



Ohio E-Check Annual Report

2014

This document is the 2014 Annual Report for the United States Environmental Protection Agency (U.S. EPA) on the Ohio Enhanced Inspection and Maintenance Program (I/M Program) known as E-Check. This report covers January 1 to December 31, 2014.

Ohio Vehicle
Inspection and
Maintenance
Program

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1 Executive Summary

This document is the 2014 Annual Report for the United States Environmental Protection Agency (U.S. EPA) on the Ohio Enhanced Inspection and Maintenance Program (I/M Program) known as E-Check. This report covers January 1 to December 31, 2014.

This annual report is required by U.S. EPA under 40 CFR 51.366. U.S. EPA requires this report to cover four categories of information:

- emissions test data;
- quality assurance information;
- quality control information; and
- compliance and enforcement actions.

In the spring of 2013, the Ohio legislature passed, Ohio Revised Code 4503.103 effective July 1, 2013, that allows all types of vehicles to be registered for up to five years. The law recognizes the requirement to continue biennial vehicle emissions testing despite a vehicle being registered for up to five years. The law allows the Bureau of Motor Vehicles to suspend the vehicle's registration and confiscate the license plates if the vehicle is not tested every two years within an extended registration period.

Also, during this time period the I/M program rules Chapter 26 were under the 5 year review. In order to simplify the extension process, the rule was revised so that all types of extensions will be for six months instead of any that had been for four months. This change simplifies the tracking, notifying and enforcing compliance with the extension certificate. The Ohio EPA Mobile Sources Section worked with the BMV to implement the above changes by June 30, 2014.

1.1 Major Findings

Emissions Tests Conducted

In 2014, 843,586 vehicle emission tests were performed, including initial tests, retests, and off-cycle tests due to change of ownership/registration. Only 1,197 of the emission tests performed were opacity tests on diesel-fueled vehicles.

Compliance and Enforcement

In 2014, 12,254 vehicles, or 1.5 percent of the vehicles that were emission tested, received a waiver. Some of the vehicles that initially failed E-Check did not obtain a passing test or waiver.

In 2014, 19 investigations by Ohio BMV's Special Investigations Unit were initiated for E-Check-related vehicle registration violations which resulted in one criminal

prosecution. Registration cancelation resulted in 12 of the cases, while 7 resulted in address compliance.

Emissions Reductions from Tailpipe Tested Vehicles

In 2014 there were 9,670 vehicles that initially failed the tailpipe test. The number of vehicles that failed the initial tailpipe test and passed at a later date following repairs was 4,475. The repaired vehicles had an average emission improvement of 72 percent for hydrocarbon, 87 percent for carbon monoxide, and 62 percent for oxides of nitrogen. Of the 843,586 emissions tests performed in 2014, 88 percent were completed using OBD, and 12 percent received a “tailpipe” test.

Quality Assurance

In 2014, Ohio EPA performed 4,040 site audits to determine if stations are correctly performing all emissions tests and if the station’s physical conditions meet all state requirements. As a result of these audits, there were no performance issues identified that warranted shutting down a station.

2 The Ohio I/M Program

2.1 Purpose and Statistics of the Ohio E-Check Program?

The northeast Ohio area has been officially designated as attaining the 1997 ozone standard of 0.08 ppm. However, there are measured violations of the 2008 ozone standard of 0.075ppm. In 2012, the U.S. EPA designated the Cleveland-Akron area as marginal nonattainment. The nonattainment designation means that Ohio EPA will need to find additional emission reductions of volatile organic compounds (VOC) and nitrogen oxides (NOx) in order to attain the 0.075 ppm standard. Although designated as marginal nonattainment, as a practical matter, Ohio EPA will need to maintain the current program in the Cleveland area to maintain the emission reductions from the program.

Ohio EPA administers the vehicle emissions testing program, or E-Check, as authorized by Ohio Revised Code (ORC) 3704.14. The goals of the E-Check program are to identify gross-polluting vehicles for repair, and provide a fair and accurate test with minimum inconvenience to Ohio’s motorists. In 1996, Ohio contracted with Envirotest Systems to operate the Ohio I/M Program in the Dayton-Springfield, Cincinnati, and Akron-Cleveland areas. In 2005, the contract was extended for an additional two years in northeast Ohio with Envirotest Systems. In 2007, the contract was extended for an additional six months in northeast Ohio. Envirotest Systems was awarded a one-year contract in early 2008 to continue providing motor vehicle emission tests to motorists through June 2009. A six month extension was granted in June 2009. The contract was renewed in October 2009 with Envirotest Systems until the end of June 2011. Beginning July 1, 2011, the contract was extended for one year until June 30, 2013.

In the summer of 2011, the Ohio legislature passed legislation for Ohio to implement a decentralized program by June 30, 2012. In January 2012, Envirotec Systems won a three year contract to implement a decentralized vehicle testing program beginning June 4, 2012. The decentralized program involved adding 37 Lube Stops, 16 independent repair shops and 16 self-service testing kiosks to the 23 existing testing stations. All of the new testing options only provide OBDII testing. The existing stations maintained the ability to perform OBDII, dynamometer, idle tail pipe and opacity testing.

2.1.1 Ohio I/M Program Summary

40 CFR 51.366 (d) (1) (i) An estimate of the number of vehicles subject to the inspection program, including the results of analysis of the registration database;

In 2014, 815,316 vehicles were expected to undergo emission testing. In 2014, vehicles were exempted from the emissions testing process if they were:

- model year 1989 or older;
- model year 2011 or newer;
- greater than 10,000 pounds gross vehicle weight rating;
- motorcycles, recreational vehicles and motor homes; or
- vehicles operating on alternative fuels, such as propane or natural gas

Vehicles are required to have a valid vehicle emission certificate every other year or when transferred to a new owner if not tested within 365 days of the previous test.

2.1.2 Inspection Stations

40 CFR 51.366 (b)(1)(i): The number of inspection stations and lanes operating throughout the year:

In July of 2012, an additional 53 OBDII only inspection stations were added to the existing network of 23 testing stations. A total of 76 stations and 132 lanes conducted emissions tests in 2014. Also in July of 2012, self-serve testing kiosks were installed at 16 of the existing testing locations operated by Envirotec Systems. In 2014 there were 28,351 OBD II tests successfully conducted using the self-serve kiosks.

The 53 OBDII only inspection stations are operated by a variety of independent businesses while the 23 existing E-Check stations and 16 self-serve kiosks continue to be operated by Envirotec Systems.

2.1.3 Inspectors

40 CFR 51.366 (b) (5) The number of inspectors licensed or certified to conduct testing;

Table 1: Number of Inspectors in 2014

	# of Inspectors
Trained and Licensed to conduct testing in 2014	455

2.1.4 Emissions Tests Administered

The Ohio I/M Program uses five different emissions tests. Gasoline-fueled vehicles receive gas cap tests and one of the following tests: On-Board Diagnostic (OBD II), transient (tailpipe), or two-speed idle (tailpipe). Diesel-fueled vehicles receive an OBD II or opacity test. Each type of test is described below. All vehicles also are visually inspected to confirm that a gas cap and catalytic converter are present. If a vehicle fails the visual inspection, it fails the overall test, even if it passed the emissions portion of the test. Fails for vehicles not having a catalytic converter do not receive an emissions test but do receive the gas cap test.

1. Gas cap tests check the vehicle's gas cap pressure to ensure the cap seals tightly and does not allow fuel vapors to evaporate into the air. If the vehicle fails the gas cap test, it fails the overall emissions test, even if the vehicle passed the exhaust portion of the test.
2. On-Board Diagnostics: On-board diagnostics (OBD II) is a complex computer pack installed on 1996 and newer cars and light trucks and 1997 and newer diesel vehicles. The computer continuously tracks and stores information about a vehicle's performance. The on-board computer turns on the "check engine" light if it finds a problem with a vehicle's emission control system. On January 5, 2004, Ohio began testing vehicles equipped with the OBD II systems. During the initial test in a vehicle's test cycle that is 2000 model year or older with 3 or more readiness monitors not set to ready, or vehicles that are 2001 or newer with 2 or more readiness monitors not set, the vehicle may be tested with the tailpipe test. In 2014, 88.1 percent of emissions tests were completed using the OBD II system.
3. Transient tailpipe tests are used for most gasoline-powered vehicles that are not equipped with the OBD II equipment. For this test, Acceleration Simulation Mode (ASM 2525) standards are used. Vehicles are placed on a dynamometer, a treadmill-like device that puts resistance against the tires to simulate on-road driving. The vehicles

are driven at 25 miles per hour for a minimum of 25 seconds and a maximum of 240 seconds. Tailpipe emissions are then measured and recorded. Readings for hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) are compared to each pollutant's pass/fail points. The pass/fail points vary by vehicle type (car vs truck), model year, and, for trucks, weight category. In 2014, 10.2 percent of emissions tests were completed using the transient tailpipe test.

4. Two-speed idle (TSI) tests are used for gasoline-fueled vehicles that cannot receive an OBD II or tailpipe test. These vehicles, for the most part, cannot be driven on the dynamometer and are mainly dedicated 4-wheel-drive vehicles. This test measures emissions while the engine is operating at an elevated idle of 2,500 revolutions per minute (rpm) with no load on the engine which is followed with checking the vehicle emissions at idle upon failure of the loaded portion. The test measures HC and CO concentrations. This test does not measure NOx emissions. In 2014, 1.5 percent of emissions tests were completed using the TSI test.

5. Opacity tests use opacity meters to determine the “density” of the exhaust emitted from the vehicle’s tailpipe. Only diesel vehicles receive an opacity test. In 2014, 0.2 percent of emissions tests were completed using the opacity test.

2.2 Do the right vehicles get tested?

2.2.1 Overall motorist compliance with testing requirements

40 CFR 51.366 (d) (1) (ii): The percentage of motorist compliance based upon a comparison of the number of valid final tests with the number of subject vehicles;

In Ohio, the inspection lane computers determine which test a vehicle will receive based on model year and make information. Table 2 summarizes the 2014 overall compliance rate of the total number of unique vehicles registered in 2014 subjected to the test versus the number of vehicles receiving an I/M test. In 2014, the compliance rate (actual tests versus required tests) was 98 percent.

Table 2: Motorist Completing Testing Requirements

	Vehicle Count	Compliance % (actual tests versus required tests)
Overall Testing Compliance		
Vehicles Subject to 2014 Test	815,316	
Vehicles Tested in 2014	795,525	98%

In 2014, 11,510 of the 60,509 vehicles that failed their initial test did not receive a passing test, exemption, extension, or waiver before February 25, 2015.

2.2.2 Motorist Time Extensions

40 CFR 51.366 (d) (1) (v) The number of time extensions and other exemptions granted to motorists;
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The E-Check program offers repair waivers to individuals on their vehicle who make an effort to repair their vehicle but cannot get it to pass E-Check. In most cases, a waiver will be issued if the vehicle meets the requirements. A waiver will then allow the vehicle to be registered with the State. If an individual spends at least \$200 on emissions-related repairs for a 1995 or older vehicle, shows a 30 percent improvement in emissions readings from the initial test readings, and passes a visual anti-tampering inspection he or she may qualify for a conditional pass waiver. There is also a repair cap waiver that allows the motorist to register the vehicle if he or she spends at least \$300 on emissions-related repairs, regardless of emissions improvements and passes a visual tampering inspection. When a waiver is issued, the vehicle does not need to test for two years, or the next scheduled E-Check test, whichever comes first.

Ohio EPA offers a variety of extensions and exemptions to individuals who need more time to repair a vehicle or cannot have the vehicle tested at the current time.

- Non-permanent exemptions apply to those individuals who can have their vehicle tested out-of-state, are in the military, are currently a student outside of Ohio, or have a vehicle that will not return to Ohio within one year. The exemption allows a motorist to register the vehicle without receiving an E-Check test.
- Extensions are only available to individuals who need more time to have repairs performed, have difficulty affording repairs for the vehicle or are temporarily located out-of-state in an area that does not have emissions testing and will return within one year. Extensions only extend the period of time that a vehicle has to comply with the program. A motorist has up to six months to comply with the current testing cycle.
- Permanent exemptions from testing are issued for vehicles with a gross vehicle weight rating (GVWR) over 10,000 pounds or operating on an alternative fuel source such as electric power, natural gas, butane, propane, and 100 percent alcohol.

Out-of-state exemptions account for the highest number of exemptions issued. If the motorist is in another state's emissions testing area they must have the vehicle tested in that state. If the motorist is in a non-testing area they can still obtain an out-of-state

exemption if the vehicle will not be returning to Ohio before their next registration renewal date. Motorists can also obtain student and military exemptions which allow them to renew the vehicle’s registration without ever receiving a test.

The extensions require that a vehicle receive a test, but more time is provided to have it completed. The category of “other” in Table 3 includes special circumstances such as survivor and trust non-permanent exemptions that would require a vehicle to be tested out of its normal test cycle.

Vehicles that run on electricity or alternative fuel, such as propane or natural gas, may receive a permanent exemption from the emission test requirement. Prior to receiving any permanent exemption, the vehicle must be inspected by authorized Ohio EPA Mobile Source Section personnel. The inspection will include an anti-tampering inspection to ensure that all necessary emission control equipment is correctly installed on the vehicle. Any vehicle that does not pass the necessary inspection will be subject to the vehicle emission testing requirements. Vehicles that are more than 10,000 pounds gross vehicle weight rating and are plated with non-commercial plates also will be subject to inspection by authorized Ohio EPA Mobile Sources Section personnel prior to receiving a permanent exemption from the vehicle emission testing requirement, to be consistent with our rules, specifically OAC 3745-26-12(C)(2).

Table 3: Number of Extensions or Exemptions Issued in 2014

Type of Extensions or Exemptions	Number Issued
Extensions	1,935
Waivers	12,254
Permanent Exemptions	320
Out of State Exemptions	2,733
Student Exemptions	307
Military Exemptions	589
Hardship Extensions	1,822
Other	156
Total Number of Waivers, Extensions and Exemptions Issues	20,116

2.2.3 Registration File Audits and Compliance with Deadlines

40 CFR 51.366 (d)(2)(i) A report of the program's efforts and actions to prevent motorists from falsely registering vehicles out of the program area or falsely changing fuel type or weight class on the vehicle registration, and the results of special studies to investigate the frequency of such activity; and

(ii) The number of registration file audits, number of registrations reviewed, and compliance rates found in such audits.

Ohio EPA works with Ohio Bureau of Motor Vehicles' (BMV) Special Investigations Unit (SIU) to ensure that motorists are not falsely registering vehicles outside of a testing area to circumvent the testing requirements. When Ohio EPA receives a complaint regarding false registrations, Ohio EPA forwards the complaint to Ohio BMV SIU for investigation. Ohio BMV Registrar Offices also will forward any concerns they have about suspicious registrations along to the SIU Division. Overall in 2014, Ohio BMV SIU investigated 19 complaints regarding E-Check compliance. For 12 of the 19 investigations, Ohio BMV demonstrated vehicle registration violations for E-Check.

At this time, no registration file audits are performed to determine compliance with the vehicle emission testing program in northeast Ohio.

3 Is the testing equipment reliable?

40 CFR 51.366 (c) Quality Control Report: The program shall submit ... basic statistics on the quality control program for January through December of the previous year, including:

- (1) the number of emission testing sites and lanes in use in the program;
- (2) the number of equipment audits by station and lane;
- (3) the number and percentage of stations that have failed equipment audits; and
- (4) the Number and percentage of stations and lanes shut down as a result of equipment audits.

Within the Ohio I/M Program for 2014, there are 76 emission testing stations operating a total of 132 lanes.

Ohio EPA's equipment audit procedure is designed to verify that the lane equipment is operating within the tolerances specified by federal and State guidelines. Equipment audits are inspections of emissions testing equipment performed overtly at least two

times per year per lane. Ohio EPA’s equipment audits are performed by Agency staff and a contractor representative. If a lane fails any one of the audit criteria, the audit result is a fail and the lane is shut down until the issue is resolved.

Envirotest Systems Inc.’s equipment is required to undergo self-tests on either a per test, hourly, or weekly basis. The computer system will lock-down a lane if a self-test is not performed at the required time. The lane lock-down results in no additional vehicle testing occurring until the test is complete.

In 2014, each testing lane operated by Envirotest Systems was successfully audited. A total of 174 equipment audits resulted in 161 audit passes and only 11 audit failures, or an overall failure rate of 7 percent. The 11 equipment audit failures occurred at 5 unique stations, or 22 percent of the stations, and across 10 unique lanes, or 13 percent of the lanes.

Table 4: Number of Equipment Audits at Each Testing Station in 2014

Facility	Number of Equipment Audits
WESTLAKE	8
BEREA	6
NORTH ROYALTON	8
PURITAS	10
EAST 55TH	11
VALLEY VIEW	8
ST. CLAIR	6
WARRENSVILLE	10
EUCLID	15
WILLOUGHBY	7
PAINESVILLE	6
CHARDON	4
AUBURN	4
ROOTSTOWN	4
KENT	6
TWINSBURG	6
CUYAHOGA FALLS	10
BROWN STREET	12
COPLEY	12
MEDINA	8
SPENCER	4
AMHERST	6
ELYRIA	6

4 Quality Assurance

4.1 Overt and Covert Audits

Ohio EPA performs overt and covert performance audits to assess station and inspector performance. The results of the different types of audits are detailed below.

4.1.1 Overt Audits

40 CFR 51.366 (b) (1) (i) The number of inspection stations and lanes operating throughout the year;

For 2014, 76 stations operated 132 emission testing lanes.

40 CFR 51.366 (b) (2) The number of inspection stations and lanes operating throughout the year:
(i) receiving overt performance audits in the year; or
(ii) not receiving overt performance audits in the year.

During overt performance audits, Ohio EPA staff verifies that Envirotest Systems and the additional contracted private repair shop personnel are performing the emissions test in the proper manner while providing adequate customer service to Ohio's motorists. The performance audit is broken into three sections. The first section is *Test Procedures*, designed to evaluate how well the inspectors perform the emissions test procedures and interact with the motorists. The second section is *Safety Conditions*, designed to evaluate if Envirotest Systems and the other private repair shops provide motorists with a safe testing environment. The third section is *Station Appearance*, designed to evaluate if the stations are being kept in a customer friendly condition. Ohio EPA staff record audit findings on a form and conduct exit interviews with the station manager, informing the station manager of the results.

All 23 full-service stations and 77 of 79 full-service testing lanes operated by Envirotest Systems in 2014 received overt performance audits. Upon arriving at a station, Ohio EPA staff will audit only the lanes that are open for testing during a performance audit. The number of overt audits per lane ranged from 0 to 18 with a total of 570 being performed in 2014. There were 0 overt performance audits completed at the 53 private repair shop testing locations. It is not feasible for the Ohio EPA auditors to wait significant lengths of time for a vehicle to be tested in order to conduct performance audits at these locations. Due to this fact, Ohio EPA relied on the covert audits performed at these locations. The 53 private repair shops received 64% of the total covert performance audits performed in 2014.

40 CFR 51.366 (b) (2) (v) Number of stations and lanes ... that have been shut down as a result of overt performance audits;

No station or lane was shut down as the result of an overt performance audit in 2014.

4.1.2 Covert audits

40 CFR 51.366 (b) (2) The number of inspection stations and lanes operating throughout the year:

- (iii) receiving covert performance audits in the year; or
- (iv) not receiving covert performance audits in the year.

During covert audits, Ohio EPA staff will verify that Envirotest Systems and the additional contracted private repair shop personnel are performing the emissions test in the proper manner, while providing adequate customer service to Ohio's motorists. The *Test Procedures* section of the covert audit is identical to the *Test Procedures* of the overt audit and is scored as such.

40 CFR 51.366 (b) (8) The total number of covert vehicles available for undercover audits over the year; and
(9) the number of covert auditors available for undercover audits.

Ohio EPA dedicates three vehicles for covert audits. The vehicles are tampered prior to testing to ensure that the vehicle fails the proper emission tests. Typically a college intern is hired to work during a three month period to supplement and assist in trying to achieve covert audit goals.

4.1.3 Covert audit results

40 CFR 51.366 (b) (3) The number of covert audits:
(i) conducted with the vehicle set to fail per test type;
(ii) conducted with the vehicle set to fail any combination of two or more tests;
(iii) resulting in a false pass per test type; or
(iv) resulting in a false pass for any combination of two or more test types.

Usually the covert vehicles are set up to fail the OBD test, or, if applicable, not allow the OBD II test to be performed by clearing the readiness monitors. A "false pass" during a covert audit is an inspection pass when the vehicle was set to fail. The audit does not directly indicate whether the false pass was a result of the equipment or the inspector. If a false pass was the result of the improper test being performed on the vehicle, Ohio EPA initiates enforcement action against Envirotest Systems. Most times, Envirotest Systems provides proper test procedures and/or additional training as follow-up action against false passes.

College interns are used to perform the covert audits in the summer because they are not recognizable to the lane inspectors like the regular state program auditors are due to the number of equipment and performance audits they do at the stations. The regular Ohio EPA auditors rotate around during the rest of the year so that they are not recognized. The 23 full-service test stations received 48 covert performance audits and the 53 repair shops received 85 covert performance audits.

Table 5: 2014 covert audit results

Conducted with the vehicle set to fail per test type	
ASM	0
OBD	133
Conducted with the vehicle set to fail any combination of two or more test types	
ASM & OBD	0
Resulting in a false pass per test type	
ASM	0
OBD	0
Resulting in a false pass for any combination of two or more test types	
ASM & OBD	0

As seen in table five, 0 of the 133, or 0 percent, of the covert audits resulted in false passes.

4.2 Inspector Performance

As stated in Section 2.1.3, 336 inspectors were licensed or certified to conduct testing in 2014.

40 CFR 51.366 (b) (4) The number of inspectors and stations:
 (i) that were suspended or fired or otherwise prohibited from testing as a result of covert audits
 (ii) that were suspended, fired, or otherwise prohibited from testing for other causes, and
 (iii) that received fines.

40 CFR 51.366 (b) (6) The number of hearings:
 (i) held to consider adverse actions against inspectors and stations; and
 (ii) resulting in adverse actions against inspectors and stations.

Ohio EPA and Envirotest Systems keep records of all fraud and bribery issues occurring at the testing stations. All cases brought to either Ohio EPA or Envirotest Systems are

investigated thoroughly. If the situation warrants use of other agencies, such as the Ohio State Highway Patrol, the agencies work together to resolve these cases. Many of the fraud and bribery cases involve customers attempting to bribe an inspector for a passing test. Few cases involve fraud or bribery on the part of a station inspector. The table below summarizes the results of Ohio EPA's enforcement actions against stations and inspectors.

Table 6: Non-customer initiated fraud and bribery cases

The number of inspectors and stations	# inspectors	# stations
That were suspended, fired, or otherwise prohibited from testing as a result of covert audits	1	0
That were suspended, fired, or otherwise prohibited from testing for other causes	1	0

4.3 Fines collected

40 CFR 51.366 (b) (4) The number of inspectors and stations: (iii) that received fines;
 40 CFR 51.366 (b) (7) the total amount collected in fines from inspectors and stations.

Ohio EPA has not collected fines from stations or inspectors.

4.4 Station Compliance Documents

40 CFR 51.366 (d) (1) (iii) The total number of compliance documents issued to inspections stations;
 (iv) the number of missing compliance documents; and
 (vi) the number of compliance surveys conducted, number of vehicles surveyed in each, and the compliance rates found.

Ohio EPA works with Envirotest Systems and Ohio BMV to ensure that no false compliance documents may be passed to Ohio BMV, resulting in vehicle registrations being approved. Each compliance document is printed with a specific type of printer, making the print difficult to copy. Furthermore, each compliance document issued contains a code that the BMV will verify prior to registration issuance. If the compliance code on the compliance certificate cannot be verified, Ohio BMV will reject the vehicle registration attempt.

5 Emission Tests Results

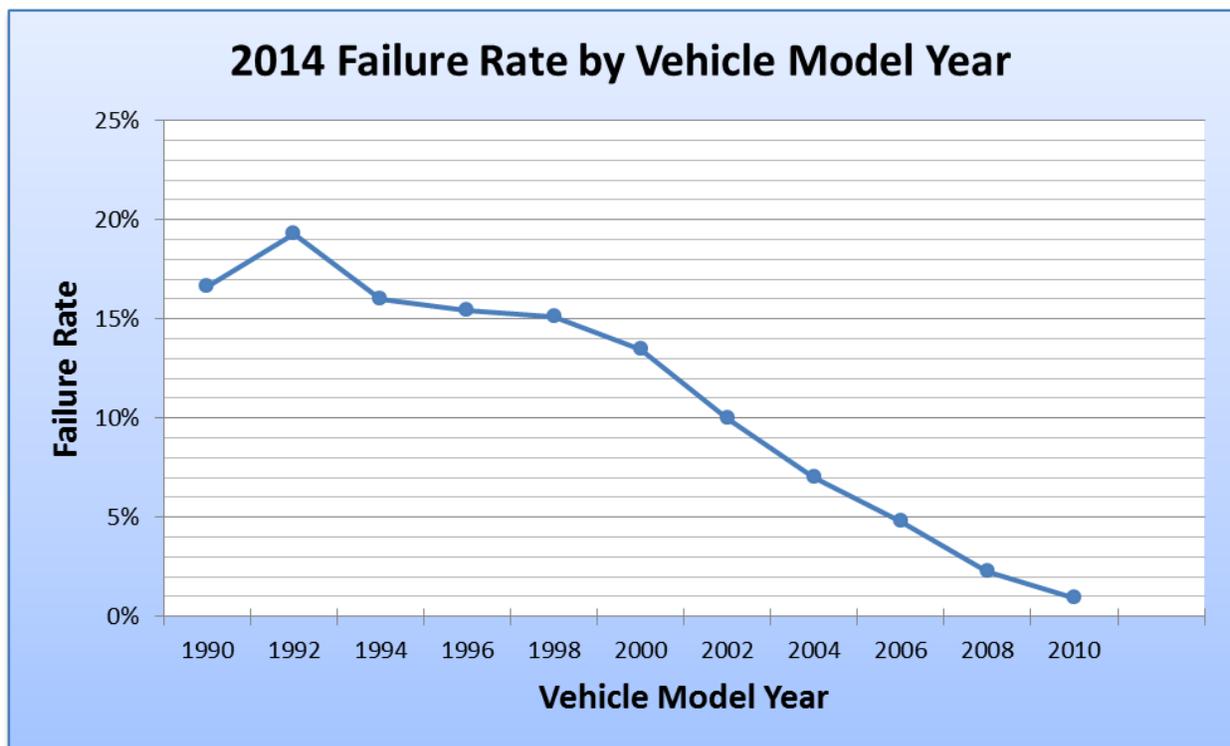
Of the 795,525 unique vehicles that received an emissions test in 2014, 60,509 vehicles, or 7.6 percent, failed their initial test. The Ohio E-Check program requires that motorists repair the vehicle and receive a passing test, waiver, or extension prior to the vehicle registration date.

Please note:

- Waivers were issued to vehicles that had repairs performed in excess of \$300 and were still unable to pass a retest. In 2014, waivers were granted to 12,254 vehicles, or 20 percent, that initially failed the emissions test.
- Of the vehicles that failed the initial test during 2014, 11,510 vehicles, or 19 percent, had neither passed a retest, obtained a waiver, nor obtained an extension as of February 25, 2015.

Details of all 2014 emission test results are available on the Ohio EPA website at www.epa.ohio.gov/dapc/echeck/whycheck/annual_reports.aspx

The following figure shows 2014 emission failure rates by model year. As can be seen, the age of a vehicle has a significant impact on failure rate.



5.1 Emission Reductions from Repaired Tailpipe-tested Vehicles in 2014

40 CFR 51.366 (a) (5) The average increase or decrease in tailpipe emission levels for HC, CO, and NOx after repairs by model year and vehicle type for vehicles receiving a mass emissions test.

U.S. EPA requires states to calculate emissions reductions from vehicles that are repaired after failing a tailpipe test. Approximately 4,475 tailpipe-tested vehicles that failed their initial test were successfully repaired and passed a tailpipe retest. Vehicles showed an average reduction of 72 percent for hydrocarbons (HC), 87 percent for carbon monoxide (CO), and 62 percent for oxides of nitrogen (NOx). A breakdown of average improvement by vehicle model year and type is shown in Attachment B.