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Impacts of Trip Permit Program Changes
on Vehicle Operations and Inspections

**Impacts of Trip Permit Program
Changes on Vehicle Operations
and Inspections**

by

Jennifer Dill, PhD.
Assistant Professor
Center for Urban Studies
Portland State University
P.O. Box 751-USP
Portland, OR 97207-0751

Report prepared for:
Transportation Northwest (TransNow)
Department of Civil Engineering
129 More Hall
University of Washington, Box 352700
Seattle, WA 98195-2700

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Executive Summary

Like most states, Oregon has a vehicle inspection and maintenance (I/M) program designed to help meet federal air quality standards. Vehicles in the Portland and Rogue Valley areas are tested biennially and must pass the test in order to get a certificate required to register the vehicle. Owners of vehicles that do not pass the test prior to their registration expiring can obtain a short-term “trip permit.” Trip permits provide vehicle owners a legal way to drive their vehicles after failing an emissions test, but before making the repairs to pass the test.

Starting January 1, 2002, the State implemented significant changes to the trip permit system. The State now issues no more than two 21-day permits in a 12-month period to any vehicle. In addition, the new system tracks the permits via a computer database. Previously, a vehicle owner could get a permit for up to 120 days in a 12-month period, and the permit records were not computerized. Since the permits were not tracked, owners could purchase successive permits at various DMV offices with little or no chance of being caught. Prior to the change, there was a belief that some were using trip permits to avoid registering vehicles when they failed a vehicle emissions test.

The primary purpose of this research was to assess the impacts of changing the trip permit system, addressing four key questions: Was there a change in the number of trip permits issued? Has the new system resulted in vehicles getting fixed and passing emissions inspections faster? Are more vehicles being repaired to pass emissions inspection and being registered as a result of the new system? What is happening to vehicles that do not pass the emissions inspection, even after getting a trip permit?

The results showed that the change in the trip permit system appeared to significantly reduce abuse of the program. However, not all vehicle owners were necessarily repairing their vehicles, passing the emissions test, and registering their vehicles. Key findings include the following:

- The number of trip permits issued in 2002 was dramatically smaller than the number issued in 2001. This finding supports the hypothesis that within the vehicle inspection program (VIP) areas people were using successive permits, and the change in the system reduced such abuse.
- The new trip permit system does not appear to be affecting how quickly vehicles are repaired to pass Department of Environmental Quality (DEQ) inspections.
- There was an increase in the share of vehicles that initially failed a DEQ inspection and eventually passed, an intended effect of the change in the trip permit program. However, there was a similar increase in the number and share of vehicles that took multiple tests, failing both the first and last tests.
- More people who obtained trip permits in 2002 and failed a DEQ test (compared to 2001) eventually renewed their registration – one intended effect of the change in the trip permit program.
- The vehicle owner survey confirmed that fewer vehicle owners were using trip permits. However, the survey also revealed that some owners of vehicles that failed a test in 2002

registered the vehicle outside of the VIP area, but kept it in a VIP area. While most of these owners claimed to not drive the vehicle, the responses suggest that there is some evasion still occurring.

- We estimate that less than one-half of one-percent of all the registered vehicles subject to VIP each year do not pass a DEQ test and do not renew their registration with DMV. About 15% of these may still be owned by the same person and kept within a VIP area, but without passing a DEQ inspection. Most of these owners claim that the vehicle is not driven.

1. Overview

Thirty-three states, and the District of Columbia have vehicle inspection and maintenance (I/M) programs designed to help meet federal air quality standards. In Oregon, vehicles in the Portland and Rogue Valley areas are tested biennially and must pass the test in order to get a certificate required to register the vehicle with the Oregon Department of Transportation (ODOT) Driver and Motor Vehicles (DMV) Services Division. Unlike some states, Oregon does not impose a cost limit for repairs required to make the vehicle pass the inspection. In other words, vehicle owners must pay whatever it costs to repair the vehicle and pass the test. Legal alternatives to this include scrapping the vehicle, selling it to someone outside of the program area, or actually moving outside the program area. Illegal alternatives include registering the vehicle outside the program area, yet still living and driving the vehicle in the area, or not registering the vehicle at all.

In Oregon owners of vehicles that do not pass the test prior to their registration expiring can obtain a “trip permit.” A trip permit allows vehicle owners who cannot otherwise register their vehicles to register their vehicles for a limited time. One objective of the trip permit system is to temporarily provide vehicle owners a legal way to drive their vehicles after failing an emissions test, but before making the repairs to pass the test. Starting January 1, 2002, the State implemented significant changes in the way trip permits for passenger cars, light trucks, and motorcycles are issued and tracked. The State now issues no more than two 21-day permits in a 12-month period to any vehicle. In addition, the new system tracks the permits via a computer database.

Previously, a vehicle owner could get a permit for up to 120 days in a 12-month period, and the permit records were not computerized. Therefore, under the old system, a vehicle owner whose vehicle failed the emissions test could continue to operate legally with trip permits for about four months. Since the permits were not tracked, owners could purchase successive permits at various DMV offices with little or no chance of being caught. Because the cost to repair a vehicle may often exceed the cost of the trip permits, this option may have attracted a significant number of vehicle owners. In fact, the Oregon Legislative Fiscal Office (2001) stated that “There is widespread belief that persons in the greater Portland area are using trip permits to avoid registering their vehicle which requires a vehicle emissions test.” This was one motivation for changing the permit system and creating a computer system to track the permits. The primary purpose of this research is to assess the impacts of changing the trip permit system with respect to vehicle operations and emissions testing.

2. Background

Starting with the Clean Air Act Amendments in 1977, the federal government has required states to implement vehicle inspection and maintenance (I/M) programs in areas with long-term air quality problems (NRC, 2001). I/M programs require vehicle owners to have their vehicles tested to ensure that emissions do not exceed certain standards. The programs are an important component of strategies to reduce emissions from vehicles. The federal government sets emissions standards for new vehicles, which results in significant emission reductions. However, if the emission control equipment malfunctions or is tampered with, the efficacy of the standards

is diminished. I/M programs aim to maintain the effectiveness of the emission control equipment on vehicles.

The 1990 Clean Air Act Amendments strengthened the I/M mandate, requiring "enhanced" I/M in areas with the worst air quality problems. One of the requirements of an enhanced program is enforcement through denial of registration, unless another enforcement mechanism is equally effective (NRC, 2001). Another change in I/M programs involves the use of on-board diagnostic (OBD) systems. Vehicles of model year 1996 and later include OBD computer systems that monitor the vehicle's emission control equipment. For these vehicles, many I/M programs simply test the OBD system, rather than emissions from the tailpipe, to determine whether the vehicle passes. The U.S. Environmental Protection Agency (EPA) believes that OBD systems are more effective than tailpipe tests because they can detect problems earlier and they can detect intermittent problems (EPA, 2002).

One of the ongoing public concerns over I/M programs involves the cost of repairing vehicles to pass the emissions test. Numerous studies have estimated the costs of repairs, with averages ranging from under \$100 to over \$600 (NRC, 2001). In addition, older vehicles and poorly maintained vehicles are more likely to fail an I/M test and are often more expensive to repair. Lower income households are more likely to own these types of vehicles (NRC, 2001). Partly in response to such equity concerns, EPA allows states to grant a "repair-cost" waiver to an individual whose vehicle still fails the emissions test after having spent a certain amount of money repairing the vehicle. The 1990 Clean Air Act Amendments establish minimum amounts for the waivers, which must be adjusted for inflation. Waivers cannot be granted to vehicles that were tampered with. Some states have also implemented programs to subsidize repairs for low-income vehicle owners.

As of March 2003, there were 33 states (including Oregon) and the District of Columbia with I/M programs (US EPA, 2003).¹ Of these, four states operated "low enhanced" programs that only test newer vehicles (model year 1996 and newer) equipped with OBD systems. None of these states had repair cost waivers. Under federal law, OBD equipment is under warranty for at least eight years or 80,000 miles. Of the remaining 30 areas, only Oregon (Portland and Medford regions) did not offer a repair-cost waiver.² Without a repair-cost waiver system, vehicle owners must pay whatever it takes to repair the vehicle and pass the I/M test, if they want to continue to legally operate the vehicle in the I/M area.

Oregon operates Vehicle Inspection Programs (VIP) in the Portland metropolitan region and the Rogue Valley (Medford) area. In Portland, the program covers vehicles of model year 1975 and newer. In Medford, the program covers vehicles 20 years old or less. Both programs exempt heavy duty diesel vehicles, motorcycles, and low-speed vehicles (e.g. golf carts, tractors, etc.).³

¹ The Connecticut program was temporarily suspended in April 2004 due to software problems. It is included in this count (www.ctemissions.com).

² New Mexico, which operates I/M in Albuquerque, offers a one-time extension if repair costs exceed \$300, allowing the owner to register the vehicle for one year. After the one year, they must repair the vehicle in order to keep it registered in the area.

³ For more information about the program, <http://www.deq.state.or.us/aq/vip/>

Vehicles are tested at stations operated by the Oregon Department of Environmental Quality (DEQ). Vehicles of model year 1996 and newer are tested using OBD. In Portland, the test costs \$21; in Medford it costs \$10. If a vehicle fails the emissions inspection, the owner is not charged for the test, and DEQ provides a print-out of the test results that will aid in repairing the vehicle. Low-income residents who have vehicles that do not pass the enhanced test (for vehicles of model year 1981-1995) can obtain a waiver and take the less rigorous basic emissions test, usually used only for 1980 and older vehicles. If the vehicle still does not pass, a new pilot program, in partnership with United Way and Ron Tonkin Family of Dealerships, offers financial assistance to low-income residents to repair vehicles. Qualifying owners in the Portland VIP area (?) pay only \$50 for vehicle repairs.

In order to register a vehicle with the DMV within either VIP area, the owner must present a valid DEQ inspection certificate. An owner who has not passed the DEQ inspection can obtain a trip permit. The State will issue a trip permit “to temporarily operate a vehicle on the highways of this state under circumstances where the operation would not otherwise be legal because the vehicle is not registered by this state or because provisions related to the vehicle’s registration do not allow the operation” (ORS 803.600).⁴

Different trip permits are issued for light duty vehicles (less than 8,001 pounds), heavy duty vehicles, recreational vehicles, manufactured structures, trailers, and vehicles that need to operate above the vehicle’s registered weight. The light vehicle trip permits serve a number of purposes. For example, a vehicle that fails a DEQ inspection and has an expired registration can use a trip permit to operate until the vehicle is repaired and passes the test. An owner of a collector vehicle that is rarely driven might use a trip permit to operate the vehicle for a short time. An owner who is about to move out of state or get rid of the vehicle might also decide that a trip permit is cheaper than renewing the vehicle’s registration. A vehicle owner without proof of title could use a trip permit until proof is obtained. For example, a person moving to Oregon from another state whose vehicle title is held by a bank may have difficulty getting that title sent to Oregon. There are other legitimate and non-legitimate reasons someone might not have proof of title.

Prior to 2002, light vehicle trip permits were available for 10, 30, 60, 90, or 120 days, costing \$5, \$10, \$20, \$30, and \$40, respectively. Owners were limited to operating the vehicles a maximum of 120 days on trip permits within a 12-month period. However, the trip permits were not tracked. Therefore, owners could get additional trip permits beyond the 120 days with little chance of getting caught. The DMV and Legislature believed that people were avoiding DEQ testing by operating vehicles on consecutive trip permits (Joint Committee on Ways and Means, 2001). Ending this practice was one motivation behind HB 2178, passed by the Oregon Legislature and signed by the Governor in 2001.

Starting in January 2002, the law limited light duty vehicle owners to two 21-day trip permits in a 12-month period. Each permit now costs \$20. As part of the legislation, the DMV created a computer database to track trip permits to help enforce the limit. The DMV estimated that the change would “result in a 10% increase in persons registering their vehicles who would have

⁴ For more information about trip permits: <http://www.oregondmv.com/Vehicles/TripPermits.htm>

otherwise continued to abuse the trip permit system” (Legislative Fiscal Office, 2001, p. 2). The legislation also made changes to the trailer trip permits, unrelated to the emissions testing issue.

3. Research Objectives

The overall intent of this research project was to determine the impacts of the change in the trip permit system as it relates to vehicle operation and emissions testing. Key questions included the following:

- Was there a change in the number of trip permits issued?
- Has the new system resulted in vehicles getting fixed and passing emissions inspections faster?
- Are more vehicles being repaired to pass emissions inspection and being registered as a result of the new system?
- What is happening to vehicles that do not pass the emissions inspection, even after getting a trip permit?

Vehicles within either VIP area that are not exempt from testing have a number of legal and illegal options after failing an inspection. These pathways are outlined in Table 1. If the change to the trip permit system had the intended effect, there would be fewer vehicles following paths 6 and 10 (operating without valid registration after getting a trip permit) and more following paths 2, 3, and 7 (eventually passing DEQ and renewing registration). In addition, emissions would decline slightly because of the repaired vehicles. However, if the costs of repairs are high, some owners may take the risk and continue to operate their vehicles in the VIP area without valid registration or a trip permit. An owner might also keep the vehicle and not drive it, but also not renew the registration, perhaps hoping to fix it or sell it later. Others might follow paths 5 or 9, moving or selling the vehicles outside the VIP area, since they can no longer obtain successive trip permits.

Meeting the original objectives of the research project was difficult and limited by the data available, which is described in detail in the next section. Because the research was initiated after the change in policy took place, we had to rely on existing data sources that were not designed for this type of evaluation. Moreover, part of the very nature of the change being evaluated – going from a non-computerized, paper-based system to a computer database – by definition presented a data problem. Given these limitations, we are unable to make definitive conclusions regarding the objectives listed above. However, we have attempted to address the questions from multiple angles, using multiple data sources, to answer them as best we can, while still acknowledging the limitations and caveats.

Table 1: Potential Pathways for Tested Vehicles

Path	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
1	Pass test	Register vehicle			
2	Fail test	Re-test and pass	Register vehicle		
3	Fail test	Re-test and fail	Trip Permit(s)	Pass test	Register vehicle
7	Fail test	Trip Permit(s)	Re-test and pass	Register vehicle	
5	Fail test	Re-test and fail	Trip Permit(s)	Move/sell vehicle outside VIP region and register (in OR or other state)	
9	Fail test	Trip Permit(s)	Move/sell vehicle outside VIP region and register (in OR or other state)		
12	Fail test	Move/sell vehicle outside VIP region and register (in OR or other state)			
6	Fail test	Re-test and fail	Trip Permit(s)	Operate vehicle without valid registration	
10	Fail test	Trip Permit(s)	Operate vehicle without valid registration		
13	Fail test	Operate vehicle without valid registration			
4	Fail test	Re-test and fail	Trip Permit(s)	Scrapped	
8	Fail test	Trip Permit(s)	Scrapped		
11	Fail test	Scrapped			

4. Sources of Data

To answer the questions posed in the research objectives, we analyzed a variety of data sources, which are described below. One difficulty in this research stems from the motivation for the research in the first place. Trip permit records prior to 2002 were not tracked. Records were only kept in original paper form in chronological order. Therefore, it would not be possible, for example, to take a DEQ record from 2001 and find out if that vehicle got a trip permit. Nor would it be possible to see how many vehicles obtained more than one permit in 2001. Given this limitation, we attempted to answer the questions by tracing records from various directions and

conducting a survey of vehicle owners. In most cases, we compared 2001 records to 2002 records to determine whether changes outlined in the research objectives had occurred.

4.1. *DMV Trip Permits*

The DMV Services Division provided summary data for the number of trip permits issued by DMV field offices for 1999 through 2002. This data was used to see overall trends for the issuance of trip permits. For 2002, DMV provided an electronic file with all light vehicle trip permit data (except personal information about the vehicle owner). This database included the vehicle identification number (VIN). For 2001, Portland State University (PSU) research staff went to DMV offices in Salem, Oregon and randomly selected 820 trip permits from the hard copy files. For each permit, staff recorded the VIN, permit issue date, permit expiration date, vehicle license plate and vehicle make and model. In many cases, the license plate or make and model section of the form was left blank. In addition, the records were hand written and often not very clear. Staff did their best to interpret handwriting and sometimes drew another permit at random if the writing was illegible. At PSU the VINs were compared to records from DEQ (below). In some cases, staff were able to correct typographical errors (e.g., a 6 was actually a G) based on matching the make and/or license plate and the rest of the VIN.

4.2. *DEQ Vehicle Inspection Records*

The DEQ provided electronic records of all tests conducted from October 2000 through April 2003 (31 months). There were over 1.67 million inspection records over this time period, in over four gigabytes of files. Each record included the VIN, inspection date and time, the overall inspection result (pass, fail, abort), and additional information about the emissions test (e.g. emissions levels). DEQ does not obtain or keep information about vehicle owners.

4.3. *DMV Vehicle Registrations*

ODOT provided DMV registration data for 2000, 2001, and 2002. These databases were essentially copies of the DMV database made at the end of each calendar year, but without any personal information. This data provided information about the vehicle's registration expiration date and changes to vehicle registration, e.g. transfer of ownership, issuance of a salvage title, etc. The database also had the zip code where the vehicle was registered. The data could be matched to the trip permit and DEQ records with the unique VIN.

4.4. *Vehicle Owner Survey*

We anticipated that the search through trip permit, DEQ and DMV records would not yield complete results. In particular, if a vehicle failed the emissions test, and the owner did not renew the registration (with or without a trip permit), the DMV would not have a record of exactly what happened with that vehicle. The person may be driving the vehicle without registration in a VIP area. The vehicle could be stored in a garage and not be driven, it might have been scrapped without the issuance of a salvage title, or it could have been moved out of state without DMV's knowledge. In addition, none of the records listed above included any information about the vehicle owner, such as their income or how much they drive the vehicle.

To help fill this gap, we conducted a survey of vehicle owners who reside in the two Vehicle Inspection Program areas of the state – Portland and Medford. The survey was intended to obtain

information not contained in the existing DEQ and DMV records. In particular, we wanted to find out what happened with vehicle owners who used trip permits to avoid passing a DEQ inspection. Therefore, we randomly sampled from vehicles that took more than one DEQ test in 2001 or 2002 and failed the first and last tests they took. These vehicle owners were more likely to obtain a trip permit and may have potentially operated the vehicle without valid registration.

The survey served several purposes: (1) to determine what the vehicle owners did with the vehicles; (2) as a check against the results from the records search; and (3) to collect information that was not available through the DMV and DEQ records, such as why the owners chose the options they did.

ODOT provided names and addresses for current registered owners of a random sample of vehicles in the Portland and Medford VIP areas based on VINs. The survey questionnaire was sent to 100 owners as a pre-test, and based on the response, it was revised slightly.

The final survey questionnaire was sent to 800 vehicle owners whose vehicles failed multiple tests in 2001 and 800 that failed multiple tests in 2002. The survey instrument and cover letter are included in this report as Appendix 9.1. The questionnaires were sent in July 2004, with reminder postcards sent within a week. The packet included a postage-paid return envelope and an entry form for a drawing for two \$250 gift cards to a local department store as an incentive for completing the survey. The survey and cover letter were also translated into Spanish. Vehicle owners with Hispanic surnames (320 total) were sent both the English and Spanish versions of the survey and cover letter. This was done to increase response rate. Technical difficulties prevented additional follow-up mailings to further increase the response rate.

Table 2 shows a breakdown of the responses to the vehicle owner survey. Since the response rate was low, and the final questionnaire was virtually identical to the pre-test instrument, the pre-test responses were also included in this analysis. Of the 1,700 total surveys that were sent, 169 were returned as undeliverable, eight were returned but not completed, and 218 were returned complete. Therefore, 14% of the surveys that were delivered were returned completed (218 of 1,531). Based on past experience, we could expect that a follow-up mailing may have resulted in additional responses totaling 10-14% of the adjusted sample size.

It is impossible to tell whether these 218 respondents are representative of the sample, since we have very limited information about the sample. A comparison to secondary data sources, such as the Census, would not be appropriate, since our sample is not representative of the population as a whole. Because the survey asked about behavior violate state regulations regarding vehicle inspections and registration, there could be a tendency for respondents to either not respond or respond untruthfully. The cover letter did ensure that the information would not be given to ODOT or DEQ to help reduce this, but it is impossible to know how honest respondents are. Given the possible limitations of the survey responses, we attempt to draw conclusions from all of the data sources combined, rather than relying solely on the survey.

Table 2: Vehicle Owner Survey Response Rate

	Pretest	Full Survey	Total	
			N	%
Sample Size	100	1,600	1,700	
Undeliverable	7	162	169	
Adjusted sample size	93	1438	1,531	100.0%
Returned not completed	1	7	8	0.5%
Completed questionnaires	13	205	218	14.2%

The survey asked the owner a series of questions about a particular vehicle and a particular DEQ failure. The vehicle and test date were indicated on the survey form. If the person receiving the survey did not own the vehicle at the time of the DEQ test, they were asked to indicate that and only fill out the demographic information on the form. This would happen if the vehicle was sold or given to the survey recipient after it failed the DEQ test.

5. Findings: Existing Data Sources

5.1. Overall Changes in Trip Permits Issued

There was a significant drop in the number of trip permits issued after the change in the law went into effect on January 1, 2002, as shown in Figure 1. The total number of trip permits issued in 2002 was 175,809 – a 54% drop from the 382,468 issued in 2001.⁵ The number of permits issued at DMV offices within DEQ Vehicle Inspection Program (VIP) areas (greater Portland and Medford) fell 55%. The number of permits issued in other areas fell 50%.

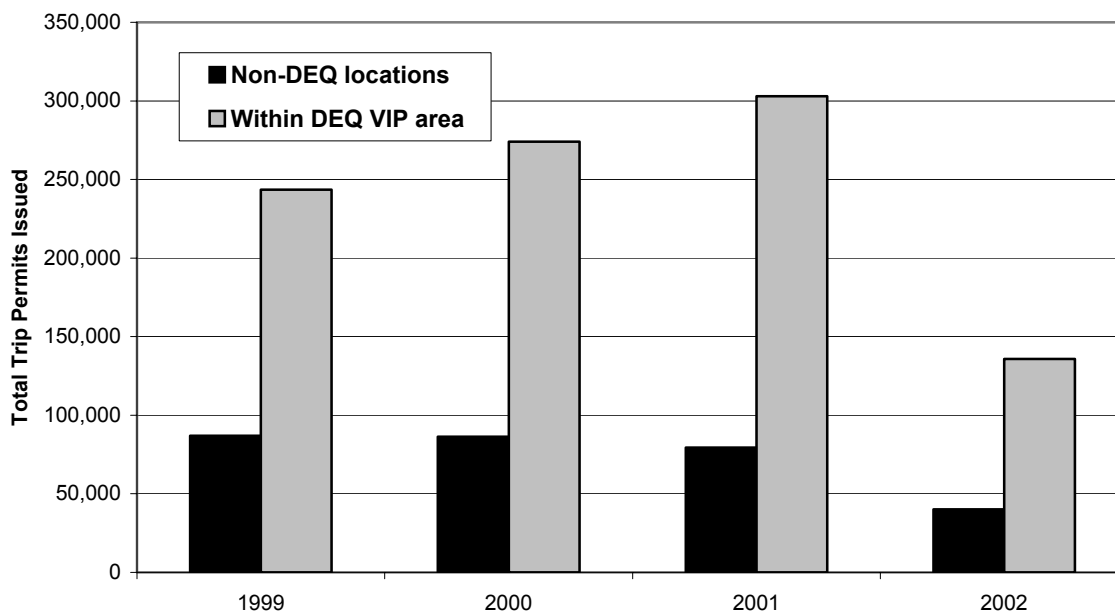
Two changes in the trip permit system would explain the drop in the number of permits issued. First, the price of the permits increased. Prior to HB 2178, a 30-day light vehicle permit cost \$10 and a 60-day permit was \$20. Now, a 21-day permit is \$20, and 42 days worth of permits (the maximum allowed) is \$40. Second, the permit tracking system now enforces a limit on the number of permits a vehicle owner can get in a year. If the new rule is effective, there will not be any vehicle owners getting more than two permits a year.

Before the change, there were two likely reasons owners might use multiple trip permits: (1) if the cost of repairing the vehicle to pass a DEQ test was more than the cost of the permits; or (2) if the owner could not provide proof of title. Owners who were simply delayed in getting proof of title (e.g. from an out-of state bank), about to move or get rid of their vehicle, or were using the trip permit for a collector car, were far less likely to need more than two trip permits. In addition, it would not have made economic sense to get more than two of the lengthier trip permits (e.g., 60 or more days), as the total price would be close to or more than the cost of renewing the vehicle's registration. The significant drop in permits issued outside of the VIP

⁵ Note that the total for 2002 differs slightly from the number in Table 8. The data here is from a summary table provided by DMV, rather than the actual permit data.

areas may also indicate that some vehicle owners were traveling outside of the VIP areas to obtain permits to avoid the DEQ inspection.

Figure 1: Trip Permits Issued by Oregon DMV 1999-2002



A closer look at the data over time and compared to the population may help explain some of the changes that occurred. From 1999 through 2001 (prior to the change), the number of trip permits issued within the VIP areas increased, as did population (Figure 2). Outside of the VIP areas, the number of permits decreased slightly from 1999 to 2001, even while population increased (Figure 3). Table 3 includes the data and shows that prior to 2002 within the four VIP counties, about one trip permit was issued for every five or six persons. In 2002, this changed to one permit for every 12 persons. Stated another way, the number of permits per 1,000 persons was increasing prior to 2002, before dropping dramatically after the law changed.

Figure 2: Trip Permits and Population in the VIP Areas

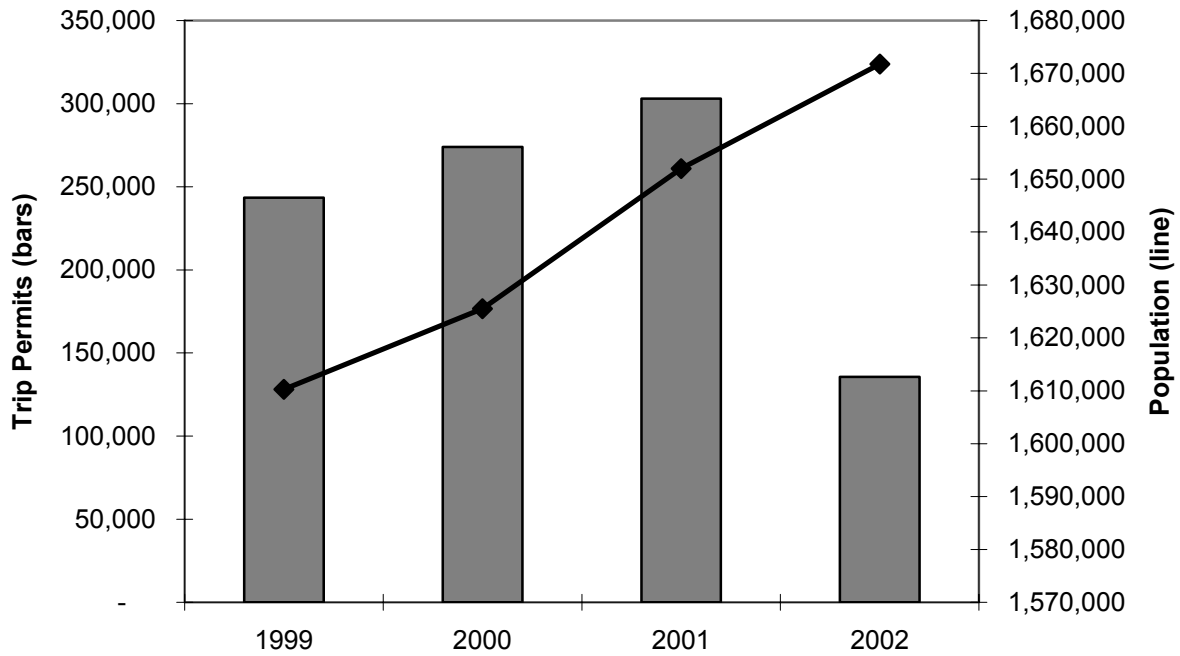


Figure 2 notes: VIP Areas defined as four counties: Multnomah, Washington, Clackamas, and Jackson. County boundaries are not identical to the VIP boundaries. Population estimates from PSU Population Research Center, certified estimates, except 2000 is from the US Census.

Figure 3: Trip Permits and Population outside the VIP Areas

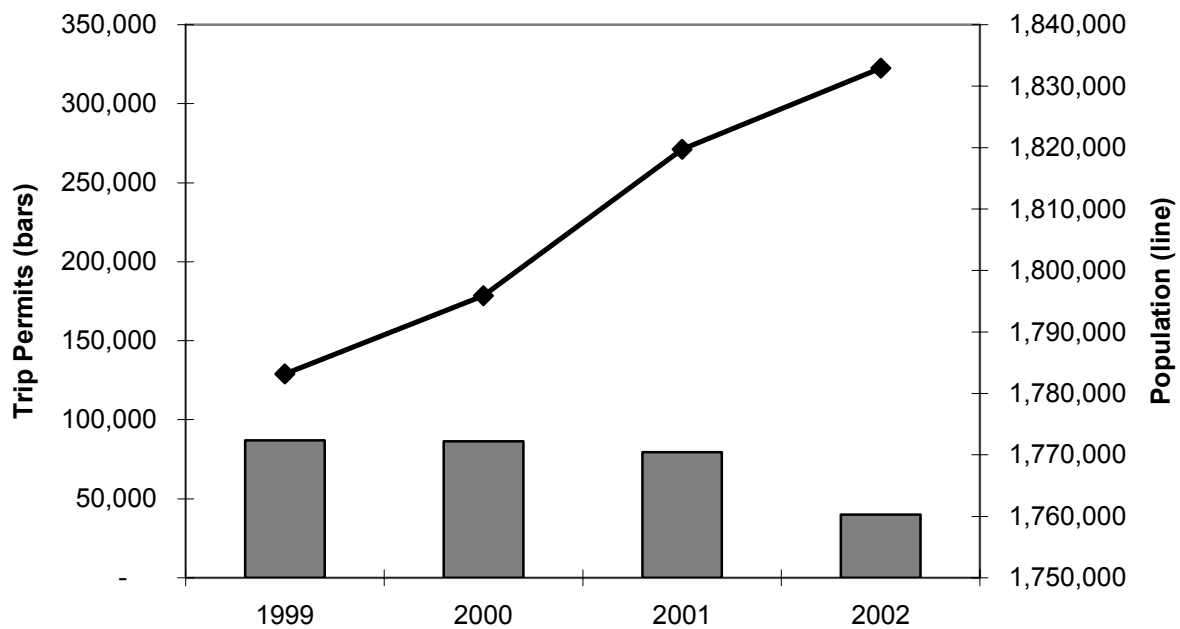


Table 3: Trip Permits and Population, 1999-2002

	1999	2000	2001	2002
Trip Permits within DEQ VIP area	243,412	273,969	303,023	135,708
Population in 4 VIP Counties	1,610,260	1,625,488	1,652,000	1,671,750
Persons per trip permit	6.6	5.9	5.5	12.3
Trip permits per 1000 persons	151.2	168.5	183.4	81.2
Trip Permits at Non-VIP locations	87,031	86,288	79,445	40,101
State Population outside 4 VIP counties	1,783,150	1,795,911	1,819,700	1,832,950
Persons per trip permit	20.5	20.8	22.9	45.7
Trip permits per 1000 persons	48.8	48.0	43.7	21.9
Difference in rates (in VIP/outside VIP)	3.1	3.5	4.2	3.7

Comparing the trends and rates inside and outside the VIP areas reveals two significant differences. First, the rate of use (permits per 1,000 persons) was increasing within the VIP areas prior to 2002, while it was decreasing outside the VIP areas. Second, the rate of use was much higher within the VIP areas than outside, both before and after January 1, 2002. The higher rate could be due to a higher percentage of people getting trip permits and/or a higher rate of people getting multiple permits. The use of trip permits to avoid or delay passing a DEQ test is the most logical explanation for most of the difference in the rates. Another common reason for getting a trip permit – difficulty obtaining proof of title – would help explain the difference in rates if people inside the VIP areas have a more difficult time than people outside VIP areas.

The impact of the new trip permit system is also seen in the monthly data. Figure 4 shows that in 2001 the trip permits issued within the VIP areas were somewhat evenly distributed throughout the year. However, in 2002 there was a steady decline in the number of permits issued each month after the change went into effect in January. This may indicate that habitual trip permit users were getting permits at the beginning of the year, but were unable to continue to do so after the first two permits were issued, covering up to 42 days. The trip permit records discussed on page 21 support this hypothesis.

Figure 4: Trip Permits Issued by Month, 2001 and 2002, within VIP areas

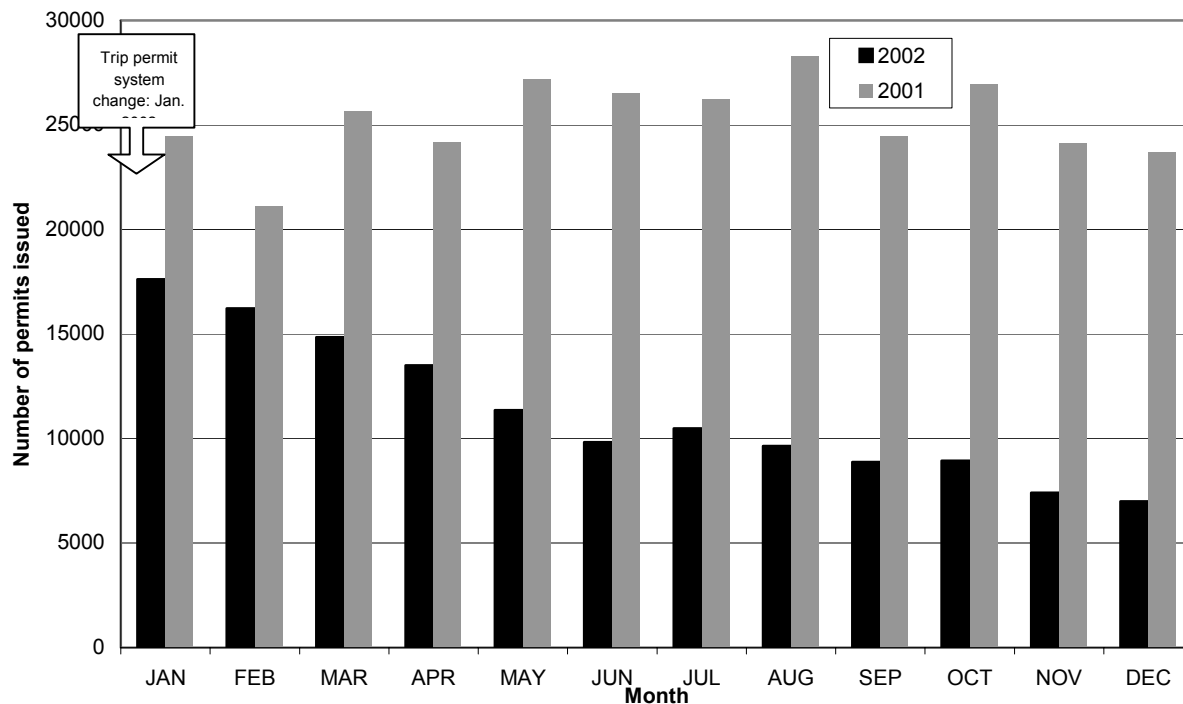
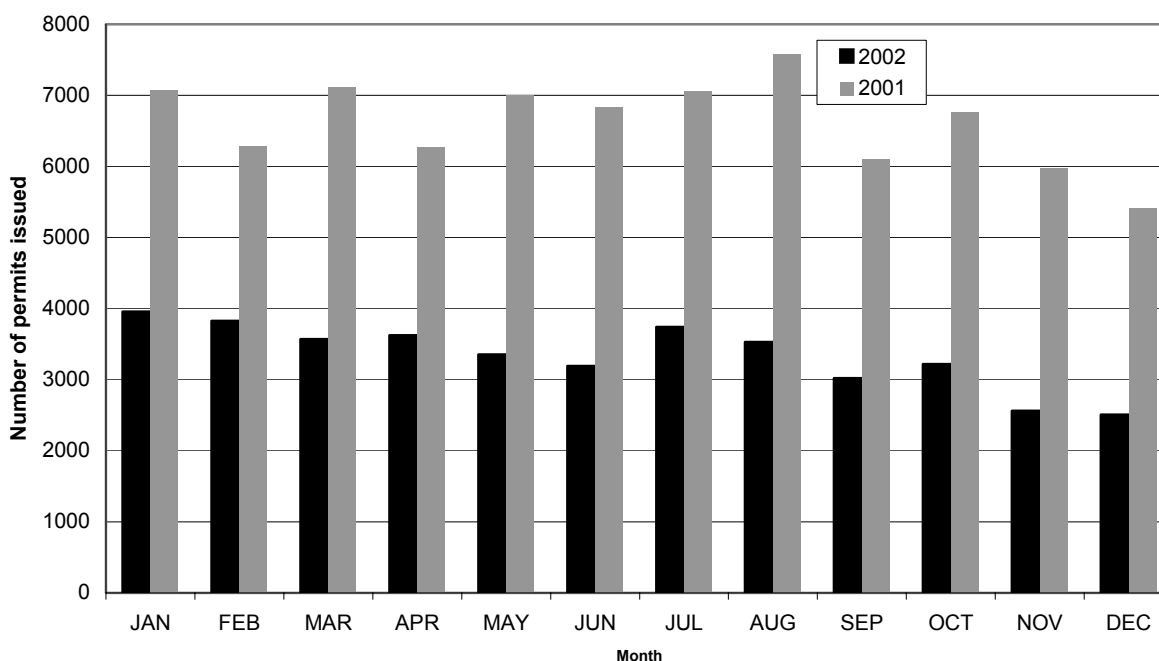


Figure 5 presents the same data for trip permits issued outside of the VIP areas. While there is a drop in the number of permits issued per month as the year (2002) progresses, it is not nearly as dramatic as within the VIP areas (Figure 4) and somewhat mirrors the pattern for 2001. This may indicate that permit users outside the VIP areas were less likely to be using successive multiple permits prior to 2002 and thus unable to continue to do so after early 2002.

Figure 5: Trip Permits Issued by Month, 2001 and 2002, outside VIP areas



5.2. DEQ Testing

DEQ provided inspection records for October 2000 through April 2003. There were over 1.67 million inspection records over this time period. We spent a significant amount of time organizing and sorting these records so that they could be used to answer our research questions. In the end, we worked with data for 931,181 vehicles that either took a single test during 2001 and/or 2002, or a series of tests completely within one of those years.⁶ About 15% of the vehicles took more than one test within 2001 and 16% took more than one test within 2002. For those taking more than one test, we analyzed the results from the first and last tests to determine the likely pathway (from Table 1) that the vehicle took. The results are shown in Table 4. With the DEQ data, it was not possible to distinguish between some of the pathways, so they have been grouped together in the table.

Overall, about 95% of the vehicles passed the test at some point (pathways 1, 2, 3, 7, 15, 16), with over 80% passing the first and only test (pathway 1). Pathway 15 includes vehicles that took multiple tests, passing both the first and last tests. Some of these vehicles may have failed a test in between. In addition, pathway 16 includes vehicles that passed their first test and failed their last within a year. For both pathways 15 and 16, why would a vehicle owner get another DEQ

⁶ If we had included vehicles that took a series of tests spanning more than one year, the comparison between 2001 and 2002 would not be equitable, since the DEQ records stopped in April 2003. For example, for a vehicle taking its first test in November 2001, we could look through 17 months following that first test to see what they did. However, for a vehicle taking its first test in November 2002, we could only look through five successive months.

test after passing? One likely explanation is if the vehicle owner intended to sell the vehicle, they might take it to get tested to show a potential buyer that it would pass.

Table 4: Pathways for Vehicles Taking Emissions Tests in 2001 or 2002

Pathway	2001		2002		Change: 2001-2002	
	#	%	#	%	Change in #	Change in %**
<i>Logical Pathways (from Table 1)</i>						
1: Single test, pass	383,456	82.33%	377,260	81.05%	-1.6%	-1.28%
2, 3, & 7: Multiple tests, did not pass first test, pass last test	56,821	12.20%	58,935	12.66%	+3.7%	0.46%
Subtotal	440,277	94.53%	436,195	93.71%	-0.9%	-0.82%
4, 5, 6: Multiple tests, did not pass first test, did not pass last test	6,620	1.42%	8,469	1.82%	+27.9%	0.40%
8 – 13: Single test, did not pass	10,595	2.27%	10,877	2.34%	+2.7%	0.06%
	457,492	98.23%	455,541	97.87%	-0.4%	--0.36%
<i>Other Pathways</i>						
14. Single test: Abort, Not Ready, or no result recorded	1,922	0.5%	1,831	0.5%	-4.7%	0.00%
15. Multiple tests, pass first and last tests	5,551	1.2%	4,630	1.0%	-16.6%	-0.20%
16. Multiple tests, pass first test, did not pass last test	555	0.1%	3,180	0.7%	+473%	0.60%
17. Multiple tests, did not pass first test, unrecorded result for last test	209	0.04%	270	0.06%	+29.2%	0.02%
TOTAL	465,729	100%	465,452	100%	-0.06%	

** Difference in shares (2001 vs. 2002) for the logical pathways are all statistically significant at 0.05 level, based on z-test for comparing two proportions. Chi-square test for logical pathways is also significant.

The data reveal some expected and unexpected changes between the years. The change in the permit system was intended to encourage people who fail a test to get their cars fixed, pass the test, and register the vehicles, rather than operating on multiple trip permits. This would be vehicles in pathways 2, 3, and 7 (taking multiple tests where the vehicle did not pass the first test, but did pass the final test within that year). There was a significant increase in the share of vehicles in these combined pathways. There were 2,114 more vehicles in this category in 2002 over 2001, representing a 3.7% increase in number and a 0.46% increase in the share.

If the law had the intended impact, there might be a decrease in the share of vehicles failing multiple tests and never passing (pathways 4, 5 & 6). This was not the case. There were 1,849 more vehicles that took multiple tests where the vehicle did not pass either the first or last test – a 27.9% increase in number and a 0.40 percentage point increase in the share, also statistically significant. This could include owners who, no longer able to obtain successive trip permits,

made repeated attempts in 2002 to pass the test, but were not able to do so within that calendar year.

When the legislature passed HB 2178, which included the changes to the trip permit system, one objective was to increase the number of vehicles that pass the DEQ inspection and are registered, rather than operating on illegal trip permits. The DMV estimated that the change would result in a 10% increase in persons registering their vehicle who would have otherwise continued to abuse the system (Legislative Fiscal Office, 2001). Based on the DEQ data (pathways 1, 2, 3 & 7), there does not appear to be an increase in the overall number or share of vehicles that are passing DEQ inspection. Including only the “logical pathways” listed in Table 4, the number of vehicles passing DEQ inspection fell 4,082 or 0.9% (a 0.82 percentage point drop in the share). If you also include vehicles that took multiple tests and passed both the first and last test, the number of vehicles passing DEQ inspection fell by 5,003 or 1.1% (a 1.02 percentage point drop in the share).

There may be other factors that account for this change. For example, the vehicle mix changes over time, thereby impacting pass/fail rates. The downturn in the economy may reduce the number of vehicles entering the region, passing the inspection and registering, which could offset an increase in vehicles already in the region that are newly registered because of the change to the trip permit program. The economy might also impact the share of people that can afford to repair their vehicles.

We were able to match the vehicles from Table 4 to the DMV database to determine whether the vehicle’s registration was renewed in 2001, 2002, or 2003.⁷ The overall results are shown in Table 5. As expected, the vast majority of vehicles that passed the DEQ test in 2001 or 2002, either on the first try or later, renewed their vehicle registrations. For the other pathways, lower shares of vehicles renewed their registrations in both 2001 and 2002. The data show that about one-third of the vehicles that did not pass a test during each year did not renew their registrations.

⁷ Renewal status for 2002 was determined by comparing the registration expiration date in 2002 with the date in 2001. If the date in 2002 was later than the date in 2001, that indicated that the vehicle’s registration was renewed at some point during that year. Renewal status for 2003 was determined in a similar manner. Because we did not have data from 2000, for 2001 renewal, we assumed that if the expiration date in the 2001 database was later than 12/31/2001, then the registration was renewed. If a valid expiration date was not available, the renewal status is not known.

Table 5: Registration Status for Vehicles Taking Emissions Tests in 2001 or 2002

Pathway	2001			2002		
	# with renewal status known	renewed registration		# with renewal status known	renewed registration	
		#	%		#	%
1: Single test, pass	373,060	372,314	99.8%	308,552	307,318	99.6%
2, 3, & 7: Multiple tests, did not pass first test, pass last test	55,305	55,139	99.7%	47,432	47,147	99.4%
4, 5, 6: Multiple tests, did not pass first test, did not pass last test	5,386	3,679	68.3%	6,099	4,166	68.3%
8 – 13: Single test, did not pass	8,154	5,210	63.9%	7,486	4,824	64.5%

Table 6 presents more detail about the vehicles from Table 5. In particular, it shows whether the zip code for the vehicle's registered owner was in a zip code inside or outside a VIP area or in a zip code that straddles a VIP boundary. This data requires some explanation. The available DMV data only included the zip code for the vehicle owner's address. If an owner keeps a vehicle in a zip code that differs from the home address, the owner may use that zip code for the vehicle's registration. This "vehicle address" was not in the data we had. For example, a parent in Portland might let a college student son or daughter use a vehicle while living in Corvallis or Eugene; or a business with headquarters in Portland might handle all vehicle registration records from the headquarters but have vehicles located elsewhere in the state. These are legitimate reasons a vehicle owner may have a vehicle zip code that is outside a VIP area, but the owner's address is inside the VIP area. An owner could also claim that a vehicle is located in another zip code when it actually is not. Unfortunately, we did not have vehicle address zip code information and had to use the owner's zip code. In addition, some vehicle owners who live within a VIP area might use a residential address outside the VIP area (e.g. a vacation home or a relative's home) to register their vehicle and avoid DEQ testing.

The final column in Table 6 includes the direction of the changes expected from the new trip permit system. In particular, there should be a *decrease* in the share of vehicles following paths 6 and 10 (operating without valid registration after getting a trip permit) and an *increase* in share vehicles following paths 2, 3, and 7 (eventually passing DEQ and renewing registration). In addition, it is possible that more owners might register their vehicles outside the VIP area because they can no longer obtain successive trip permits.

The share of vehicles in paths 2, 3, and 7 increased from 12.52% to 12.83%, a significant increase. The share that are within those pathways *and* whose registered owner is inside a VIP area also increased significantly. This may indicate that the change in the permit system had the intended effect of getting a higher share of vehicle owners to fix their failing vehicles, pass the DEQ test, and register them. However, the share in pathways 6, 10, and 13 (unregistered) also went up slightly and significantly, contrary to the intent of the change in the permit system. There was also a slight and statistically significant increase in the share of vehicles failing inspections and registering outside the VIP area (paths 5, 9 and 12), as hypothesized. Whether

these vehicles are actually located outside a VIP area is unknown. Finally, the share of vehicles in pathways 4, 5, and 6 combined increased significantly.

Table 6: Detailed Registration Status and Location for Vehicles Taking Emission Tests in 2001 or 2002

Pathway	2001		2002		change in %**	Hypothesis
	#	%	#	%		
1: Single test, pass	373,060	84.42%	308,552	83.49%	-0.93%	
Registered owner inside VIP	323,004	73.09%	268,662	72.70%	-0.40%	
Registered owner in split zip	32,598	7.38%	26,406	7.15%	-0.23%	
Registered owner outside VIP	15,362	3.48%	12,294	3.33%	-0.15%	
Registration not renewed	930	0.21%	1,159	0.31%	0.10%	
Zip code unknown	1,166	0.26%	31	0.01%	-0.26%	
2, 3, & 7: Multiple tests, did not pass first test, pass last test	55,305	12.52%	47,432	12.83%	0.32%	up
Registered owner inside VIP	48,954	11.08%	41,664	11.27%	0.20%	up
Registered owner in split zip	3,763	0.85%	3,491	0.94%	0.09%	
Registered owner outside VIP	2,282	0.52%	1,991	0.54%	0.02%*	
Registration not renewed	188	0.04%	278	0.08%	0.03%	
Zip code unknown	118	0.03%	8	0.00%	-0.02%	
4, 5, 6: Multiple tests, did not pass first test, did not pass last test	5,386	1.22%	6,099	1.65%	0.43%	
Registered owner inside VIP	2,361	0.53%	2,267	0.61%	0.08%	
Registered owner in split zip	441	0.10%	501	0.14%	0.04%	
5: Registered owner outside VIP	847	0.19%	1,039	0.28%	0.09%	up
6: Registration not renewed	1,709	0.39%	1,932	0.52%	0.14%	down
Zip code unknown	28	0.01%	360	0.10%	0.09%	
8-13: Single test, did not pass	8,154	1.85%	7,486	2.03%	0.18%	
Registered owner inside VIP	3,186	0.72%	2,925	0.79%	0.07%	
Registered owner in split zip	642	0.15%	628	0.17%	0.02%	
9 & 12: Registered owner outside VIP	1,321	0.30%	1,275	0.34%	0.05%	up
10 & 13: Registration not renewed	2,942	0.67%	2,656	0.72%	0.05%	down
Zip code unknown	63	0.01%	2	0.00%	-0.01%	
Total from logical pathways with registration status known	441,905	100.00%	369,569	100.00%		

** All differences in shares (2001 vs. 2002) are statistically significant at 0.05 level, based on z-test for comparing two proportions, except *, which is significant at 0.10 level.

One question underlying this research is whether the inability (for financial or other reasons) to pass a DEQ test is preventing owners from registering their vehicles. The data in Table 6 indicate that 1.06% of the vehicles in 2001 and 1.25% of the vehicles in 2002 did not pass a first or last test (pathways 4, 5, 6 and 8-13) and did not have their registrations renewed. The difference in percentages is significant. Based on the total number of vehicles that took DEQ tests, the number of vehicle owners failing tests and not renewing their registration may be 5,200 to 6,600 per year. During that same time, there were about 1.2 million vehicles registered within a VIP area that were subject to DEQ inspection.⁸ Some of these vehicles may be moved out of Oregon, scrapped, or no longer driven. Others may be operating without valid registration.

Another hypothesis is that the inability to obtain successive trip permits in 2002 might have prompted more people to scrap their vehicles. The data on salvage titles do not support this hypothesis, although vehicles may be scrapped without a salvage title.⁹ A very small share of the vehicles in our pathways were issued a salvage title in 2001, 2002, or 2003 (Table 7). The share was about twice as high for the vehicles that did not pass a DEQ test, suggesting that failing a DEQ test does prompt some people to scrap a vehicle. The overall share of vehicles that failed tests (pathways 4-6 and 8-13) in 2001 and got a salvage title is 1.16%; for 2002 the share is 1.04%. These vehicles would, therefore, fall in pathways 4, 8, and 11. The slightly higher share in 2001 could be explained because of the extra year of time. Looking at the salvage rates for the year of the test (2001 or 2002) and the year after (2002 or 2003), the share was still lower for the 2002 vehicles.

Table 7: Salvage Title Issued in 2001, 2002, or 2003 for Vehicles Taking Emissions Tests in 2001 or 2002

Pathway	2001		2002	
	#	%	#	%
1: Single test, pass	2,325 (of 374,611)	0.6%	1,786 (of 310,162)	0.6%
2, 3, & 7: Multiple tests, did not pass first test, pass last test	373 (of 55,618)	0.7%	400 (of 47,498)	0.8%
4, 5, 6: Multiple tests, did not pass first test, did not pass last test	55 (of 5,717)	1.0%	73 (of 6,277)	1.2%
8 – 13: Single test, did not pass	112 (of 8,671)	1.3%	73 (of 7,705)	0.9%

⁸ Included were light-duty vehicles of model year 1975 and newer that were in a zip code that falls completely in the VIP area and half of those in zip codes that straddle a VIP boundary and whose registration expiration date was after 12/31/01 (for 2001) or 12/31/02 (for 2002).

⁹ The likelihood that a scrapped vehicle is issued a salvage title may be low. Of the people who responded to our survey (discussed later), who said they scrapped their vehicle, we did not find evidence in the DMV files of a salvage title being issued.

Another question is whether the change resulted in vehicles getting repaired and passing the inspection quicker, e.g. within 42 days rather than 120 days. Of the vehicles that failed their first test, but eventually passed, the average time between the first and last test in 2001 was 22.5 days. In 2002 it was 21.9 days, a slight decrease. In 2001 and 2002 there were almost equal shares of vehicles that took over 42 days to eventually pass the test, 14.6% and 14.8%, respectively. Thus the new trip permit system does not appear to be making a large difference in how quickly vehicles are repaired in order to pass inspection.

5.3. Trip Permits

The 2002 Trip Permit database provided by DMV included 245,692 records (Table 8). Of these, 76,513 were duplicate records with the same trip permit number. Of the remaining 169,179 permits, 3.1% were for vehicles made prior to 1975, which are exempt from DEQ testing. Just over half of the vehicles (53.4%) were matched to a DEQ test. Of these, one-third only had passes and two-thirds had at least one failure. Owners of vehicles that never failed a DEQ inspection may have been getting the trip permit for a purpose unrelated to emissions inspection. Of the 820 randomly sampled trip permits from 2001, we were able to match 447 to a DEQ inspection record. Of these, almost identical shares (compared to 2002) only passed DEQ or failed at least once. In other words, similar shares of all trip permits in 2001 and 2002 – about one-third – were issued for vehicles that failed a DEQ inspection during the time period of our study. Therefore, up to one-third of the trip permits issued may be *because* vehicles failed a DEQ test. In addition, a share of the trip permits that were not matched to DEQ records may also be related to emissions testing. Some of these vehicles may have failed a DEQ test prior to October 2000, the earliest records we had.

Table 8: Trip Permits and DEQ Results

	2001 (sample)		2002 (complete data set)	
	#	%	#	%
Trip Permits	820		245,692	
Duplicate permit number	none		76,513	
Remaining unique permits	820		169,179	
Model year prior to 1975	17	2.1%	5,246	3.1%
No matching DEQ record	356	43.4%	73,526	43.5%
Unique permits with DEQ tests	447	54.5%	90,416	53.4%
DEQ match, only pass	162	36.2%	33,212	36.7%
DEQ match, at least one failure	285	63.8% (34.8% of all permits)	57,204	63.3% (33.4% of all permits)

Differences in percentages not statistically significant. Chi-square test also not significant.

A vehicle owner can get two trip permits in a 12-month period for a single vehicle. In addition, the vehicle could get two more trip permits with a different owner. Therefore, the 169,179 trip permits in 2002 represent a smaller number of vehicles. Of the 169,179 unique trip permits, there

were 124,098 unique vehicles (by VINs). Of these, 29.5% were matched to a DEQ failure (Table 9). Therefore, nearly a third of the *vehicles* getting trip permits in 2002 *may* have been motivated to get the permits because of a failed DEQ test. Of the 820 vehicles with trip permits from 2001, 34.8% were matched to a DEQ failure. This share is significantly higher than in 2002. This indicates that there may be a decrease in the share of permit holders that are getting the permit *because* they failed a DEQ test. This finding is consistent with the intent of the legislation.

Table 9: Vehicles with Trip Permits and DEQ Results

	2001 (sample)		2002 (complete data set)	
	#	%	#	%
Number of unique vehicles with at least 1 trip permit	820		124,098	
Model year prior to 1975	17	2.1%	4,422	3.6%*
No matching DEQ record	356	43.4%	57,670	46.5%*
DEQ match, only pass	162	19.7%	25,429	20.5%
DEQ match, at least one failure	285	34.8%	36,577	29.5%*

Chi-square = 14.65, significant at $p < 0.01$.

* Difference in shares (2001 vs. 2002) significant at $p < 0.05$.

Of the 2002 vehicles with trip permits, 46.5% had no matching record (based on VIN) in the DEQ data from October 2000 to April 2003. We matched these VINs to DMV records and found that 76% were registered to owners in zip codes completely outside VIP areas and 4% of the owners were in zip codes partially inside and partially outside VIP areas. Therefore, perhaps as many as 80% did not have a matching DEQ record because they did not need to get a DEQ test. However, about 20% (11,641 vehicles) had owners who were in a zip code completely within a VIP area. Of these, about two-thirds (7,731 vehicles) had an expired registration at the end of 2002. This represents about 6% of the vehicles that got trip permits in 2002. Some of these vehicles may have been operating in a VIP area without valid registration because they knew they could not pass DEQ. They might have failed a test before October 2000 (the start of our records). There were just over 3,900 vehicles that got trip permits in 2002 and were registered at the end of 2002 to an owner within a DEQ area – but we could not match them to a DEQ test between October 2000 and April 2003. These may be vehicles with a vehicle address outside the VIP areas.

Of the 36,577 vehicles in 2002 that got a trip permit and failed a DEQ test (last row of Table 9), about half only got one trip permit and 44.5% got two trip permits (Table 10). Less than five percent (1,721) got three or more trip permits, which was only legal with a change in owner. Of these, we were able to determine that 106 of them (6.2%) did have a transfer of ownership according to the DMV records.¹⁰ There may be others that had a transfer of ownership that we were unable to identify.

¹⁰ We used DMV codes 04, 07, 14, 17, 27, 37, 77, and 94 to determine transfer of ownership.

Table 10: Vehicles with Trip Permits and DEQ Failures - Number of Trip Permits

	2002 (complete data set)	
	#	%
Vehicles with at least 1 trip permit and 1 DEQ failure	36,577	
1 trip permit	18,572	50.8%
2 trip permits	16,284	44.5%
3 trip permits	1,060	2.9%
4 or more trip permits	661	1.8%

A similar comparison could not be made to 2001 because of the limited sample. However, DMV officials believed that prior to 2002 it was common for vehicles to get more than the allowed two trip permits. It is highly likely that this is no longer occurring, given that over 90% of the vehicles only received two trip permits. Of the 285 vehicles that got trip permits in 2001 and failed at least one DEQ test, 119 (41.8%) also got a trip permit in 2002. This is consistent with the theory that people were using successive trip permits after failing a DEQ test. About half of these eventually passed a DEQ test and 80% renewed their registrations. In addition, of the 162 trip permit vehicles in 2001 that only passed a DEQ test, 42 (25.9%) also got a trip permit in 2002. These were likely to be owners who obtained trip permits for reasons other than failing a DEQ test.

A majority of the trip permit vehicles in both years failed multiple DEQ tests, as shown in Table 11. Of the 36,577 vehicles in 2002 that got a trip permit and failed a DEQ test, 39.5% failed only once and about one-quarter had four or more failures between 10/1/00 and 4/30/03. For the 2001 sampled trip permits with a DEQ failure, almost the same percentage (39.3%) had only one failure during the same 30 month period. However, a significantly higher share in 2001 (30.5%) had four or more failures.

Table 11: Vehicles with Trip Permits and DEQ Failures - Number of DEQ Failures

	2001 (sample)		2002 (complete data set)	
	#	%	#	%
Vehicles with at least 1 trip permit and 1 DEQ failure	285		36,577	
1 DEQ failure	112	39.3%	14,434	39.5%
2 DEQ failures	55	19.3%	8,085	22.1%
3 DEQ failures	31	10.9%	4,761	13.0%
4 or more DEQ failures	87	30.5%	9,297	25.4%*

Chi-square = 4.90, not significant at $p < 0.10$

* Difference in shares (2001 vs. 2002) significant at $p < 0.05$.

Both years of data indicate that a large share of the vehicles getting trip permits were having difficulty passing the DEQ inspection. This is confirmed in Table 12, where the distributions are compared to all the vehicles in the DEQ database that failed an inspection. About half of the vehicles that failed an inspection during the 30 months of records only failed once, a significantly higher share than for the trip permit vehicles. Moreover, the percentage of all failing vehicles that failed four or more tests (12.6%) was less than half the percentage of the trip permit vehicles (30.5% in 2001 and 25.4% in 2002). These differences may indicate that vehicles with trip permits were having greater difficulty passing the DEQ test; owners were taking the vehicles back for re-testing and were failing more frequently. Whether the trip permit owners were repairing their vehicles prior to retesting is unknown.

Table 12: Vehicles with Trip Permits and DEQ Failures - Number of DEQ failures, compared to all DEQ tested vehicles with at least one failure

	2001 trip permits		2002 trip permits		All DEQ tested vehicles**	
	#	%	#	%	#	%
1 DEQ failure	112	39.3%*	14,434	39.5%*	129,975	50.4%
2 DEQ failures	55	19.3%*	8,085	22.1%*	62,224	24.1%
3 DEQ failures	31	10.9%	4,761	13.0%	33,104	12.8%
4 or more DEQ failures	87	30.5%*	9,297	25.4%*	32,479	12.6%
Total	285		36,577		257,782	

* Difference in share compared to all DEQ tested vehicles is significant at $p < 0.05$

**Vehicles tested at DEQ from October 2000 through April 2003 that failed at least once.

One hypothesis is that older vehicles have a more difficult time passing DEQ tests. Table 13 shows that of the vehicles getting trip permits in 2002, there are some relationships between the number of failures and model year. However, it is not a simple relationship. The share of vehicles that were made before 1980 actually declines as the number of failures increases. Only 5.3% of the vehicles with four or more failures were pre-1980, compared to 8.7% of the vehicles with only one failure. This may reflect the fact that pre-1980 vehicles are tested using the less rigorous “basic” test. In contrast, the share of vehicles from model years 1980-1993 increases. This makes sense, because these vehicles are fairly old (10-20+ years, well beyond their warranty), but must pass the enhanced test. They are more likely to experience failures of the emission system.

Table 13: Vehicles with Trip Permits and DEQ Failures – Age of Vehicle and Number of DEQ Failures

	2002 (complete data set)				
	% pre-1980	% 1980-93	% post-93	total	#
1 DEQ failure	8.7%	74.9%	16.4%	100%	14,434
2 DEQ failures	7.7%	80.5%	11.8%	100%	8,085
3 DEQ failures	6.8%	83.4%	9.8%	100%	4,761
4 or more DEQ failures	5.3%	87.6%	7.1%	100%	9,297

Chi-square = 643, significant at $p < 0.01$

The next question was whether these vehicles ever passed a DEQ test and were able to renew their vehicle registrations. Of the 36,577 vehicles from 2002, we were able to match 97% to a DMV record from 2001, 2002, or 2003. The remaining 1,141 (3.1%) could be unregistered vehicles or vehicles registered in another state. For example, someone moving from another state might have had the vehicle tested, failed, and then obtained a trip permit. If the vehicle could not pass the DEQ test, the owner would not have been able to register the vehicle in Oregon and, therefore, it would not show up in the DMV database. Whether these vehicles are staying in Oregon is unknown. Of those 1,141 vehicles, only 93 (8.2%) had a record of eventually passing a DEQ inspection.

For the 35,436 vehicles that obtained a trip permit in 2002, failed at least one DEQ test, and were matched to DMV data, we compared registration expiration dates for 2001, 2002, and 2003 to determine whether the registration was renewed. This analysis was to determine the sequence of events and whether the vehicle was registered after getting the trip permit. Table 14 shows the results.

The share of trip permit vehicle owners who did not renew their registrations decreased significantly in 2002, while the share who did renew their registrations went up significantly. This was an intended outcome of the change in the trip permit system. For 6,285 (17.8%) vehicles in 2002, the vehicle's registration was not renewed in 2002 or 2003. For a handful of these (58), we were able to determine that DMV issued a salvage title, indicating that the vehicle was scrapped. The remainder were owners whose vehicle registration expired, obtained a trip permit, and then did not renew the registration by the end of 2003. Some may still be in Oregon but without valid registration in Oregon (pathways 6 and 10). Others might have been scrapped (pathways 4 and 8) or moved out of state without notifying DMV (pathways 5 and 9). For the 2001 trip permit sample, a higher share (23.1% or 64 vehicles) did not renew their registration in 2002 or 2003. The registration expiration dates for all of these 64 vehicles were prior to 2001, confirming that registrations were not renewed in 2001.

The difference in the share of permit holders that eventually renewed their registration (80.1% in 2002 vs. 71.8% in 2001) indicates that more people who obtained trip permits in 2002 and failed DEQ are eventually renewing their registration – one intended effect of the change in the trip permit program.

Table 14: Vehicles with Trip Permits and Failed DEQ - DMV Registration

	2001 (sample)		2002 (complete data set)	
	#	%	#	%
Vehicles with at least 1 trip permit and 1 DEQ failure - Matched to DMV	277		35,436	
Vehicle did not renew its registration after the trip permit** was issued	64	23.1%	6,285	17.8%*
Salvage title issued	0	0%	58	1%
No salvage title issued	64	100%	6,227	99%
Vehicle did renew its registration after the last trip permit was issued	199	71.8%	28,667	80.1%*
Missing data on expiration date	14	5.1%	484	1.4%*

Chi-square = 34.06 (without salvage title rows), significant at $p < 0.01$

* Difference in shares (2001 vs. 2002) significant at $p < 0.01$.

** In 2002 the second trip permit obtained was used if the vehicle had more than one trip permit. If there were more than 2 trip permits for a vehicle, we assumed that the latter ones were for different owners.

Next we examined whether these vehicles ever did pass a DEQ test. For both years, of the vehicles that did not renew, the vast majority never passed a DEQ test (see Table 15).¹¹ A small share did pass a DEQ test. A handful of the owners in 2002 passed a DEQ test before getting a trip permit. This indicates that the owner might have gotten the trip permit for another reason – not because the vehicle couldn't pass DEQ. For example, an owner may not want to renew the vehicle's registration for two years, in anticipation of selling or moving the vehicle. There were also 258 vehicles that passed a DEQ test after getting the trip permit, but the owners still didn't renew the vehicle registrations.

More importantly, a higher share of the permit holders passed a DEQ test after the trip permit date and renewed their registrations. Of the sampled vehicles that got trip permits in 2001, 30.0% passed a DEQ test after the permit and had the registration renewed. In 2002, this share went up to 51.7%, a significant increase. This difference confirms that under the new program a higher share of the trip permit holders were eventually passing DEQ and registering their vehicles.

¹¹ For the time period of our DEQ data, through April 30, 2003.

Table 15: Vehicles with Trip Permits and Failed DEQ - DMV Registration and Subsequent DEQ tests

	2001 (sample)		2002 (complete data set)	
	#	%	#	%
Total: Vehicles with at least 1 trip permit and 1 DEQ failure - Matched to DMV	277	100.0%	35,436	100.0%
Vehicle did not renew its registration after the trip permit was issued				
Vehicle passed DEQ before last trip permit	0	0.0%	90	0.3%
Vehicle passed DEQ after last trip permit	1	0.4%	258	0.7%
Vehicle never passed DEQ**	63	22.7%	5,937	16.8%*
Vehicle did renew its registration after the trip permit* was issued				
Vehicle passed DEQ before last trip permit	2	0.7%	1,146	3.2%*
Vehicle passed DEQ after last trip permit	83	30.0%	18,318	51.7%*
Vehicle never passed DEQ**	114	41.2%	9,202	26.0%*
Owner zip not in DEQ inspection area	40	35.1%	3,028	32.9%
Owner Zip partially in DEQ inspection area	6	5.3%	1,150	12.5%
Owner zip entirely in DEQ inspection area	68	59.6%	5,024	54.6%
Missing data on expiration date	14	5.1%	484	1.4%*

* Difference in shares (2001 vs. 2002) significant at $p < 0.01$.

**between 10/1/2000 and 4/30/2003

Of those who did renew their registrations, but did not pass DEQ before April 2003, about one-third of the owners (for both years) were no longer in a VIP area and more were in zip codes that straddle VIP areas – so they may have been outside of a VIP area. However, there were over 5,000 vehicle owners who obtained trip permits in 2002, renewed their registrations afterwards and were within a VIP area, but we do not have a record of them passing a DEQ inspection before April 2003. Of these, 57% had a "last process date" after April 2003, indicating that the vehicle might have passed DEQ and renewed its registration after that date. In addition, some may have had vehicle addresses outside a VIP area.

6. Findings: Survey of Vehicle Owners

6.1. Background

The findings in the sections above, based on the existing data sources (DEQ, trip permits, and DMV) only tell part of the story. The survey of vehicle owners conducted for this project aimed to fill some of the anticipated gaps. In particular, what happened to vehicles that did not pass a

DEQ test? The DMV data could only confirm whether the vehicle's registration was renewed. It did not tell us for sure what the person did with the vehicle or how the trip permit was used. In addition, we only had comprehensive trip permit data for 2002, making comparisons between 2001 and 2002 more difficult.

The survey sample was drawn from owners of vehicles that failed two or more DEQ tests, including the last in a sequence of tests. This sampling frame was thought to be the most likely to comprise the owners who used the trip permits to avoid DEQ testing. These were vehicles that we believed could fall into pathways 5, 9, and 12 (ending with moving the vehicle outside the VIP area), 6, 10, and 13 (ending with operating the vehicle without valid registration), or 4, 8, and 11 (ending with scrapping the vehicle). Of the 218 completed surveys, 82 were from people who owned a vehicle that failed in 2001 and 92 were from people who owned a vehicle that failed in 2002. The remaining 44 were from people who reported they did not own the vehicle at the time of the DEQ test failure. These respondents are not included in the following analysis.

6.2. Motivations for DEQ test and actions after DEQ test

Overall, 95% of the respondents reported they were getting the DEQ test in order to renew their vehicle registration. In 2001, about half of the respondents obtained a trip permit after failing the test (Table 16), compared to 36.6% in 2002. This difference is significant ($p < 0.10$) and suggests that the change in the trip permit system may have impacted people's use of trip permits. The majority of respondents getting a trip permit in both years indicated that they used the trip permit(s) for 42 days or less. There is no significant difference in how long people used trip permits between 2001 and 2002, suggesting that the limits put in place in 2002 may not have impacted these owners' behavior. Only two respondents from 2001 and one from 2002 indicated using the permits for longer than 120 days, the limit in 2001. This either indicates that only a small portion of owners abused the system or that our survey did not capture this behavior. The latter could happen if people did not answer honestly or because of the small sample.

Table 16: Respondents' Use of Trip Permits after DEQ Inspection Failure

	2001		2002	
	#	%	#	%
Respondent got one or more trip permits after failing the DEQ inspection	41	50.6%	34	36.6%
Length of time trip permit used, 21 days or less	9	22.0%	8	23.5%
22 – 42 days	15	36.6%	14	41.2%
Over 42 days	13	31.7%	11	32.4%
Did not indicate length of trip permits	4	9.8%	1	2.9%
Did not get trip permit	40	49.4%	59	63.4%
Total	81		93	

* Difference in shares (2001 vs. 2002) significant at $p < 0.10$.

About equal shares of respondents (76.5% and 72.5%) attempted to repair the vehicle (Table 17). Just under half claimed that the vehicle later passed a DEQ inspection. However, the DEQ records indicate that fewer than five percent of these respondents' vehicles passed a DEQ test prior to April 2003. One respondent explained their problems in passing the inspection:

I was told by a mechanic and people at various DEQ stations to keep trying to pass DEQ, that it was a matter of getting lucky since nothing was wrong with the car. I finally got lucky on the 9th try. It was a hassle to keep finding the time to go to DEQ and to get trip permits. This year the car passed on the first try, go figure.

Table 17: Respondents' Actions after DEQ Inspection Failure

	2001		2002	
	total #	%	total #	%
Respondent attempted to repair the vehicle because it didn't pass inspection	81	76.5%	91	72.5%
Average amount spent trying to repair vehicle	54	\$396	58	\$258
Respondent claimed that the vehicle later passed a DEQ inspection	80	47.5%	89	49.4%

About half of the respondents stated that they were eventually able to register the vehicle within the Portland or Medford area (Table 18). The share of owners who did so is slightly higher for 2002 than 2001. More owners from 2001 indicated that they registered the vehicle outside the VIP areas. About 40% of the owners from each year were not able to register the vehicle. Note that this is just slightly higher than the share of vehicles from the DEQ test data that did not pass a DEQ test and did not renew their registration (Table 5). All but one of these respondents indicated that they were not able to later pass the DEQ test.

Table 18: Were you eventually able to register the vehicle?

	2001		2002	
	#	%	#	%
Yes, within the Portland or Medford area	36	45.0%	48	52.7%
Yes, outside the Portland or Medford area	11	13.8%	7	7.7%
No	33	41.3%	36	39.6%
Total	80		91	

Chi-square not significant.

6.3. Problems encountered with DEQ testing

For most respondents, failing the DEQ inspection was at least a minor problem (Table 19). For about half, it was a major problem. The differences between 2001 and 2002 are not statistically significant. These are some examples of problems the respondents encountered:

It was my major transportation. I live 24 miles outside city limits. No bus service or public transportation. Eventually needed to purchase new vehicle even though Chevy ran great, it was old and difficult to get it to pass DEQ standards

I lost my job b/c my car was towed. I sold my car to pay my rent. It was then licensed in WA. Since I have no car I ride the bus and it only goes to low paying jobs. So now I make enough to pay rent and eat but I can't take a job too far off the bus line

It's important that people realize transportation and childcare (besides proper housing) are huge impediments to getting out of poverty. Poor people can't afford the comprehensive insurance required to drive a newer car. Trip permits give you 20 days to handle your s***, which if you're broke, ain't enough.

It made it hard to get back and forth to work for that week. Also getting my daughter to and from school, to and from the store was also difficult. I also had to use money I could have paid another bill with just so I could get through DEQ

I ended up giving my car to my brother. He lives out of the stupid DEQ boundary. Had to take out a \$2000 loan b/c my little Honda barely would not pass. But rich pompous people can drive SUVs. Stupid law.

Table 19: How much of a problem was it that the vehicle failed the DEQ inspection?

	2001		2002	
A major problem	37	45.7%	47	52.8%
A minor problem	31	38.3%	24	27.0%
Not much of a problem at all	13	16.0%	18	20.2%
Total	81		89	

Chi-square not significant.

6.4. Where are the vehicles now?

Respondents were asked if they still had the vehicle that had failed the inspection. Table 20 shows that among the 2001 owners, 34.1% indicated that they still had the vehicle in the Portland or Medford area. Of these, 37.0% indicated that they were not able to pass DEQ and 33.3% indicated that they were unable to register the vehicle in the Portland or Medford area. Overall, 12.5% of the 2001 owners and 16.9% of the 2002 owners indicated that they still had the vehicle in a VIP area, but had not passed a DEQ inspection.

Those who still had the vehicle in the VIP areas but did not renew the registration fall into pathways 6, 10, and 13. For 2002, the share of respondents in this category was somewhat lower than in 2001 (27.3% vs. 33.3%). This decrease was an intended effect of the change in the trip permit program – reducing the share of people not renewing their vehicle registrations. However, an additional 9.1% of the 2002 respondents indicated that they had registered the vehicle outside the VIP areas but kept it in the VIP areas. Therefore, there was no real increase in the share of

respondents obtaining a valid registration for their vehicle.¹² An example of how some vehicle owners dealt with their difficulty in passing a DEQ test was voiced from one respondent:

I took ownership of the car from my son who live in Oregon City where the test is required so he could continue driving it.

Respondents were asked to estimate how many miles the vehicle was driven each month. Of those who responded to this question, the majority of those without valid registration for vehicles still in the Portland or Medford areas claimed that the vehicles were driven zero miles per month.

Table 20: Do you still have this vehicle?

	2001		2002	
Yes, and it's in the Portland or Medford area	28	34.1%	44	47.3%
<i>Vehicle did not later pass DEQ inspection according to respondent</i>	10	37.0% (12.5% of total)	15	35.7% (16.9% of total)
<i>Respondent was not able to register vehicle (pathways 6, 10, 13)</i>	9	33.3% (11.3% of total)	12	27.3% (13.2% of total)
% that claim vehicle is not driven	6	66.7%	8	100.0%*
<i>Respondent registered vehicle outside Portland or Medford area</i>	0	0.0%	4	9.1% (4.4% of total)
% that claim vehicle is not driven			2	50.0%
Yes, but I keep it outside the Portland or Medford area	2	2.4%	5	5.4%
No	52	63.4%	44	47.3%
<i>Failing DEQ was the main reason for getting rid of the vehicle</i>	21	40.4% (25.3% of total)	18	40.9% (19.1% of total)
Total	82		93	

*Only 8 respondents of 12 responded to this question.

The finding from Table 16 that a smaller share of respondents from 2002 got trip permits compared to 2001 holds true for the vehicles that were still kept by the owner within a VIP area. Table 21 shows that of the respondents who still had the vehicle in a VIP area, 46.2% got trip permits in 2001 compared to 29.5% in 2002. While the difference is not statistically significant due to the small sample size, the finding does indicate that the change in the trip permit system may have reduced reliance on trip permits. The pattern holds true for those who claimed the

¹² At least two-thirds of the respondents who claimed to keep their vehicle outside the VIP area had an address for the survey that was inside a VIP area.

vehicle eventually passed DEQ. It does not hold for those who stated that it did not later pass DEQ. However, the sample size for these vehicles is very small.

Table 21: Vehicles Still in VIP Area and Use of Trip Permits

	2001		2002	
Respondent still has vehicle in the Portland or Medford area	Share that got one or more trip permits after the DEQ failure			
All respondents	12 (of 26)	46.2%	13 (of 44)	29.5%
Vehicle did later pass DEQ inspection according to respondent	9 (of 16)	56.3%	7 (of 27)	25.9%
Vehicle did not later pass DEQ inspection according to respondent	3 (of 9)	33.3%	6 (of 15)	40.0%

Table 22 examines just the respondents who obtained a trip permit after the DEQ failure. It shows that more of the 2001 owners no longer have the vehicle. Some of this difference can probably be explained by the additional year that has passed for the owners of vehicles that failed in 2001. The share of owners who still have the vehicle in a VIP area and have it registered was slightly higher in 2002 than 2001, but the difference is not statistically significant. In addition, the share of owners who still have the vehicle in a VIP area but not registered is also higher in 2002, but not significantly. Again, some of this difference can be explained by time.

Table 22: Current Vehicle Status for Owners who Used Trip Permits

Respondent got a trip permit after DEQ failure	2001		2002	
	#	%	#	%
Still has vehicle in the Portland or Medford area, registered	9	22.0%	9	26.4%
Still has vehicle in the Portland or Medford area, not registered	3	7.3%	4	11.8%
Still has vehicle, but outside the Portland or Medford area, registered	0	0.0%	1	2.9%
Still has vehicle, but outside the Portland or Medford area, not registered	0	0.0%	1	2.9%
No longer has vehicle	29	70.7%	19	55.9%
Total	41		34	

Chi-square not significant.

Among all respondents, Table 20 shows that a higher share of the 2001 owners than 2002 owners no longer had the vehicle (63.4% vs. 47.3%). For each year, about 40% of the respondents claimed that failing the DEQ test was the main reason they got rid of the vehicle. About one-third (35% in 2001 and 32% in 2002) claimed that it didn't matter, and the remainder said that it was one of many reasons.

For respondents who no longer had the vehicle, the survey asked what the owner did with it. Table 23 shows the results. Overall, the majority of vehicles that were no longer owned by the respondents were likely still on the road somewhere. This would include vehicles sold or given to an individual and some of the vehicles given to charity or traded in. In each year, over 40% of the respondents sold the vehicle. A sizable share of the respondents gave the vehicle to an individual or charity. The survey did not ask where the sold or gifted vehicles reside. However, the DMV provided the most recent registered owner, which was the person responding to the survey. In a few of the cases, the vehicle registration might have been transferred after the DMV information was provided. In other cases, the original owner or buyer may not have notified the DMV about the transfer. This might be a common occurrence, given that about a dozen people called after receiving the survey questionnaire, claiming that they did not have the vehicle in question. In one case, a survey respondent indicated that he gave the vehicle to a student at PSU, who was delinquent in payments, and asked if we could assist in tracking the student down.¹³

For the subset of respondents who obtained a trip permit and later got rid of the vehicle, slightly higher shares scrapped their vehicles or gave them to individuals and smaller shares sold the vehicles. While the differences are not statistically significant because of the small sample size, the differences are logical. Getting a trip permit may indicate that repairing the vehicle to pass DEQ is more difficult and that the vehicle is in worse condition, decreasing the likelihood of being able to sell it – except to a scrap yard.

Table 23: What did you do with the vehicle?

	2001				2002			
	All		Trip Permit users		All		Trip Permit users	
	#	%	#	%	#	%	#	%
<i>May still be on the road</i>								
Sold it	23	44.2%	11	37.9%	18	40.9%	5	26.3%
Gave to an individual	5	9.6%	4	13.8%	7	15.9%	4	21.2%
Gave to charity	9	17.3%	4	13.8%	6	13.6%	4	21.2%
Traded it in	2	3.8%	0	0.0%	8	18.2%	2	10.5%
<i>No longer on the road</i>								
Other	3	5.8%	3	10.3%	1	2.3%	1	5.3%
Junked or scrapped it	7	13.5%	5	17.2%	4	9.1%	3	15.8%
Totaled it	3	5.8%	2	6.9%	0	0.0%	0	0.0%
Total	52		29		44		19	

¹³ Given the confidentiality requirements of the survey, we could not.

6.5. Demographics of survey respondents

The survey included some basic demographic questions. Table 24 shows the results. The majority of the respondents¹⁴ were men. The average highest year of school completed was over 13. Of the 2001 respondents, 13% had not completed high school (highest year ≤11); for the 2002 respondents, the share was 8%. As shown in Table 25, the race/ethnicity of the respondents was similar to the population from the 2000 Census for the VIP areas. About two-thirds of the respondents from both years reported that they work either full- or part-time (Table 26).

Table 24: Demographics of Vehicle Owner Survey Respondents

	2001		2002	
	#	%	#	%
Male	47	57.3%	58	64.4%
Age (mean and standard deviation)	n/a	46.4 (14.4)	n/a	45.1 (15.5)
Highest year of school completed (mean and standard deviation)	n/a	13.2 (2.8)	n/a	13.6 (2.0)
White/Caucasian*	71	85.5%	80	86.0%
Hispanic*	10	12.0%	3	3.2%
Total	83		93	

* Respondents were allowed to check more than one race/ethnicity category.

Table 25: Race/Ethnicity of Vehicle Owner Survey Respondents

	Respondents		2000 Census	
			Multnomah, Washington & Clackamas Counties	Jackson County
White/Caucasian only	144	85.5%	82.9%	91.6%
Non-white/Caucasian only	20	11.9%	13.7%	5.4%
More than one race/ethnicity	4	2.3%	3.4%	2.9%
Did not answer	4	2.3%	0.0%	0.0%
	172	100.0%	100.0%	100.0%

¹⁴ "Respondents" only include those who indicated that they owned the vehicle when it failed the inspection.

Table 26: Employment Status of Vehicle Owner Survey Respondents

	2001		2002	
	#	%	#	%
Work full-time or part-time	55	66.2%	62	68.9%
Unemployed & looking for work	5	6.0%	4	4.4%
Unemployed	3	3.6%	2	2.2%
Retired	12	14.5%	10	11.1%
Homemaker	3	3.6%	3	3.3%
Other employment status	5	6.0%	9	10.0%
Total	83		90	

Over half of the respondents indicated that their household earned less than \$40,000 in 2003 and about one third made less than \$20,000 (Table 27). The shares of respondents in the lower income categories are significantly higher than the Census data from 2000, particularly for the Portland three-county area. This is consistent with expectations. Vehicles that fail multiple tests (such as this sample) are more likely to be poorly maintained. The research literature indicates that lower income vehicle owners are less likely to perform regular maintenance or make repairs that may be necessary to pass an emissions test because of their limited income (National Cooperative Highway Research Program, 1997; Wenzel et al, 2000). These households are least likely to be able to afford to repair their vehicle to pass the DEQ test, and, therefore, may be more likely to risk driving an unregistered vehicle. One respondent, for example, explained his/her situation:

I had no transportation. I tried 2 times and spent \$300 on repairs and was saving more money to fix it. I was told to get it out of the apartment parking lot or they would tow it because my tags were expired. I put it on the street and in one week got 2 \$35 tickets for my expired tags, there went my repair money

Table 27: Income of Vehicle Owner Survey Respondents

	Respondents* (2003 income)		2000 Census (1999 income)	
			Multnomah, Washington & Clackamas counties	Jackson county
	#	%		
Under \$20,000	60	34.1%	17.2%	25.0%
\$20,000 – 39,999	44	25.0%	24.6%	29.3%
\$40,000 – 59,999	31	17.6%	21.1%	19.8%
\$60,000 – 99,999	21	11.9%	23.4%	17.9%
\$100,000 or more	14	8.0%	13.7%	8.0%
No response	6	3.4%	0.0%	0.0%
Total	176			

* Respondents who owned the vehicle at the time of the DEQ failure.

7. Conclusions

7.1. Was there a change in the number of trip permits issued?

The number of trip permits issued in 2002 was dramatically smaller than the number issued in 2001. There were drops in the number of permits issued both inside and outside the VIP areas. However, the number of permits per thousand population within VIP areas is much higher than outside the VIP areas, for both 2001 and 2002. This difference indicates that problems in passing a DEQ test may be the motivation for many of the trip permits issued within the VIP areas.

One motivation for the change in the trip permit system was to reduce the number of people using successive permits to avoid the DEQ altogether. Given Oregon's low vehicle registration renewal fees, vehicle owners are unlikely to use trip permits to simply avoid the renewal fee. Two of the 120-day permits in 2001 would have cost \$80, more than the registration renewal fee. Vehicle owners who were abusing the system were thus probably using the trip permits for other reasons, such as avoiding DEQ testing, or they didn't have the necessary proof of title.

Within the VIP areas, the number of permits issued per month dropped steadily throughout 2002 after the change went into effect January 1st. There was no similar pattern outside of the VIP areas. This finding supports the hypothesis that within the VIP areas people were using successive permits, and the change in the system would reduce such abuse. These vehicle owners were no longer able to continue using trip permits after getting two permits in 2002, lasting 42 days.

7.2. Has the new system resulted in vehicles getting fixed and passing emissions inspections faster?

The new trip permit system does not appear to be making a difference in how quickly vehicles are repaired to pass DEQ inspection. For vehicles that failed an initial DEQ test and eventually passed, the amount of time between failing and passing did not decline significantly in 2002 compared to 2001.

7.3. Are more vehicles being repaired to pass emissions inspection and being registered as a result of the new system?

There was an increase in the share of vehicles that initially failed a DEQ inspection and eventually passed, an intended effect of the legislation. However, there was a similar increase in the number and share of vehicles that took multiple tests, failing both the first and last tests.

The comparison in trip permits between 2001 and 2002 indicates that more people who obtained trip permits in 2002 and failed DEQ eventually renewed their registration – one intended effect of the change in the trip permit program. Of the vehicles with trip permits that had failed a DEQ test, the share that later passed a DEQ test and renewed the vehicle registration went up from about 30% in 2001 to 52% in 2002.

The vehicle owner survey also confirmed that fewer vehicle owners were using trip permits. A smaller share of vehicle owners who failed multiple DEQ tests used trip permits in 2002 compared to 2001. This was true overall and also for owners who still had their vehicles in a VIP area. However, the survey also revealed that some owners of vehicles that failed a test in 2002 registered the vehicle outside of the VIP area, but kept it in a VIP area. While most of these owners claimed to not drive the vehicle, the responses suggest that there is some evasion still occurring. Passing a DEQ test was a problem for many vehicle owners and was the primary reason many of them got rid of the failing vehicle. Overall, all three sources indicate that, while vehicle owners may not be abusing the trip permit system any more, not all of them are necessarily repairing their vehicles, passing DEQ, and registering them.

7.4. What is happening to vehicles that do not pass the emissions inspection, even after getting a trip permit?

The existing data records (trip permits, DEQ, and DMV) indicate that a larger share of vehicles that got trip permits in 2002 had their registrations renewed after getting the trip permit, compared to 2001. A larger share of the vehicles getting trip permits in 2002 did eventually pass a DEQ inspection: 52.4%, compared to 30.3% for the sample of 2001 trip permits. These are positive findings, consistent with the intent of the legislative change.

However, some owners are probably continuing to keep their vehicles without valid registration – they are just not getting trip permits. The survey findings confirm this. Of the survey respondents who obtained trip permits, less than 12% from each year still had the vehicle in a VIP area without valid registration. Presumably, these vehicles had not passed a DEQ test. The exact magnitude of this problem is unknown. Many of these owners claimed to not drive the vehicle. In addition, our survey respondents had vehicles that failed multiple DEQ tests and, therefore, represent a small portion of all vehicle owners – less than three percent overall. On the other hand, most of the respondents who got trip permits no longer had the vehicle, and most of

these owners sold or gave the vehicle to an individual or charity. These vehicles might still be operating somewhere, perhaps still not repaired to pass DEQ.

7.5. *Does the inability to pass a DEQ test lead to unregistered vehicles?*

We estimate that about 5,200-6,600 vehicles each year do not pass a DEQ test and do not renew their registration with DMV. This is equivalent to less than one-half of one-percent of all the registered vehicles subject to VIP. Based on the survey responses, about 15% of these may still be owned by the same person and kept within a VIP area, but without passing a DEQ inspection. Most of these owners claim that the vehicle is not driven. It is likely that without the DEQ test requirement or with a repair cost waiver, many of these vehicle owners would renew their registration – given the relatively low cost to register a vehicle in Oregon. For some, the requirement for insurance or proof of title may still be an impediment to vehicle registration. A larger share of the failing vehicles are transferred to a new owner, some of which may still be in a VIP area. A small portion is scrapped.

7.6. *Policy Implications*

Overall, it appears that the change in the trip permit system has significantly reduced abuse of the program. A large number of vehicle owners are no longer using successive trip permits to avoid passing a DEQ test. A larger share of the trip permit holders who had failed a DEQ test later passed a test and renewed their vehicle registrations. However, there are still vehicle owners with vehicles in the VIP areas that have neither passed a DEQ test nor have had their registration renewed. A repair cost waiver program would likely entice many of these owners to register their vehicles. The impact on emissions of these vehicles being registered without passing DEQ is likely minimal, since many of them are currently in the VIP areas already without valid registrations. However, there may be many owners who pass DEQ after spending more money on repairs than the likely level of a repair cost waiver. If these owners opted for the waiver, their vehicles might be polluting more than without the waiver option. In addition, many of the vehicles that are not registered, but are still in the VIP areas, are not, according to their owners, being driven. With a repair cost waiver option, these owners might start driving these vehicles.

The people most likely to have problems getting their vehicles to pass a DEQ test and, therefore, registered with DMV, are lower-income households. The new DEQ (Tonkin - United Way) program that offers subsidized repairs for such owners can help address this problem. Whether the program as currently designed and operated is effective at reaching these owners is beyond the scope of this project, but worth examining further. The survey responses indicated that there are many vehicle owners who would like to get their vehicles to pass DEQ, but they just cannot afford it. Losing access to that vehicle can cause hardship.

8. References

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- Legislative Fiscal Office, "Fiscal Analysis of Proposed Legislation HB 2178," Oregon 2001 Legislative Session, February 6, 2001.
- National Cooperative Highway Research Program, *Improving Transportation Data for Mobile Source Emission Estimates*. Transportation Research Board, Washington, DC, 1997
- National Research Council (NRC), Committee on Vehicle Emission Inspection and Maintenance Programs, *Evaluating Vehicle Emissions Inspection and Maintenance Programs*, National Academy Press: Washington, DC, 2001.
- US EPA, Office of Transportation and Air Quality, "OBD: Frequently Asked Questions," EPA420-02-014, August 2002.
- US EPA, Office of Transportation and Air Quality, "Major Elements of Operating I/M Programs," EPA420-B-03-012, March 2003.
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9. Appendices

9.1. Survey cover letter and instrument

July 22, 2004

Name
Address
City, OR, ZIP

Dear NAME:

My name is Jennifer Dill, and I am a faculty member at Portland State University. I am conducting a study of vehicle owners and their experiences with DEQ emissions testing. We want to find out what people do if their vehicle does not pass an inspection and how this impacts their use of the vehicle and their everyday life. The information we collect from this study will help us understand the impacts of the emissions inspection program.

You are being asked to take part in this study because, according to DEQ records, you own or owned a vehicle that did not pass a DEQ emissions test. If you decide to participate, we ask that you complete the enclosed survey. It includes questions about what you did after the vehicle did not pass the DEQ test. It should take about 10-15 minutes to complete, and you can return it in the postage-paid envelope. In appreciation of your participation, we invite you to enter a random drawing for two \$250 Fred Meyer gift cards. The form for the drawing is also enclosed.

We will protect the confidentiality of your individual survey responses. Each survey has a unique number. The number is used to determine who has responded and who has not. Your name will **not** be linked to your answers. The database linking your name to the survey number is kept in a separate location from the survey responses. If you remove the number and return the survey, you may receive a second copy of the survey. If so, please do not complete the survey twice.

Please return the survey by August 6, 2004. Participation is entirely voluntary. Your decision to participate or not will not affect your relationship with PSU or the State of Oregon in any way. This project is being sponsored, in part, by the Oregon Department of Transportation. However, your individual survey responses with the numbers or any other identifying information *will not* be accessible to the DEQ or DMV.

If you have concerns or problems about your participation in this study or your rights as a participant, please contact the Human Subjects Research Review Committee, Office of Research and Sponsored Projects, 111 Cramer Hall, Portland State University, 503-725-4288. If you have any questions about the study, contact me at 350 Urban Center, PSU, 503-725-5173 or jdill@pdx.edu.

Sincerely,

Jennifer Dill, Ph.D.
Assistant Professor
Center for Urban Studies

«SurveyID»

PORTLAND STATE UNIVERSITY – – CENTER FOR URBAN STUDIES

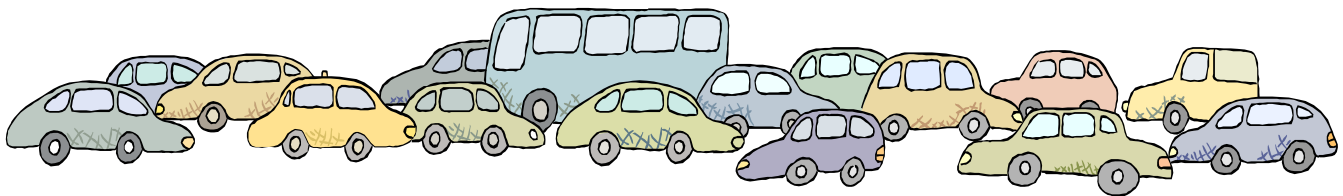
Vehicle Owner Survey

This survey is about your experiences as a vehicle owner with DEQ emissions testing. According to DEQ records, you owned a vehicle that did not pass a DEQ emissions inspection in 2001 or 2002. We are interested to know what actions you took as a result of this vehicle not passing the DEQ inspection. That vehicle is described on the label below:

The survey will take only a few minutes to complete. Each survey has a unique number. The number is used to determine who has responded and who has not. Your name will **not** be linked to your answers. If you remove the number and return the survey, you may receive a second copy of the survey. If so, please do not complete the survey twice.

Thank you for your help.

Jennifer Dill
Center for Urban Studies
Portland State University
PO Box 751
Portland, OR 97207-0751
jdill@pdx.edu
503-725-5173



PART I: Vehicle that Failed a DEQ Inspection

1. Did you own the vehicle described above when it failed the inspection?
 - a. No (*If No, please skip to Part II on page 3.*)
 - b. Yes
2. Were you getting the vehicle inspected in order to register it with the DMV?
 - a. Yes
 - b. No. If no, why were you getting the vehicle inspected? _____

We would like some general background information about you. Your answers to these questions are important to help us generalize the findings from this sample to the population as a whole. We assure you that your responses are confidential.

1. How old are you? _____ years
2. Are you
 - a. Male
 - b. Female
3. What zip code do you live in? _____
4. What is the highest year of school you have completed? (Circle one number)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17+
elementary/middle school								high school				college			post grad	
5. What is your race/ethnicity? (Circle all that apply.)
 - a. White/Caucasian
 - b. Asian/Pacific Islander
 - c. Hispanic
 - d. Black/African-American
 - e. Other (describe): _____
6. What is your employment status? (Please circle one answer.)
 - a. Work full-time
 - b. Work part-time
 - c. Unemployed and looking for work
 - d. Unemployed
 - e. Retired
 - f. Homemaker
 - g. Other: _____
7. What was your household income in 2003?
 - a. Less than \$20,000
 - b. \$20,000 to 39,999
 - c. \$40,000 to 59,999
 - d. \$60,000 to 79,999
 - e. \$80,000 to 99,999
 - f. \$100,000 or more
8. Do you have any questions or comments about this survey?

Thank you for participating in this important research.