTSA, Office of Defects Investigation

Related technical report and
sponsorship details are available at:

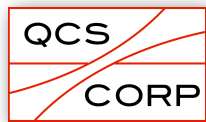
<[http://www.safetyresearch.net/Library/
QCSRReport00203.pdf](http://www.safetyresearch.net/Library/QCSRReport00203.pdf)>



The statistical research involving NHTSA's Early Warning Reporting System and the associated, published article on surveillance for motor vehicle safety related defects was supported solely by Quality Control Systems Corp.



Note that statistics involving NHTSA's Consumer Safety Complaint data were developed for research projects sponsored by law firms representing plaintiffs in litigation with Toyota Motor Company.



Thank You.