

**ATTACHMENT I****Memorandum***District of Columbia**Bowie**College Park**Frederick County**Gaithersburg**Greenbelt**Montgomery County**Prince George's County**Rockville**Takoma Park**Alexandria**Arlington County**Fairfax**Fairfax County**Falls Church**Loudoun County**Manassas**Manassas Park**Prince William County*

Date: March 15, 2006
April 28, 2006 (Revised)

To: File

From: Michael Freeman

Subject: Evaluation of 2005 Vehicle Registration Data for District of Columbia

Background

The Mobile 6.2 model that is used to develop emissions rates for mobile source emissions inventory for the State Implementation Plan (SIP) and transportation conformity analysis requires a number of vehicle-specific inputs. In the Washington non-attainment region emissions rates are developed for each jurisdiction in the non-attainment area. Two of the inputs are: vehicle registration data used to develop age distribution by vehicle type, and the percentage of diesel vehicles for each vehicle type. As part of the interagency consultation procedures in place, the transportation department and the environmental department have agreed to update these data sets once every three years. The region has been using 2002 registration data sets for all emissions analysis and we are in the process of using the 2005 raw registration data information to develop 2005 input files to the Mobile 6.2 model.

Vehicle registration data have been used to develop the two input files used in the Mobile 6.2 model; namely "xxx.rdt" (age distribution by vehicle type) and "xxx.dsf" (percentage of diesel vehicles for each vehicle type and for each model year). DC staff has transmitted to TPB staff 2005 raw registration data files. TPB staff has used these raw data to produce a set of "xxx.rdt" and "xxx.dsf" files using a method that includes vehicle identification

number (VIN) decoding software. This memo will document TPB staff's findings and make recommendations for developing rdt and dsf files for future air quality planning studies.

Methodology

COG used the following outline to develop rdt and dsf files (depicted graphically as a flowchart in Attachment 1):

- 1) Extract all unique VIN (deleting duplicates and purging expired registrations) by jurisdiction from the 2005 vehicle registration database (July 2005 snapshot) and decode with VINPOWER decoding software. The decoding software provided model year, Mobile 6.2 vehicle type, and other vehicle attributes. Attachment 2 summarizes the VIN control totals and decoded results. A summary of the number of decoded VIN by vehicle type is provided in Attachment 5.
- 2) Convert the decode results:
 - a. Vehicle age distribution: This is the first of the two input files needed.
 - i. *Vehicle type*: The VIN decoder software breaks down the registration data into the Mobile 6.2 28 vehicle categories. However, the current version of Mobile 6.2 16 can only handle registration (xxx.rdt) files in 16 vehicle types and it uses the "xxx.dsf" files internally to break it into 28 categories. Therefore, the decoded data are converted from the 28 (Mobile 6.2) types to 16 vehicle types by combining the diesel and gasoline vehicle types. While aggregating the data and developing the diesel vehicle percentages, a percentage of the heavy duty gas bus (HDGB) had to be assigned to heavy duty school bus, and heavy duty transit bus. Since Mobile 6.2 guidance did not provide specific guidance as to how to split the heavy duty gas bus between school and transit bus staff assigned 50% of the heavy duty gas bus to transit bus (HDBT) and 50% to school bus (HDBS). A similar assumption had to be made with light duty diesel trucks as

well due to lack of guidance. Light duty diesel trucks 12 (LDDT 12) were assigned 50% percent to light duty truck 1 (LDT1) and 50% to light duty truck 2 (LDT2), and light duty diesel truck 34 (LDDT34) were assigned 50% to light duty truck 3 (LDT3) and 50% to light duty truck 4 (LDT4). After discussion with air and transportation agency representatives the method was modified. Since all heavy duty transit buses are diesel, and since a majority of the heavy duty gas buses were smaller shuttle buses it was decided that heavy duty gas bus (HDGB) were to be distributed among the different heavy duty vehicle types (HDV2B, HDV3, and HDV6) using the gross vehicle weight of the bus as determined by the VIN decoder. Similarly light duty diesel truck 1,2 and light duty diesel truck 3,4 were also distributed among light duty trucks 1,2,3 and 4 based on the gross vehicle weight as determined by the VIN decoder Attachment 3 shows the factors used for converting the 28 types to 16 types.

- ii. *Model Years:* Since the raw registration file reflects July 1, 2005 conditions, it includes model year 2005 and 2006 as the first year vehicles. The Mobile 6.2 guidance recommends combining the two model years into model year 'one'. In addition, Vinpower does not decode VINs for vehicles that were manufactured prior to 1980 since the VINs did not meet International Standards Organization (ISO) standards prior to 1980. In order to solve this problem, we used the decoded results to directly assign vehicles to model years one through twenty-four, and used the year 24 profile to develop year 25 and older model years. The vehicle registration records were used to determine control totals by jurisdiction for: (A) Mobile 6 vehicle type years < than 25; (B) Mobile 6 vehicle types year = 25 or older. For Mobile 6 vehicle type year = 25, apply regional distribution for mobile year = 24 and normalize to match control total % from step (B). For Mobile years 1 through 24, use vin decode results to develop distributions by

vehicle type and year. Then normalize years 1 through 24 of each row so that years 1 through 25 = 100%. Develop 16 (vehicle type) by 25 (Mobile 6 year) matrices by jurisdiction. This is the rdt file for input into Mobile 6. After discussion this method was modified by distributing model year 25+ vehicles among the 16 vehicle types using the vehicle type distribution for years 20 through 24 obtained through the VIN decoder. This calculation is depicted in Attachment 6.

- b. Diesel percentages by vehicle type: This is the second input file needed in Mobile 6.2 model. For percentage of diesel vehicles by vehicle type and by year (xxx.dsf) file development, use the vehicle equivalency table and the VIN decode to calculate the number of diesel and gasoline vehicles for each of the 16 vehicle types. The ratio of diesel vehicles to the total number of vehicles is the dsf for each category. Since the VIN decoder will not decode for year 25, use the dsf calculated for year 24 for year 25, also.

Comparison with Mobile 6 Defaults

The next step in the processes was to compare the data developed using the methodology described above with 2002 registration data and Mobile 6.2 defaults used in previous air quality planning efforts. The attached comparison charts were used to summarize the findings.

- 1) Vehicle Age Distribution
 - a. For LDV and LDT1, LDT2, LDT3, LDT4 (less so than the others) vehicle types, the VIN Decodes compare well with 2002 registration data. The vehicle types with the most observations (LDV, LDT2) match better than vehicle types with fewer observations.
 - b. Generally “Heavy Duty” vehicle categories do not track as well as “Light Duty” vehicle categories.
 - c. For the motorcycle category, the mobile defaults put all vehicles older than 12 years into the 12th year category and no values are provided for years 13 through 25.

2) Percentage of Diesel Vehicles: The diesel fractions calculated from vin decode results were plotted against mobile defaults as shown in Attachment 8. The following conclusions were made from reviewing the diesel fractions.

- a LDV:* Both the vin decodes and Mobile defaults have dsf values near zero for years 1 to 20. For years 20 to 25, the mobile defaults increase to about 0.08, but the dsf values based on VIN decodes increase to about 0.25 for the same years.
- b LDT1/LDT2/LDT3/LDT4:* The DSF values generated by the VIN decode method are near zero for a number of years as compared to the Mobile 6 default.
- c HDV2B:* VIN decoder and Mobile defaults are fairly close with VIN decodes slightly higher in years 1 through 10 and mobile defaults slightly higher in years 11 through 24. However, two large spikes occur in year 8 and year 19 with the vin decodes.
- d HDV3/HDV4:* VIN decodes are lower than Mobile defaults for these categories, particularly in later years.
- e HDV5/HDV6/HDV7:* VIN decodes are higher than Mobile defaults for these categories.
- f HDV8A/HDV8B:* Both VIN decodes and Mobile defaults have dsf values at or near 1.0.

Recommendations

1) Age Distributions

- Use distributions developed by COG based on VIN decode results for the 16 vehicle types. It was decided to use the VIN decoded transit and school bus registration data instead of the Mobile 6.2 defaults as was done previously, despite the ‘peaks’ occasioned by the periodic purchase of vehicles.

2) Diesel Fractions

- Due to the relatively small number of registered vehicles in the District of Columbia (considered regionally), MWCOG staff aggregated DC and Maryland jurisdictions and calculated composite DC / MD regional diesel fraction for the 14 vehicle types.

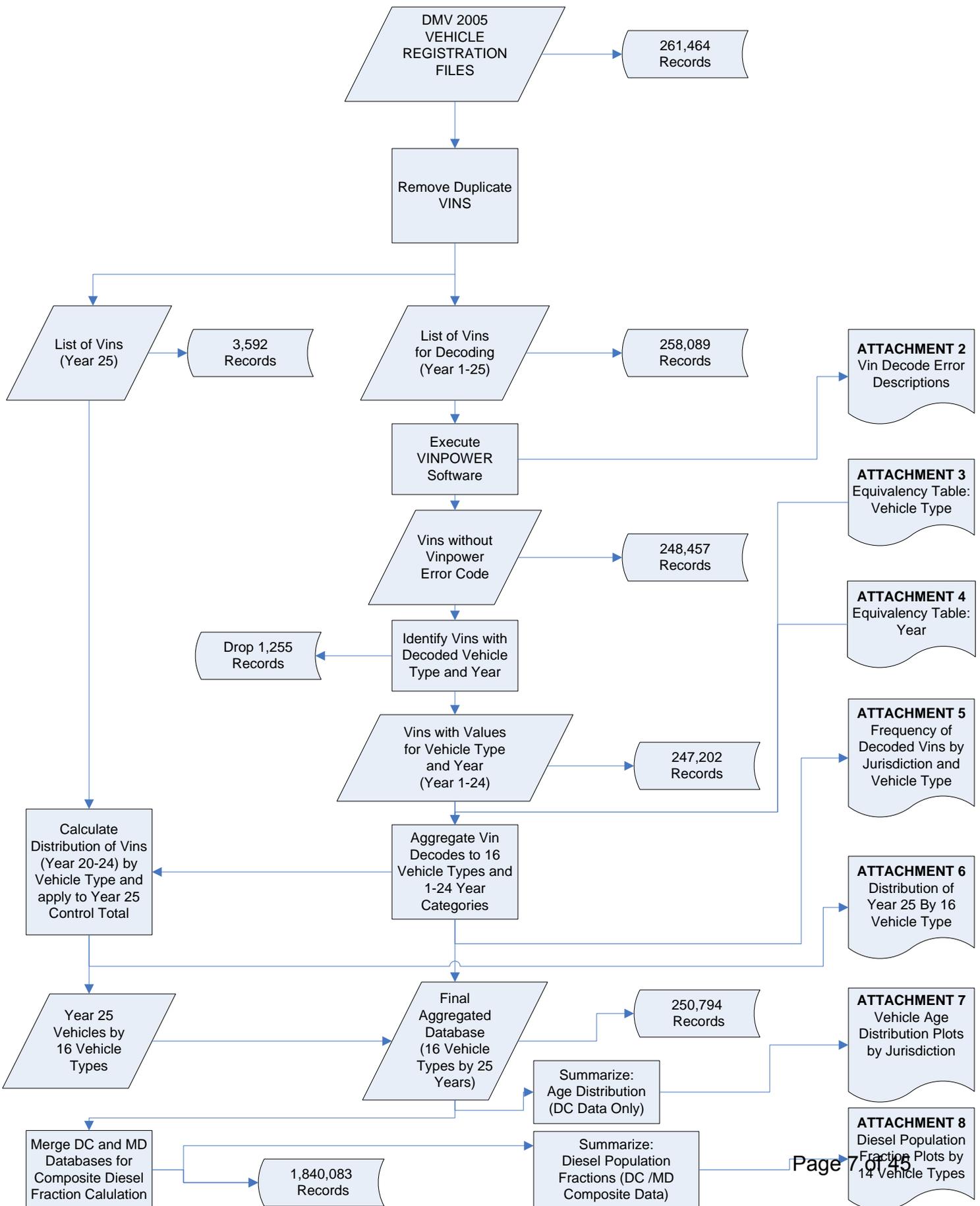
LIST OF ATTACHMENTS

- **ATTACHMENT 1:** VIN DECODE PROCESS FLOWCHART
- **ATTACHMENT 2:** 2005 VEHICLE REGISTRATION DATA VINPOWER DECODE RESULTS
- **ATTACHMENT 3:** EQUIVALENCY TABLE: VEHICLE TYPE (28 Mobile 6.2 Vehicle Types Versus 16 Mobile 6.2 Vehicle Types)
- **ATTACHMENT 4:** EQUIVALENCY TABLE: YEAR (Manufacturer Model Year Versus Mobile 6.2 Model Year)
- **ATTACHMENT 5:** FREQUENCY OF DECODED VINS BY VEHICLE TYPE
- **ATTACHMENT 6:** CALCULATION OF 25TH YEAR AGE FRACTIONS
- **ATTACHMENT 7:** COMPARISON OF VEHICLE AGE DISTRIBUTIONS (VIN Decoder Results Versus 2002 Registration Data for 16 Vehicle Types)
- **ATTACHMENT 8:** PERCENTAGE OF DIESEL VEHICLES BY VEHICLE TYPE (Comparison of VIN Results with 2002 Defaults for 14 vehicle types)
- **ATTACHMENT 9:** AGE FRACTION (RDT) AND DIESELL FRACTION (DSF) INPUT FILES FOR MOBILE 6.2

ATTACHMENT 1

Vin Decode Process Flowchart

District of Columbia



ATTACHMENT 2

2005 Vehicle Registration Data VinPower Decode Results

State	VINS
DC	258,089

Error Code	Error Code Description	DC
	No Error - Decoded Successfully	96.3%
1	VIN Number contains illegal characters	0.4%
2	VIN too short to decode (i.e.: < 10 chars)	0.4%
3	VIN Exceeds 17 characters	0.0%
4	Check Digit is bad	1.2%
5	This vehicle is unavailable in the database	0.8%
6	The model year for this vehicle is unavailable	0.2%
7	VIN Decode Error	0.0%
	Error w/o Error Code	0.7%
	TOTAL	100.0%

**ATTACHMENT 3
EQUIVALENCY TABLE - VEHICLE TYPE**

Mobile 6 Vehicle Type	COG Vehicle Type																TOTAL	
	1 LDV	2 LDT1	3 LDT2	4 LDT3	5 LDT4	6 HDV2B	7 HDV3	8 HDV4	9 HDV5	10 HDV6	11 HDV7	12 HDV8A	13 HDV8B	14 HDBS	15 HDBT	16 MC		
1 LDGV	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
2 LDGT1	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
3 LDGT2	-	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
4 LDGT3	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
5 LDGT4	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	1.00
6 HDGV2B	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	-	1.00
7 HDGV3	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	1.00
8 HDGV4	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	1.00
9 HDGV5	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	1.00
10 HDGV6	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	1.00
11 HDGV7	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	1.00
12 HDGV8A	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	1.00
13 HDGV8B	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	1.00
14 LDDV	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
15 LDDT12	-	-	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00
16 HDDV2B	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	-	1.00
17 HDDV3	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	-	1.00
18 HDDV4	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	-	1.00
19 HDDV5	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	-	1.00
20 HDDV6	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	-	1.00
21 HDDV7	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	-	1.00
22 HDDV8A	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	-	1.00
23 HDDV8B	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	-	1.00
24 MC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	1.00
25 HDGB	-	-	-	-	-	0.78	0.17	-	-	0.05	0.00	-	-	-	-	-	-	1.00
26 HDDBT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	1.00
27 HDDBS	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	-	-	-	1.00
28 LDDT34	-	-	-	0.63	0.37	-	-	-	-	-	-	-	-	-	-	-	-	1.00

**ATTACHMENT 4
EQUIVALENCY TABLE - YEAR**

Vehicle Model Year	Mobile 6 Year
2006, 2005	1
2004	2
2003	3
2002	4
2001	5
2000	6
1999	7
1998	8
1997	9
1996	10
1995	11
1994	12
1993	13
1992	14
1991	15
1990	16
1989	17
1988	18
1987	19
1986	20
1985	21
1984	22
1983	23
1982	24
<= 1981	25

ATTACHMENT 5
FREQUENCY OF DECODED VINS BY JURISDICTION AND
VEHICLE TYPE

Sum of count	source	
cog_veh	Vin Decodes	%
LDV	173,864	70.3%
LDT1	1,672	0.7%
LDT2	46,377	18.8%
LDT3	11,596	4.7%
LDT4	2,854	1.2%
HDV2B	4,327	1.8%
HDV3	822	0.3%
HDV4	1,516	0.6%
HDV5	208	0.1%
HDV6	382	0.2%
HDV7	288	0.1%
HDV8A	379	0.2%
HDV8B	52	0.0%
HDBS	253	0.1%
HDBT	468	0.2%
MC	2,144	0.9%
Grand Total	247,202	100.0%

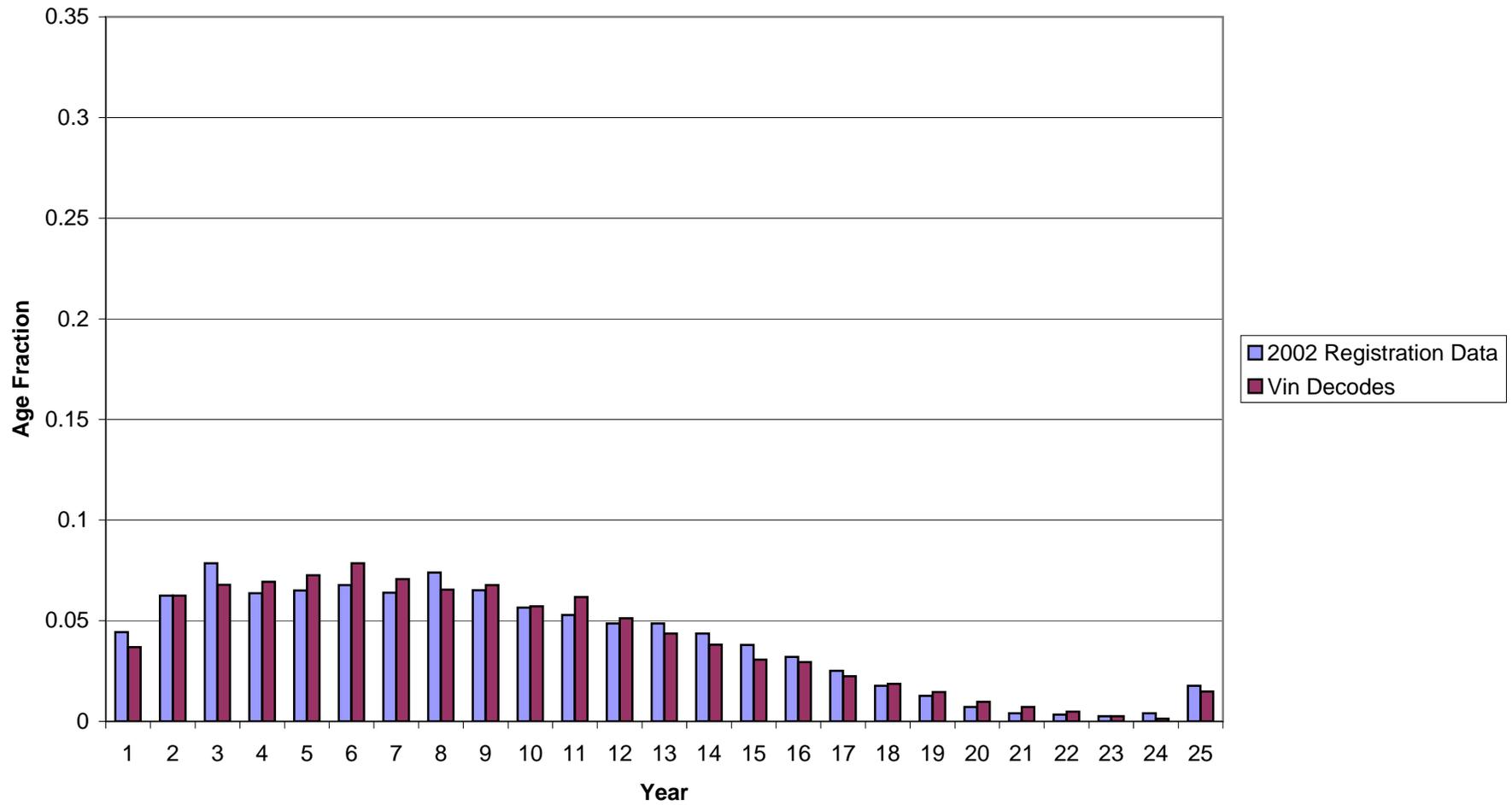
ATTACHMENT 6
Estimation of 25th Year Age Fraction
Based Upon DMV Vehicle Registration Records and Vin Decode Results

2005 District of Columbia Vehicle Registration Data		
	Freq	%
Years 1 - 24	254,497	98.61%
Year 25	3,592	1.39%
TOTAL	258,089	100.00%

A Vehicle Type	B Yrs 20 - 24		D Est 25th YR Veh C*3592	E Vin Decodes Yrs 1 - 24	F Est Control Total D+E	G 25th Yr RDT D/F
	Freq	%				
LDV	4,499	73.06%	2,624	173,864	176,488	1.49%
LDT1	49	0.80%	29	1,672	1,701	1.68%
LDT2	766	12.44%	447	46,377	46,824	0.95%
LDT3	344	5.59%	201	11,596	11,797	1.70%
LDT4	30	0.49%	17	2,854	2,871	0.61%
HDV2B	248	4.03%	145	4,327	4,472	3.24%
HDV3	39	0.63%	23	822	845	2.69%
HDV4	44	0.71%	26	1,516	1,542	1.66%
HDV5	14	0.23%	8	208	216	3.78%
HDV6	25	0.41%	15	382	397	3.68%
HDV7	19	0.31%	11	288	299	3.71%
HDV8A	6	0.10%	3	379	382	0.91%
HDV8B	3	0.05%	2	52	54	3.26%
HDBS	7	0.11%	4	253	257	1.59%
HDBT	9	0.15%	5	468	473	1.11%
MC	56	0.91%	33	2,144	2,177	1.50%
TOTAL	6,158	100.00%	3,592	247,202	250,794	1.43%

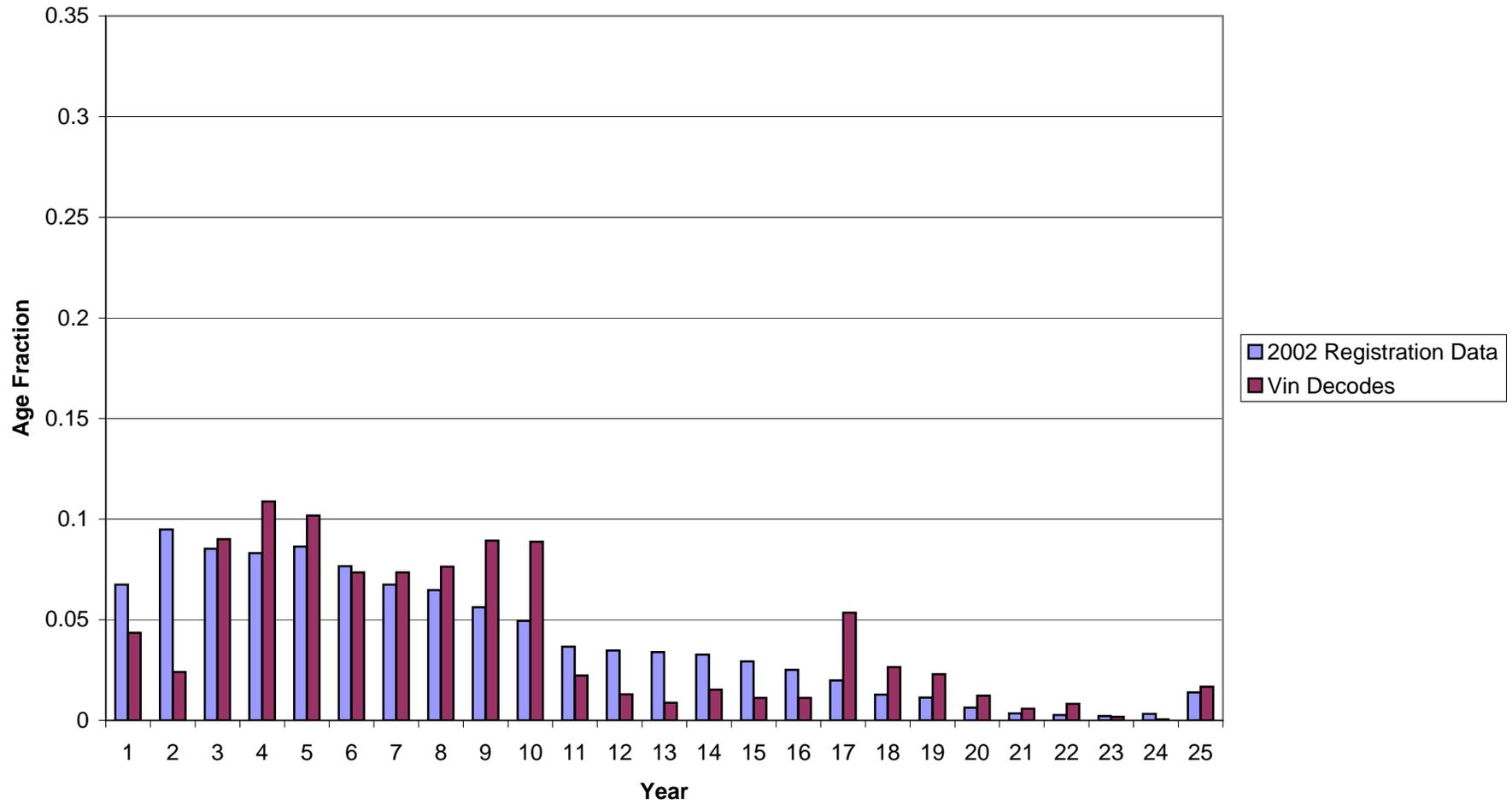
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = LDV
Number of Decoded Vins = 173,864



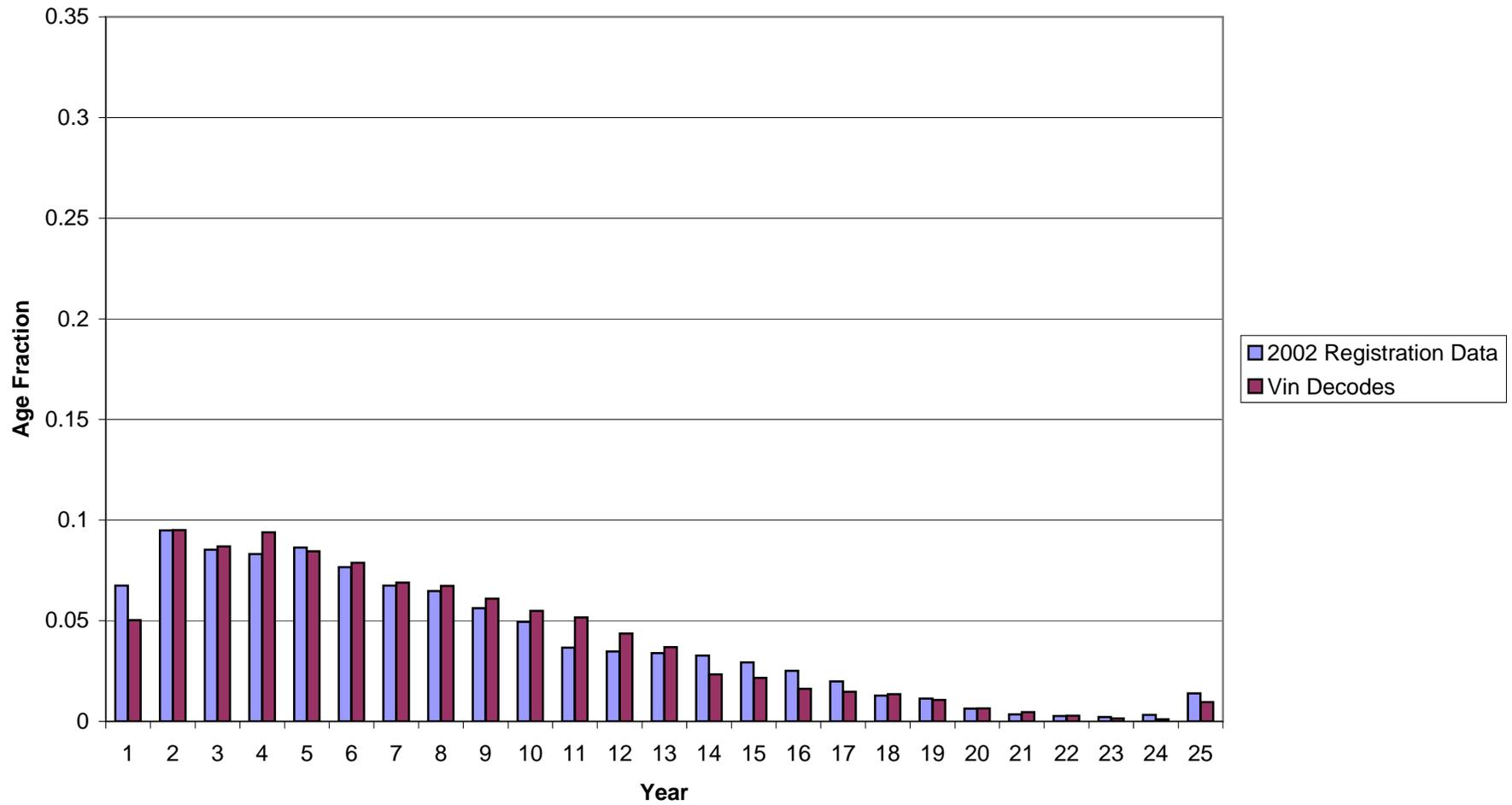
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = LDT1
Number of Decoded Vins = 1,677



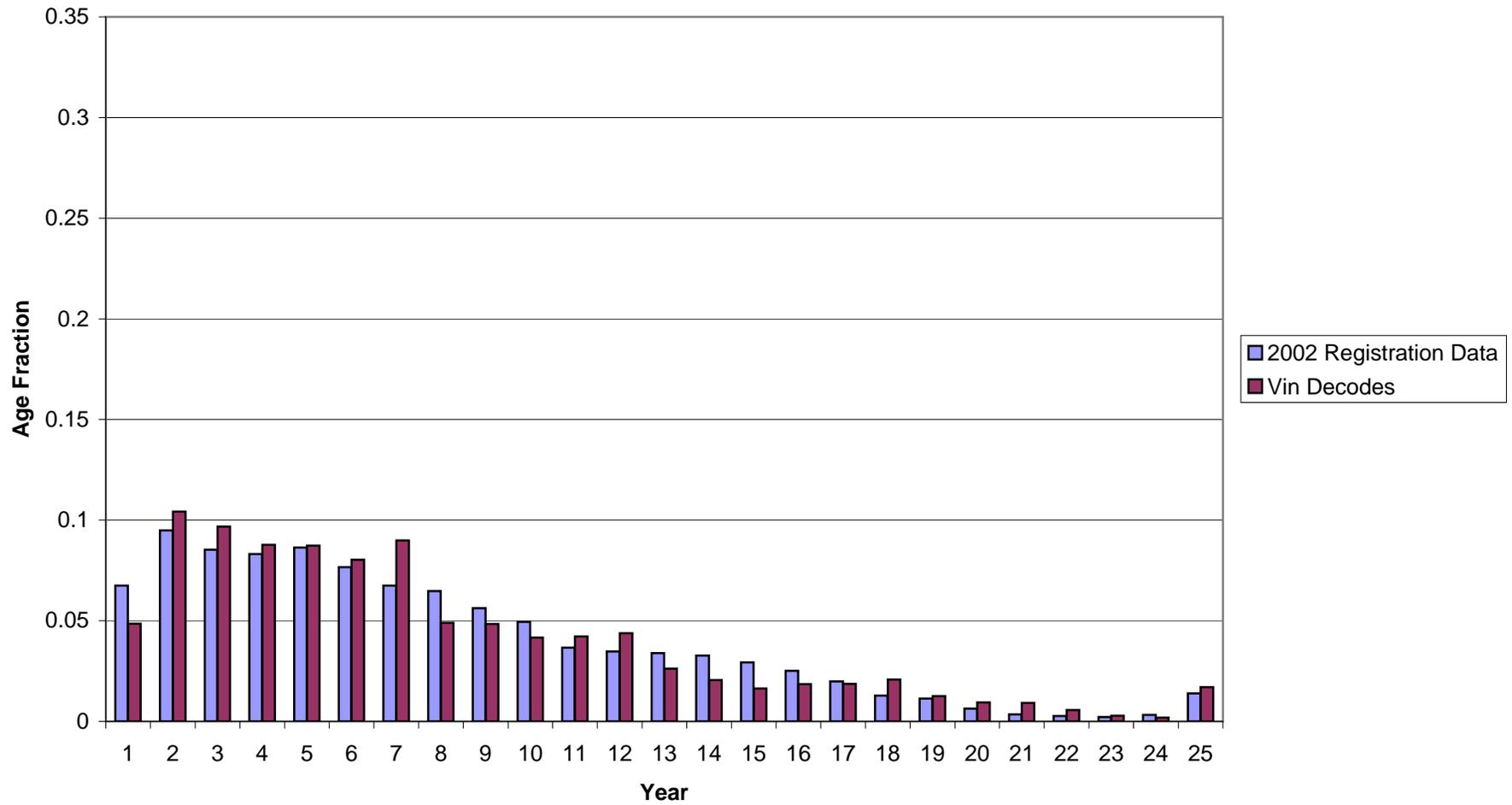
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = LDT2
Number of Decoded Vins = 46,372



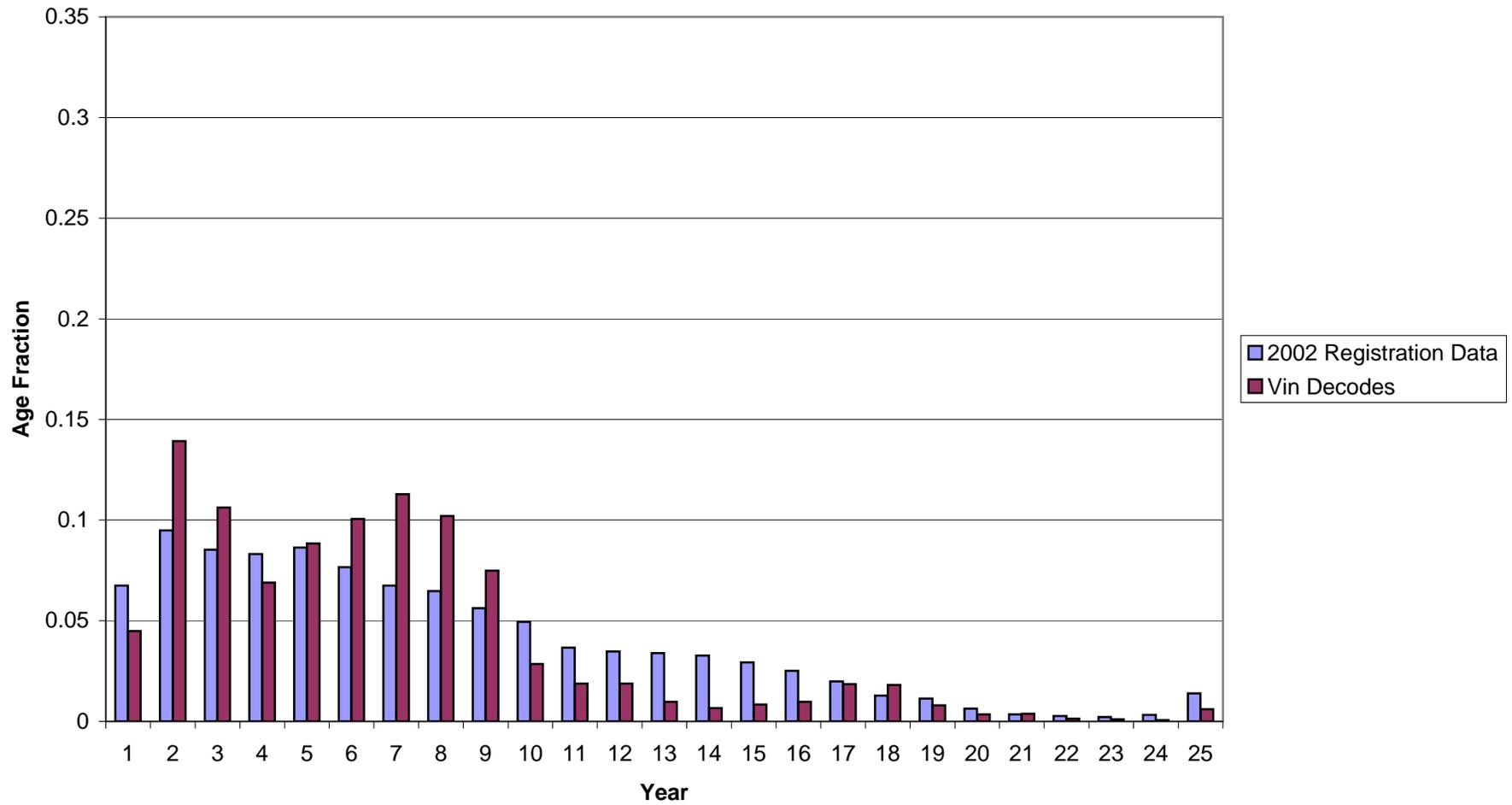
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = LDT3
Number of Decoded Vins = 11,586



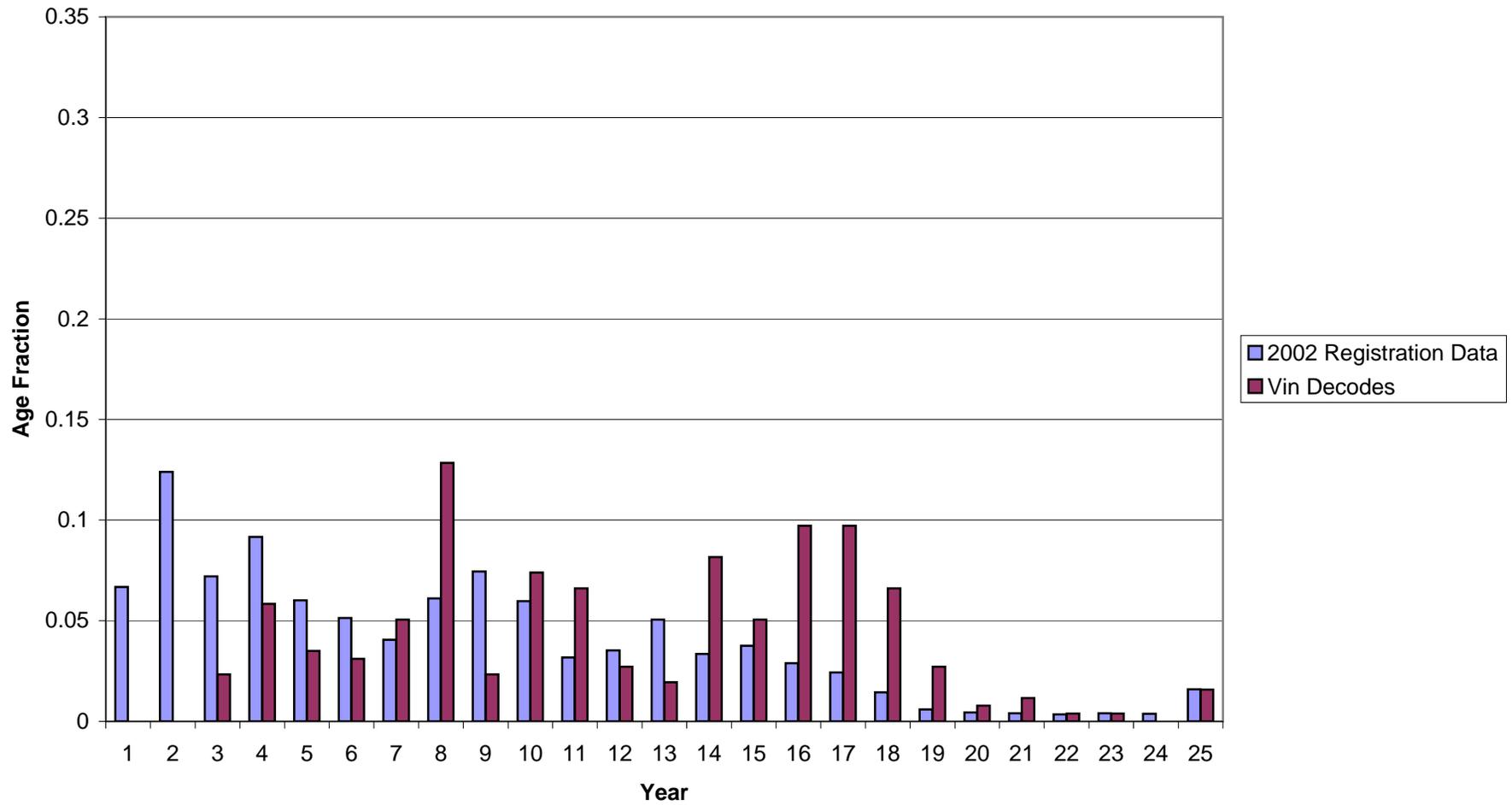
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = LDT4
Number of Decoded Vins = 2,864



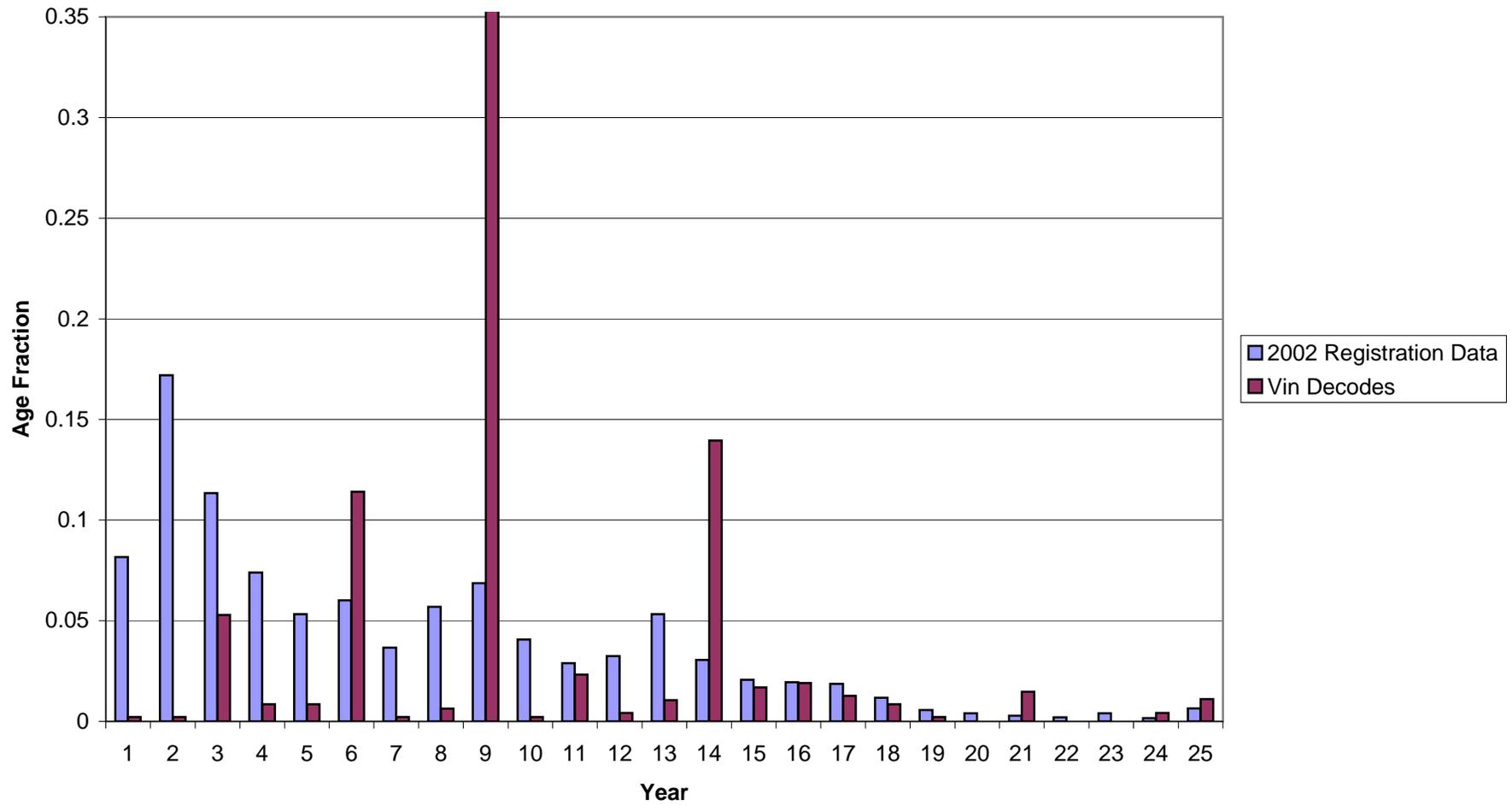
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDBS
Number of Decoded Vins = 664



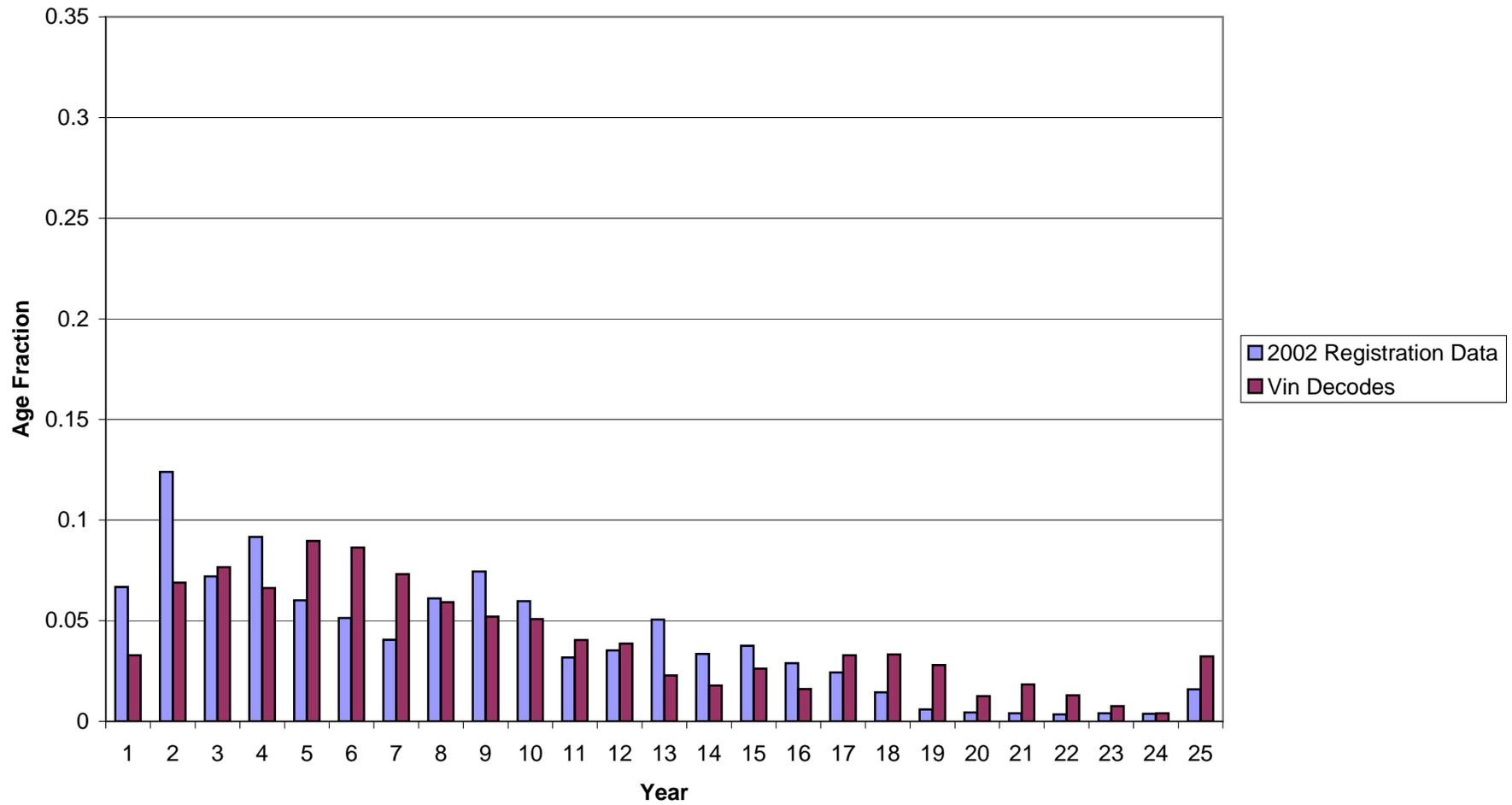
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDBT
Number of Decoded Vins = 923



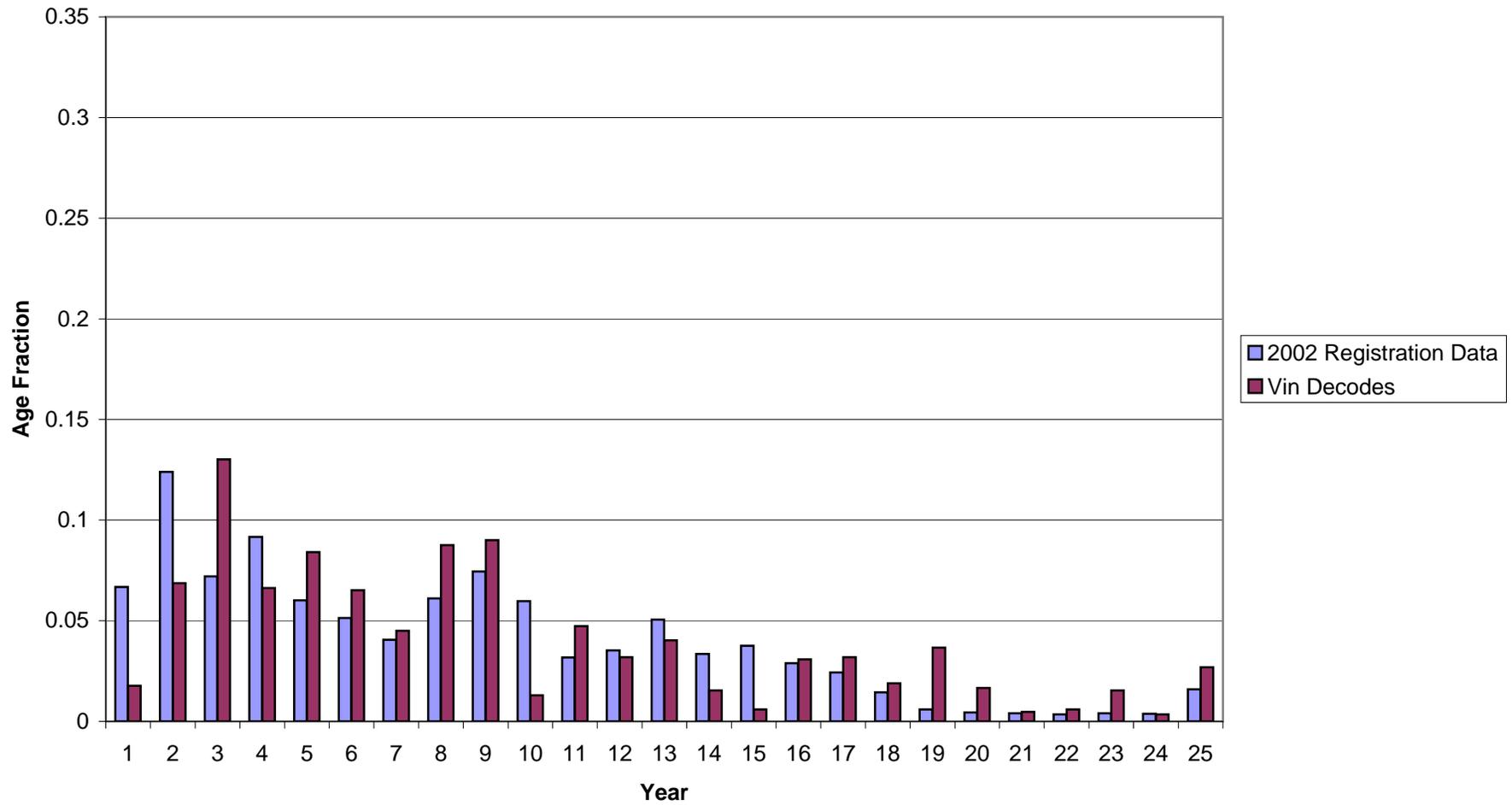
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDV2B
Number of Decoded Vins = 3,727



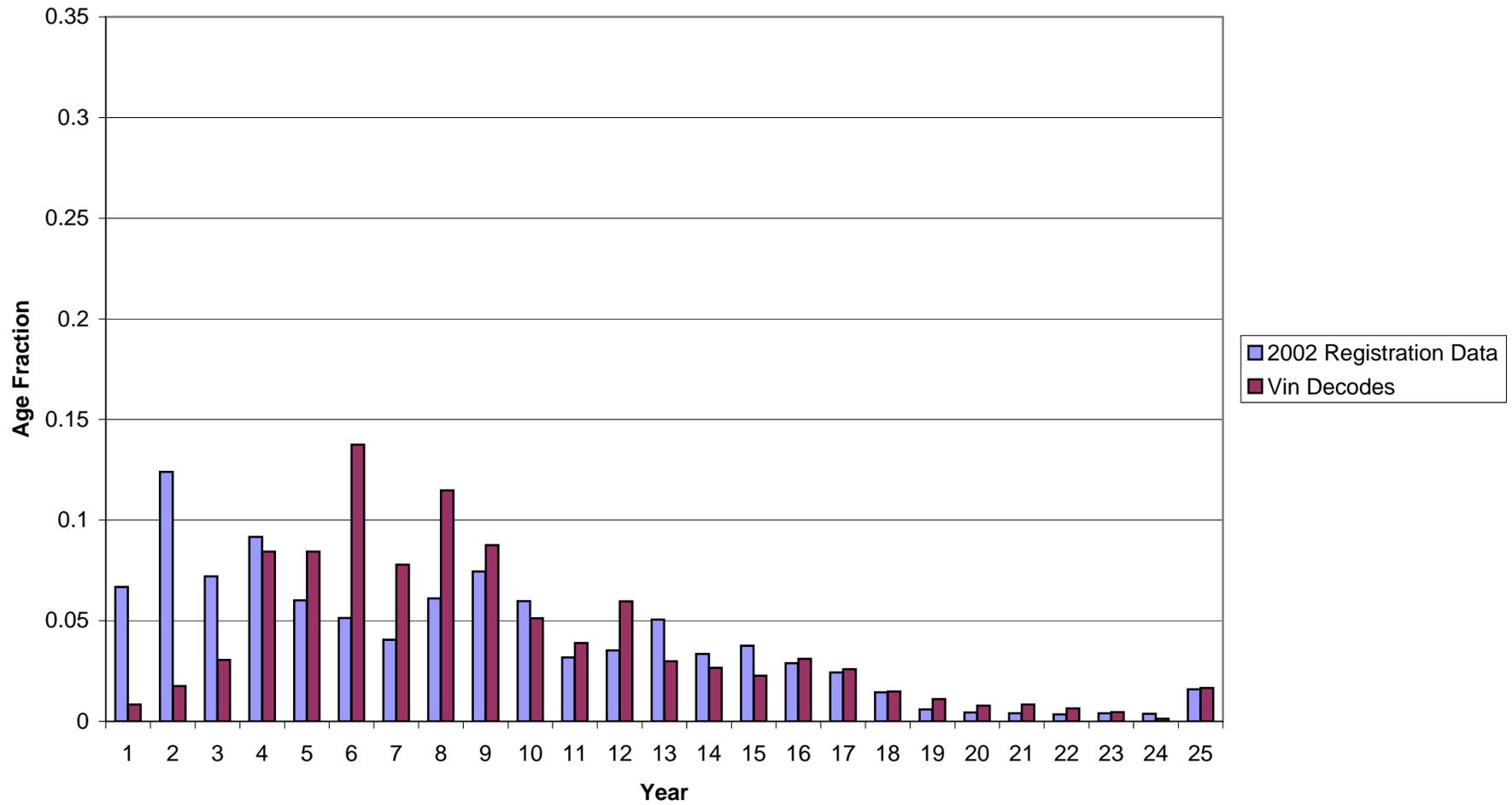
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDV3
Number of Decoded Vins = 599



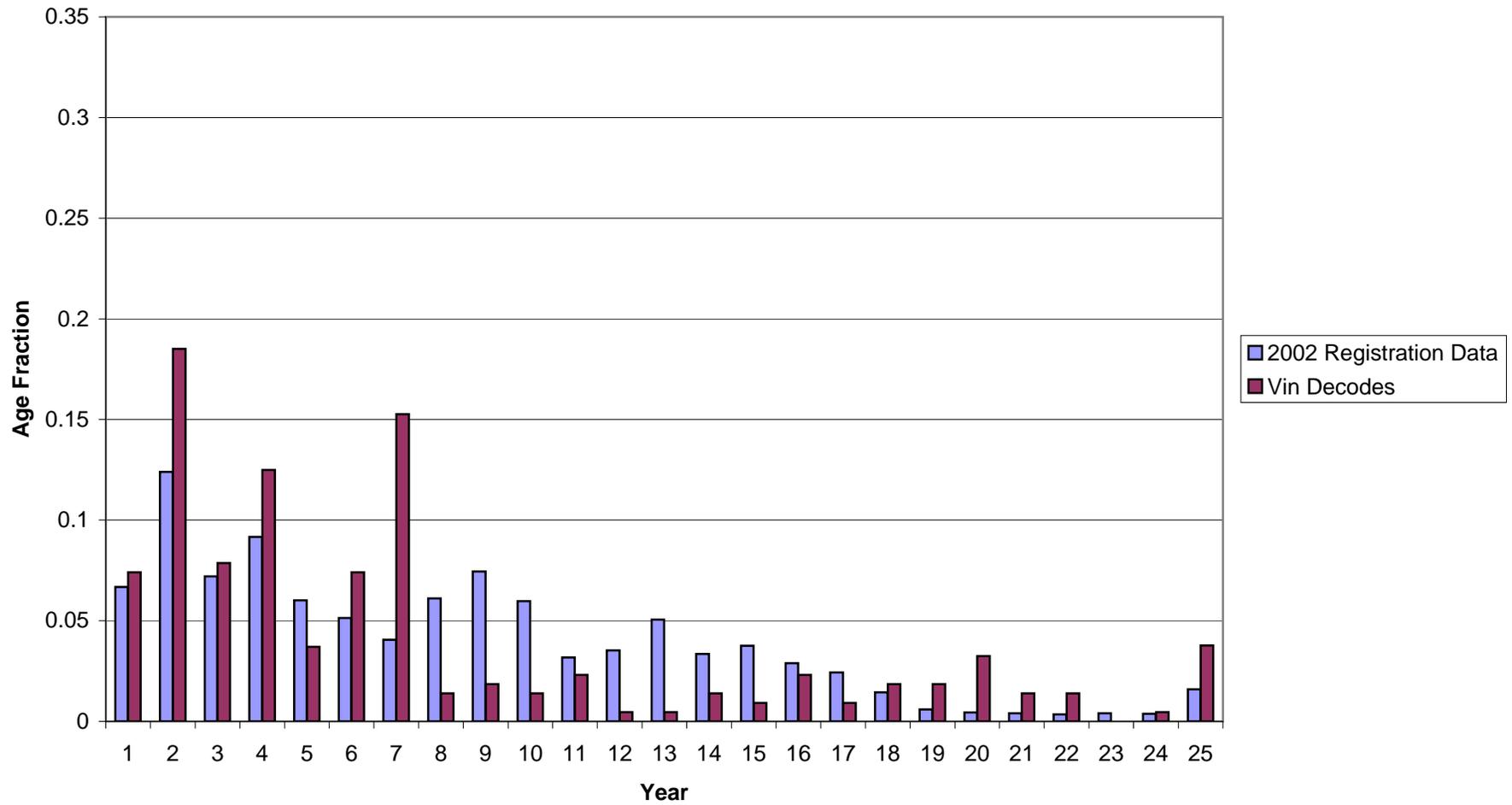
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDV4
Number of Decoded Vins = 1,516



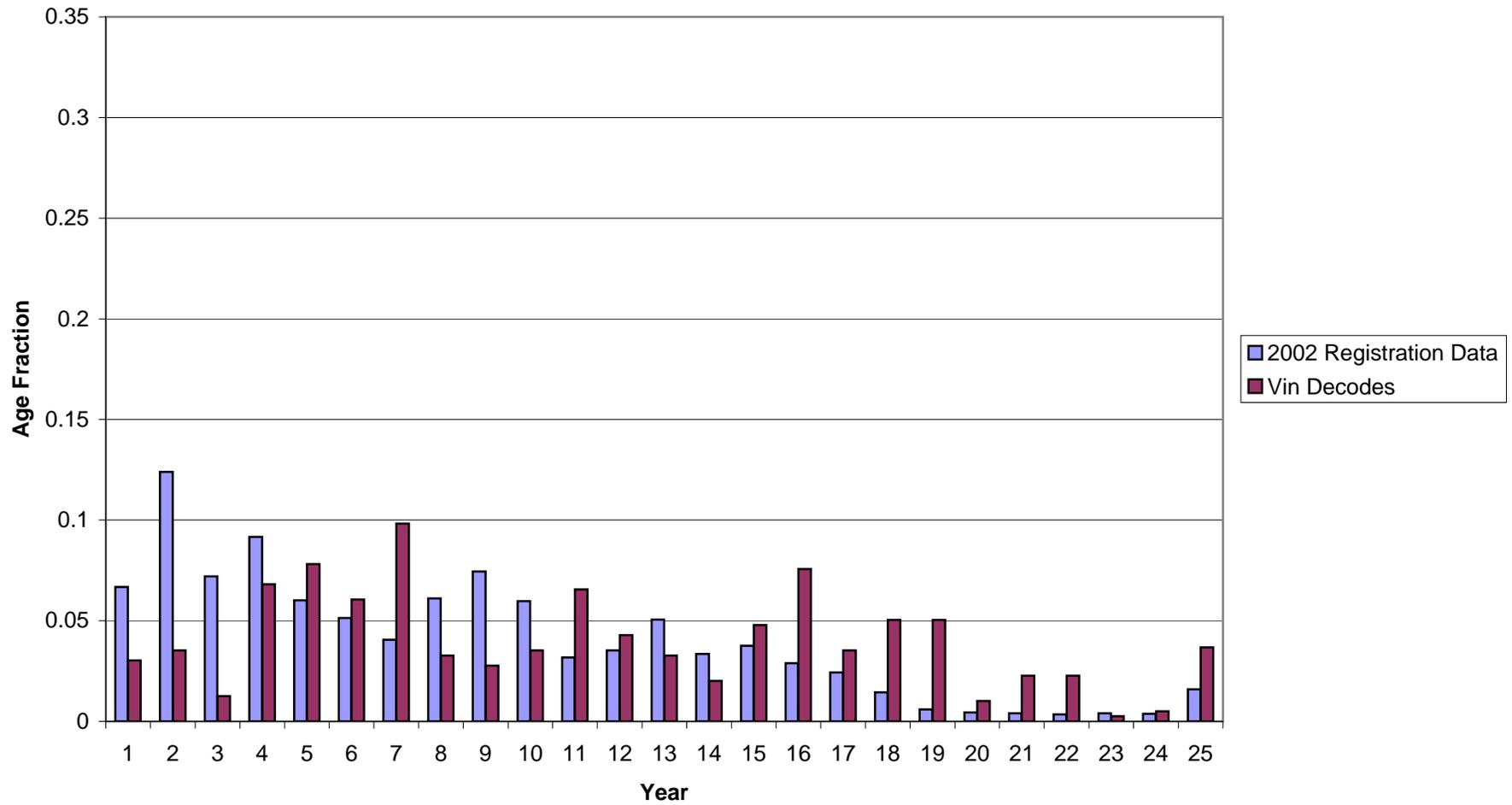
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDV5
Number of Decoded Vins = 208



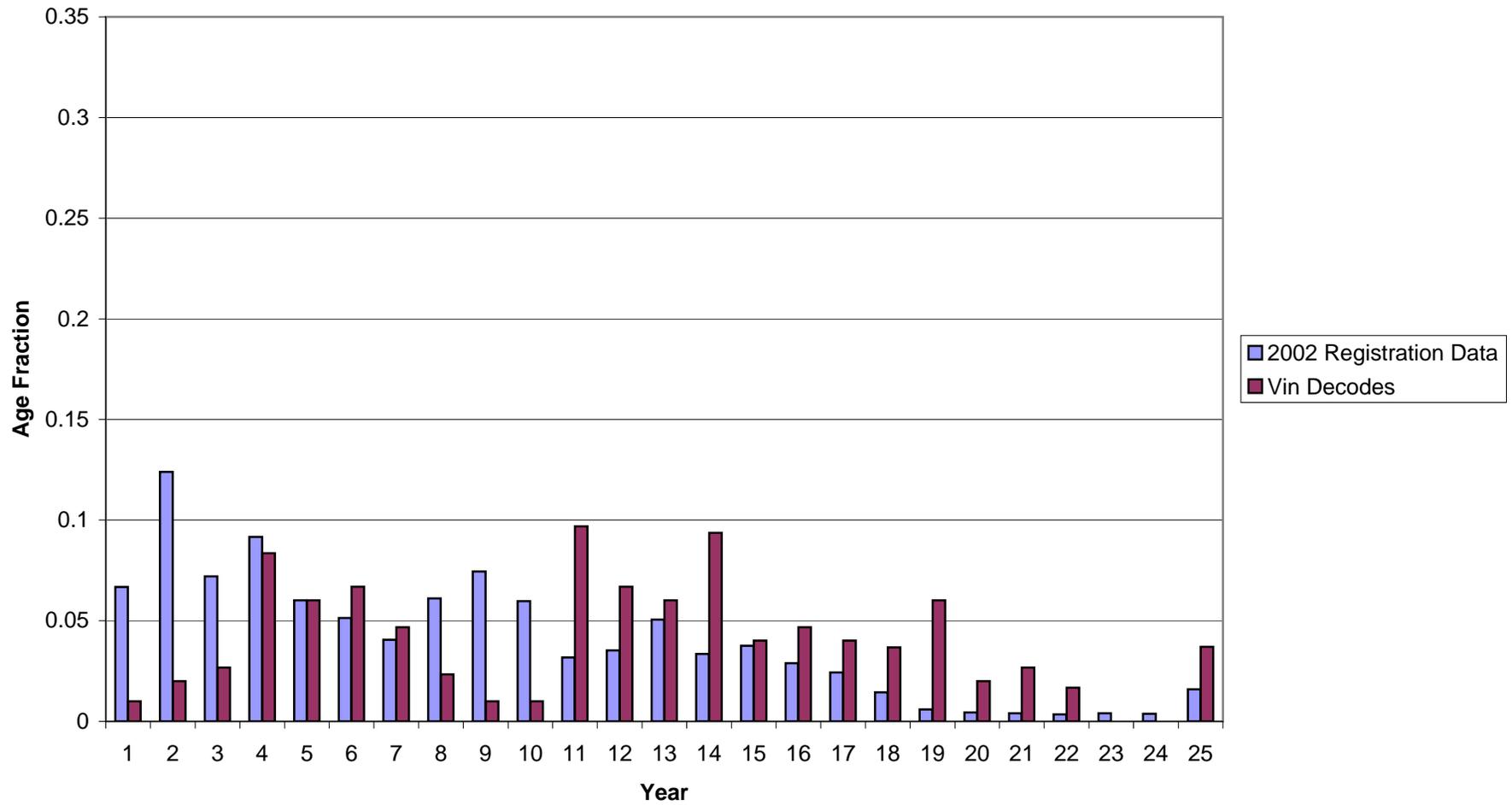
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDV6
Number of Decoded Vins = 339



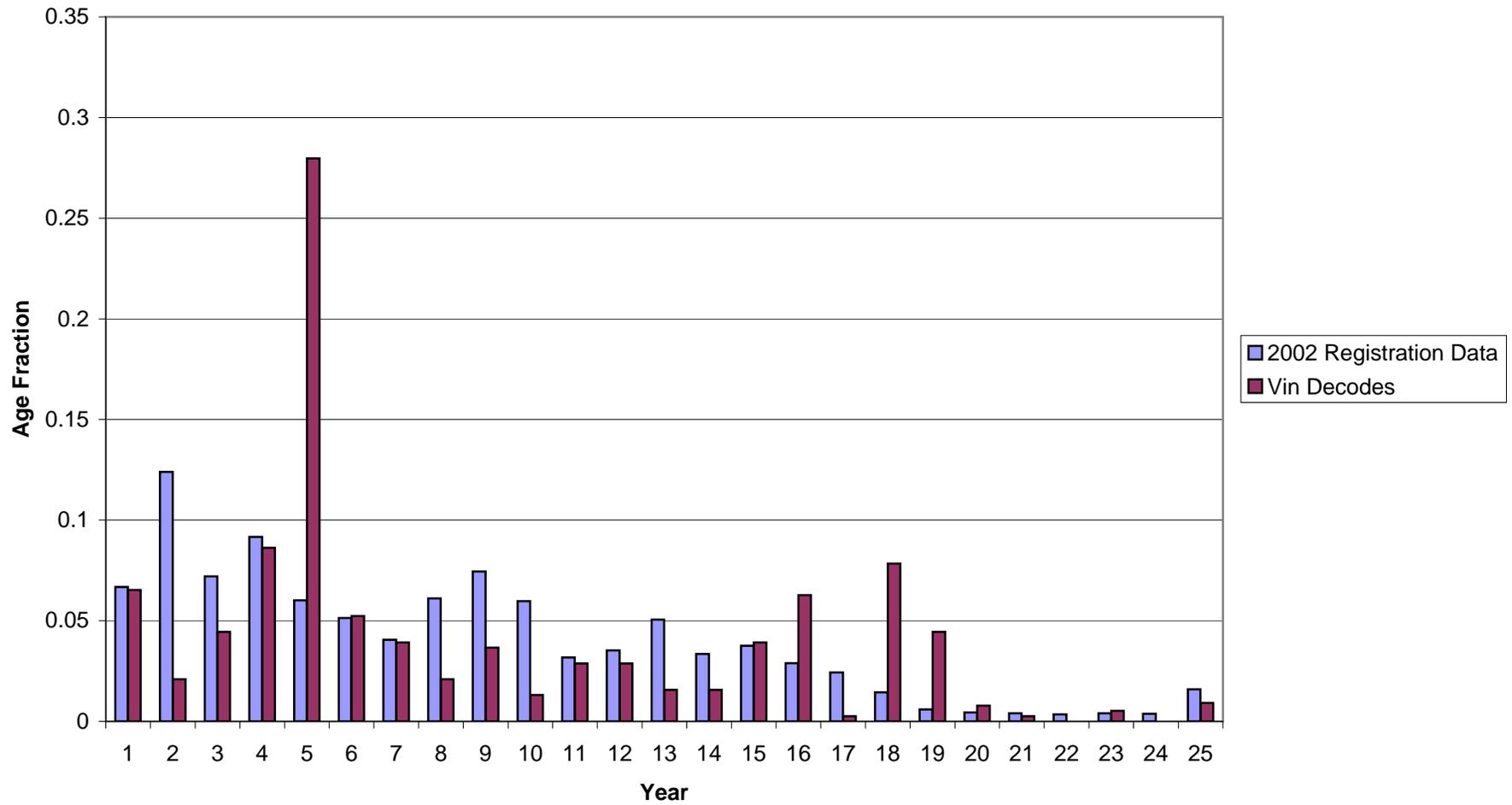
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDV7
Number of Decoded Vins = 288



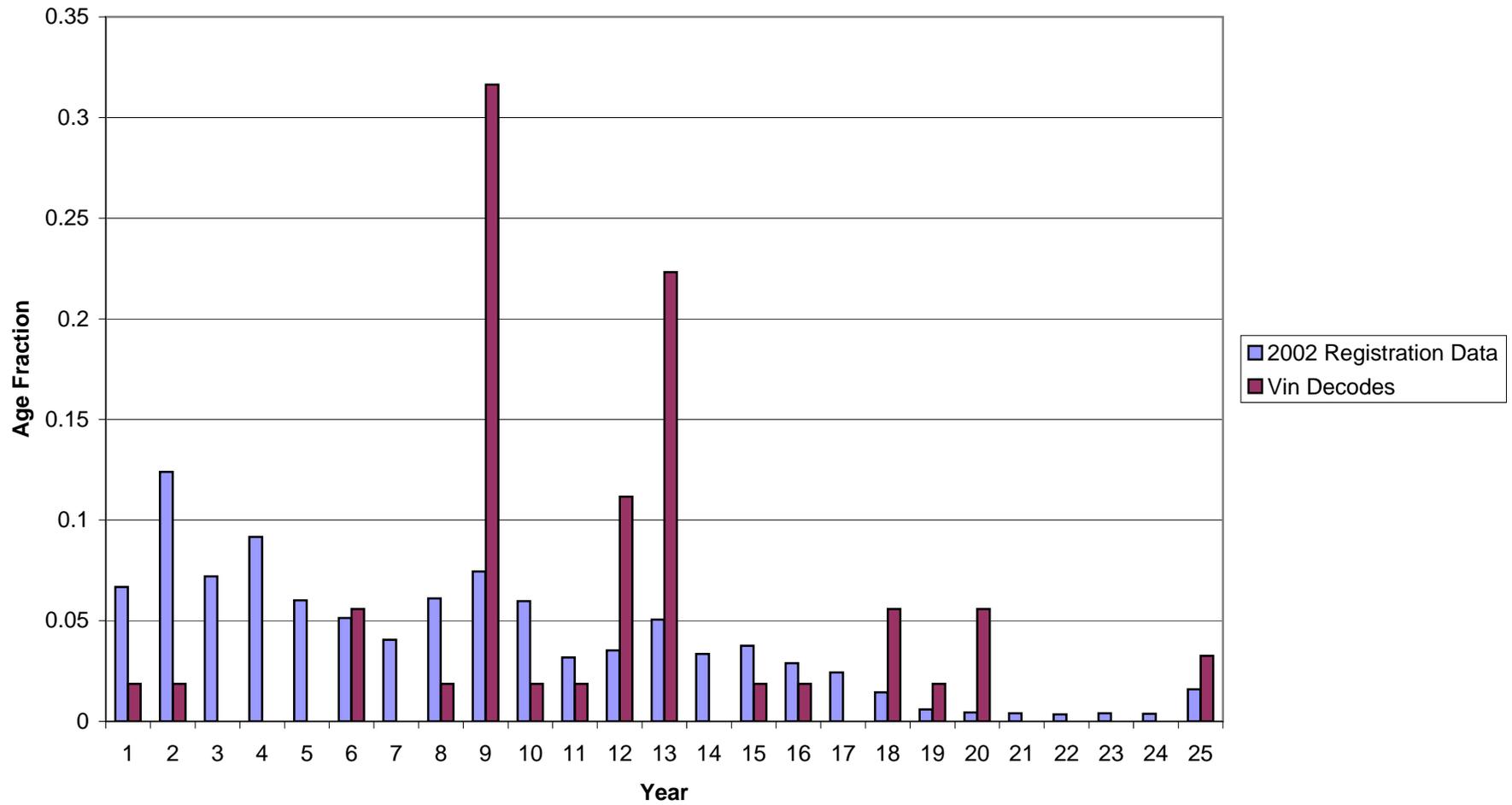
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDV8A
Number of Decoded Vins = 379



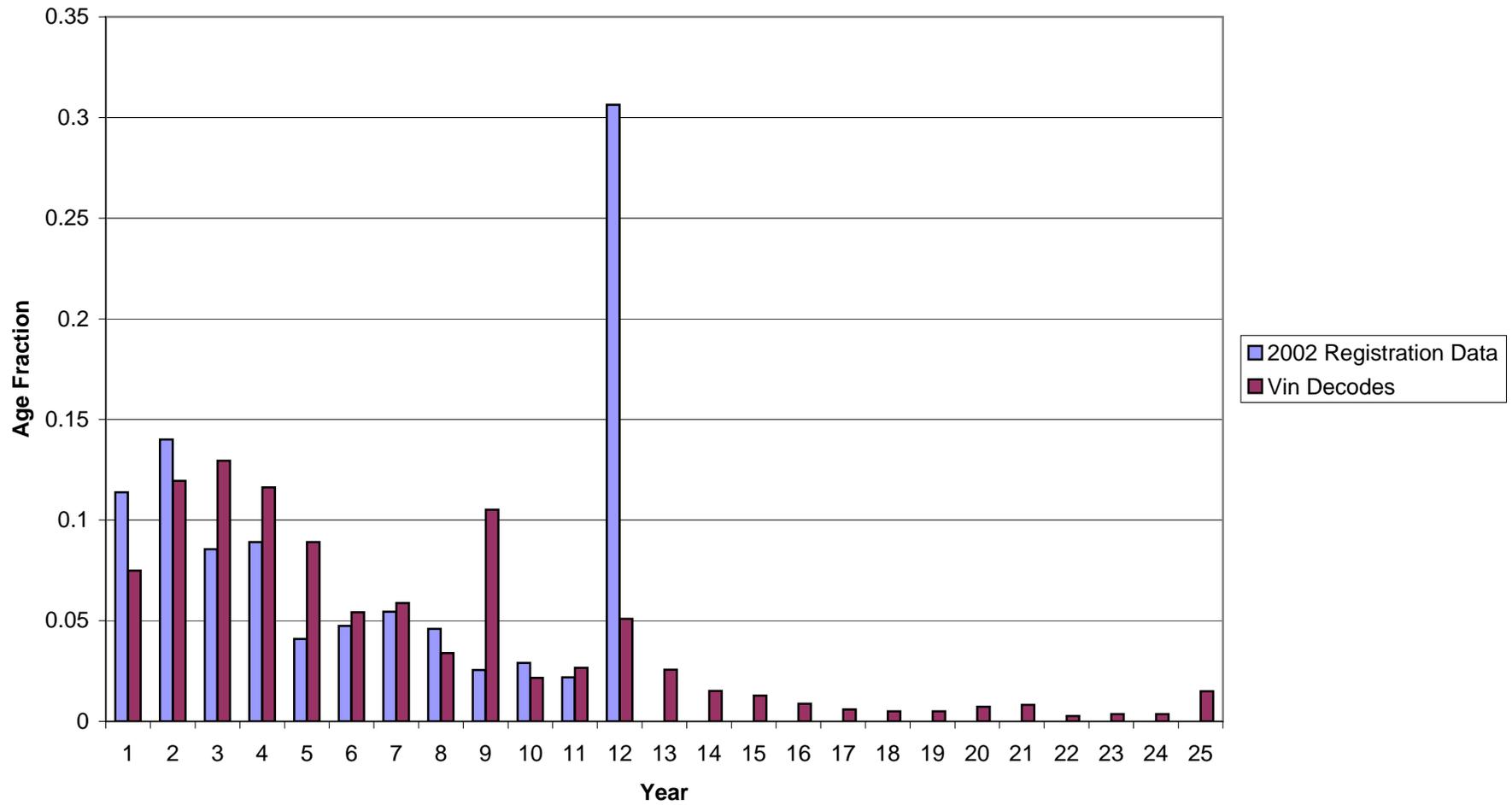
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = HDV8B
Number of Decoded Vins = 52



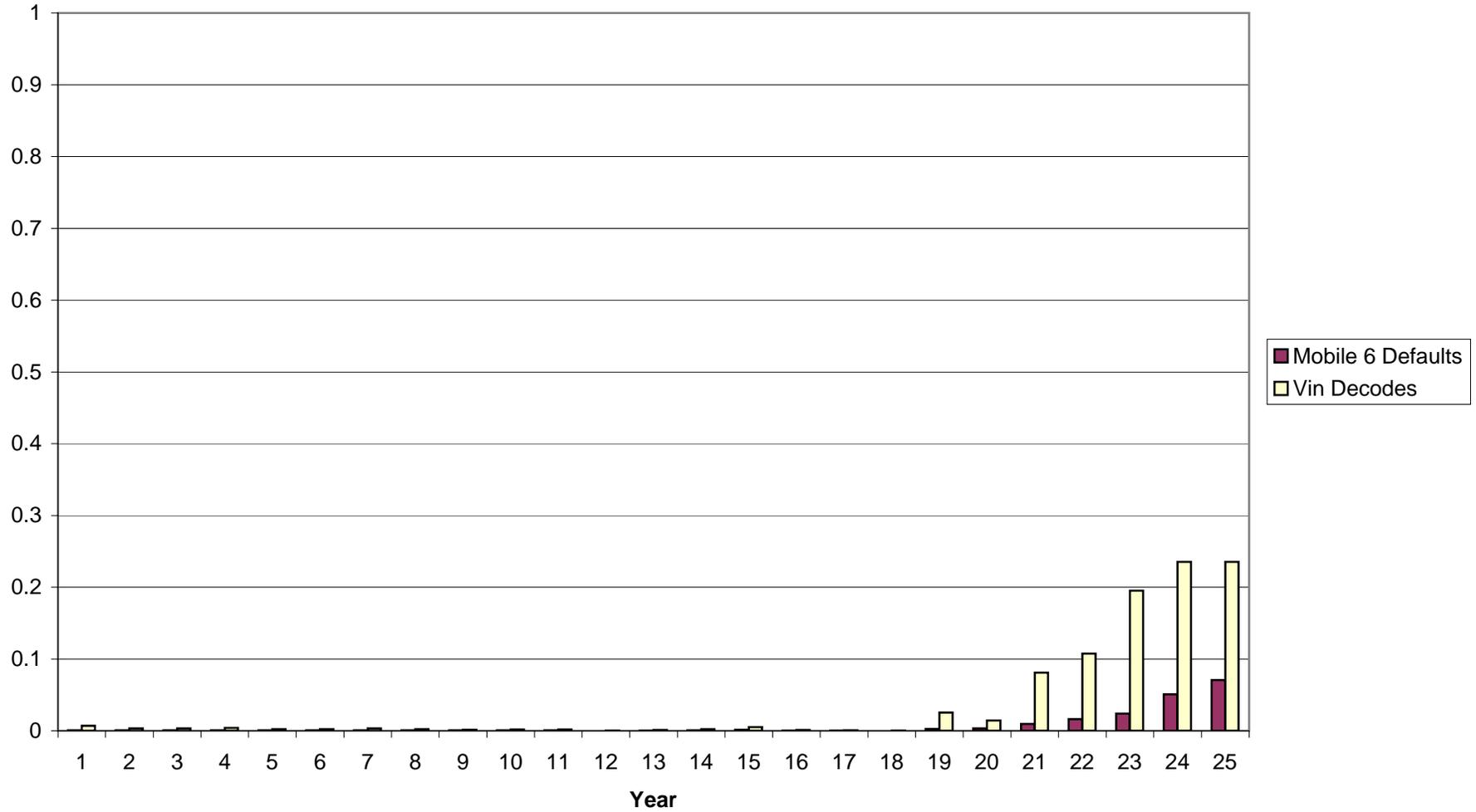
ATTACHMENT 7

2005 Age Fractions
District of Columbia
Vehicle Type = MC
Number of Decoded Vins = 2,144



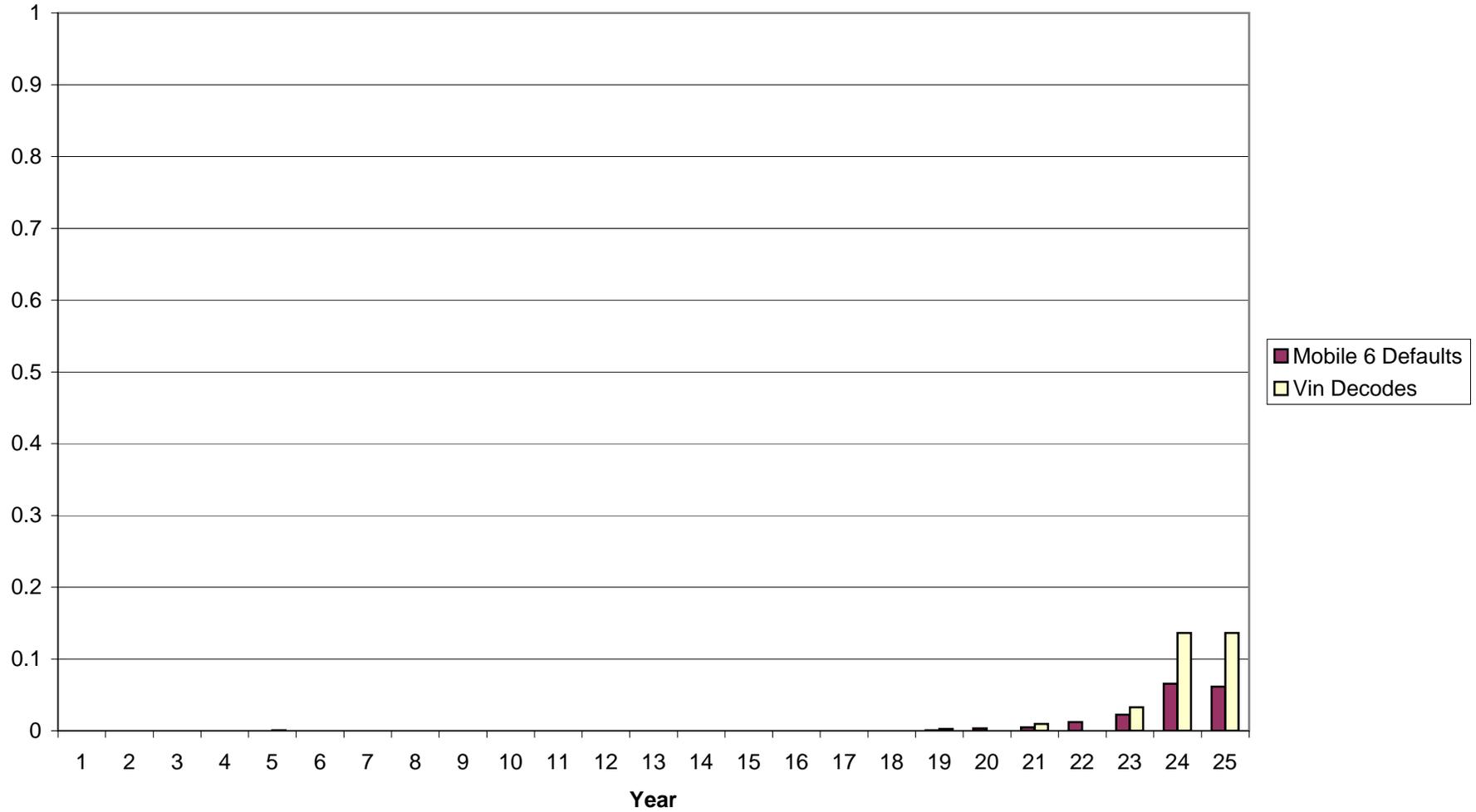
ATTACHMENT 8

Diesel Sales Fractions District of Columbia and Maryland Jurisdictions Combined Vehicle Type = LDV



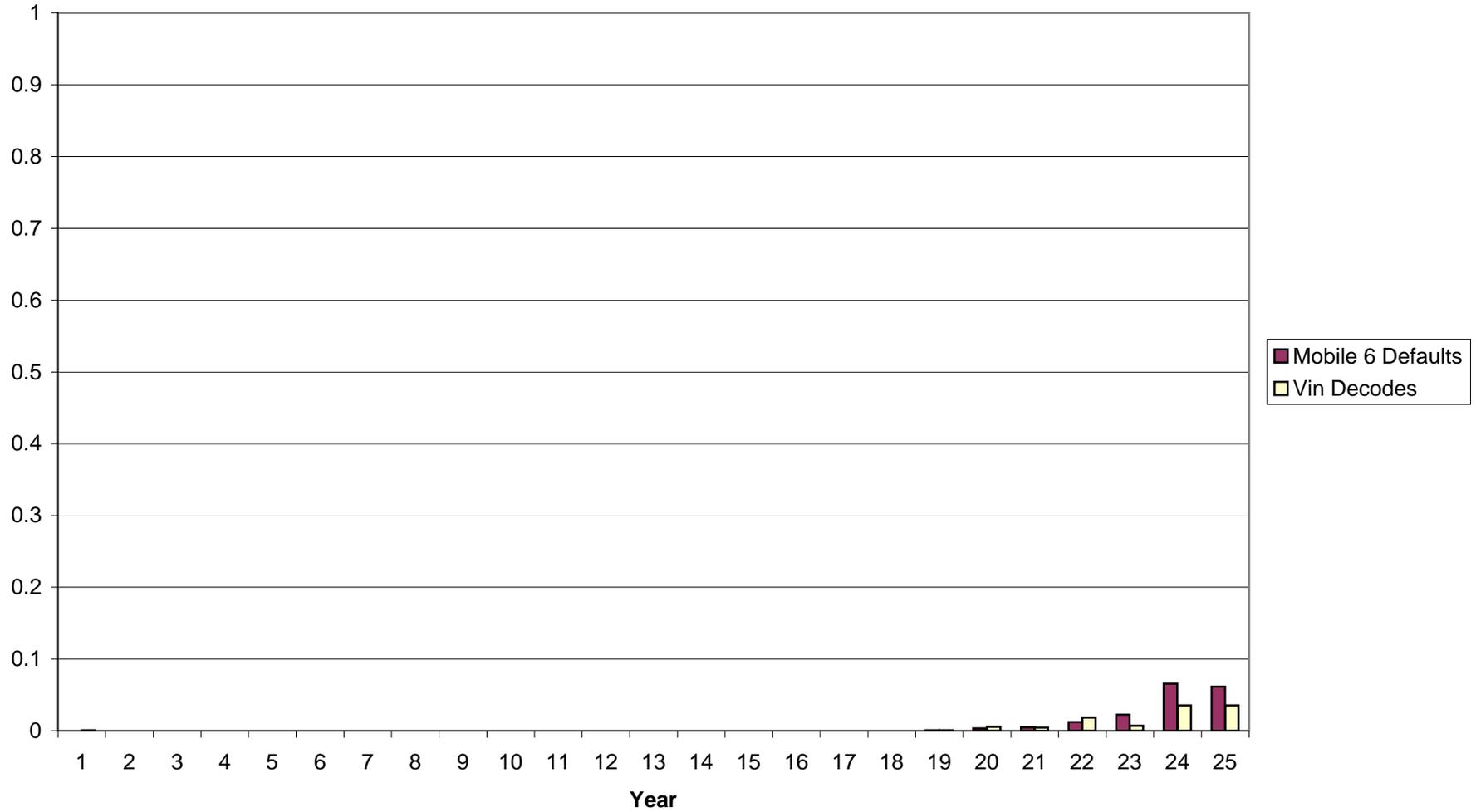
ATTACHMENT 8

Diesel Sales Fractions District of Columbia and Maryland Jurisdictions Combined Vehicle Type = LDT1



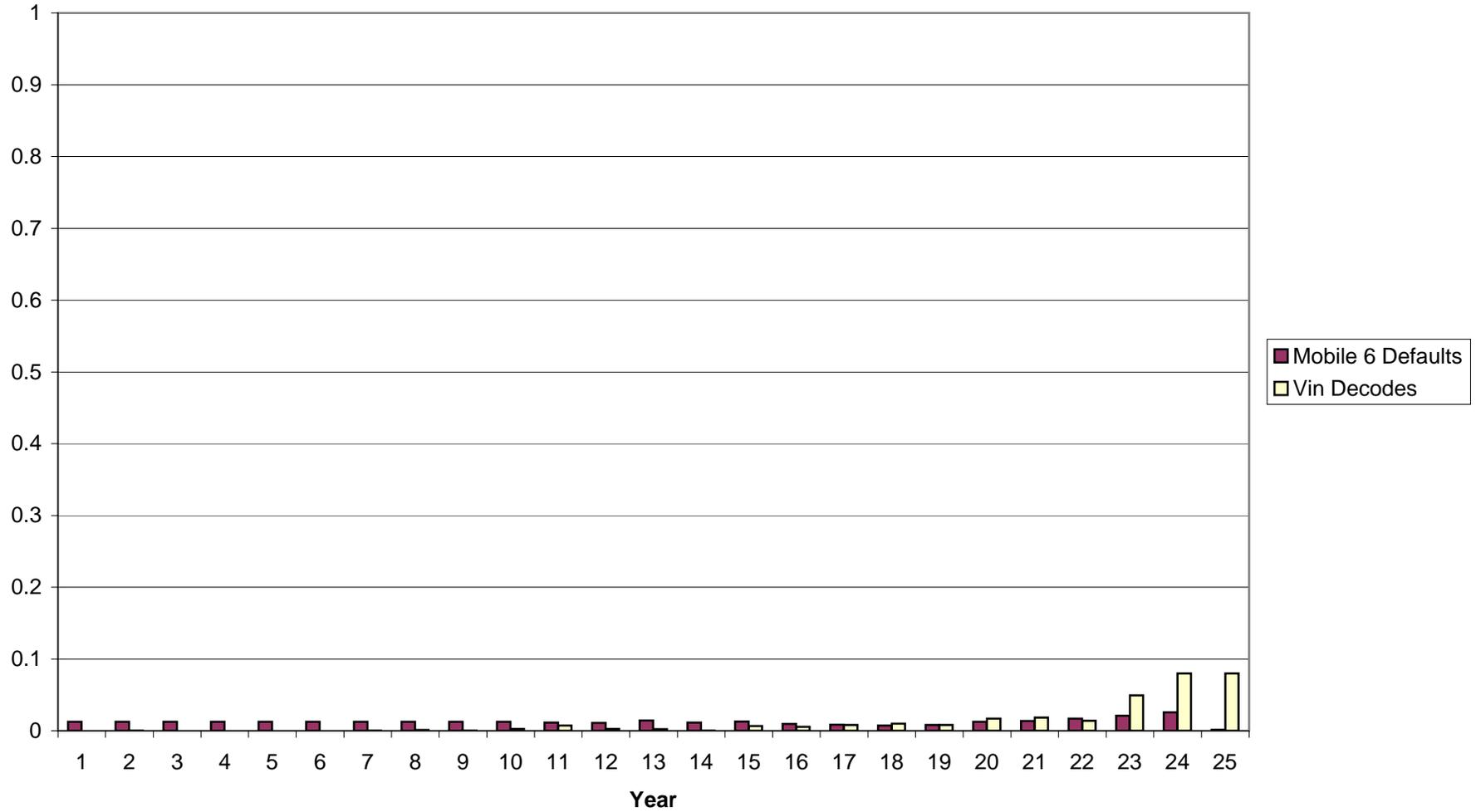
ATTACHMENT 8

Diesel Sales Fractions District of Columbia and Maryland Jurisdictions Combined Vehicle Type = LDT2



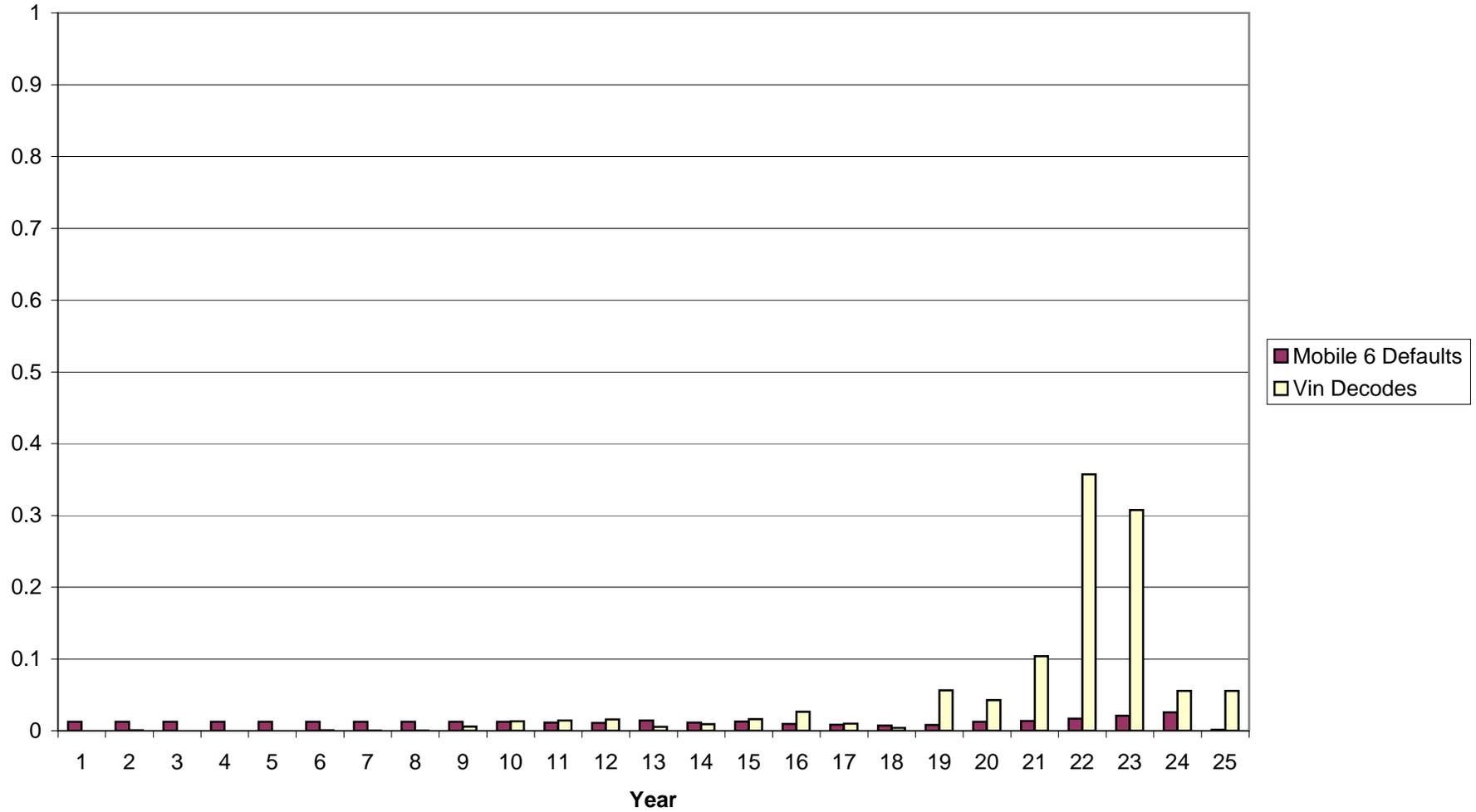
ATTACHMENT 8

Diesel Sales Fractions District of Columbia and Maryland Jurisdictions Combined Vehicle Type = LDT3



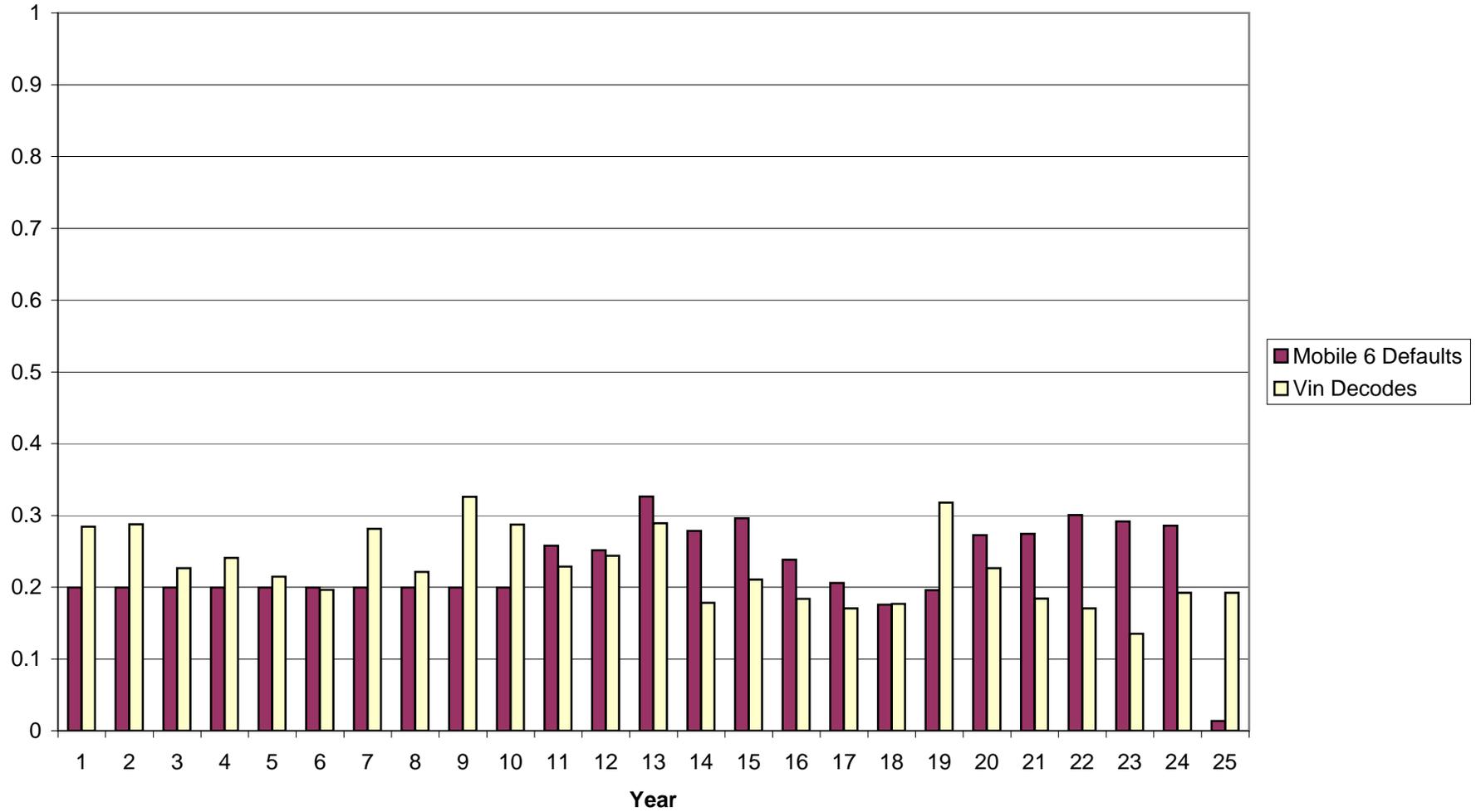
ATTACHMENT 8

Diesel Sales Fractions District of Columbia and Maryland Jurisdictions Combined Vehicle Type = LDT4



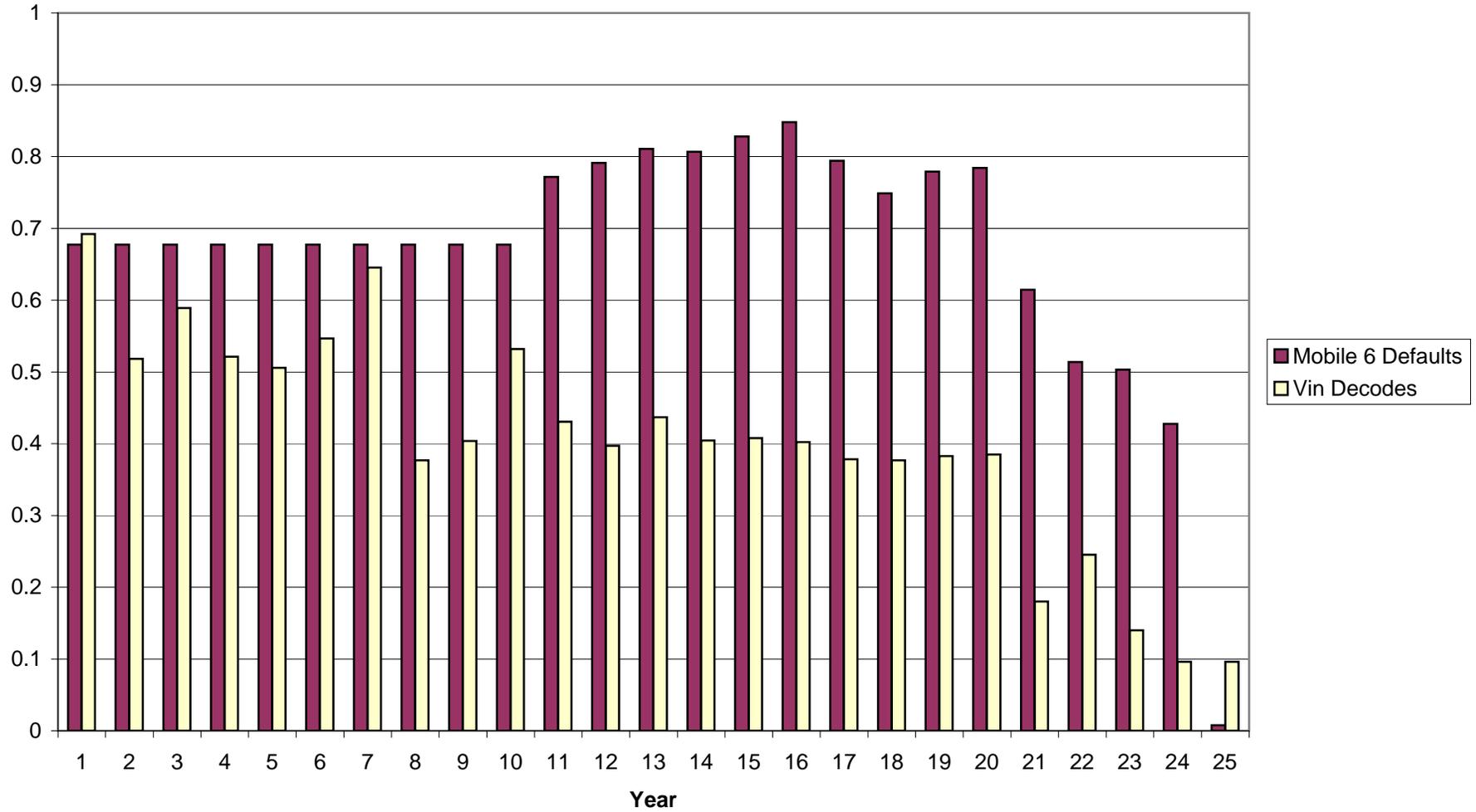
ATTACHMENT 8

Diesel Sales Fractions District of Columbia and Maryland Jurisdictions Combined Vehicle Type = HDV2B



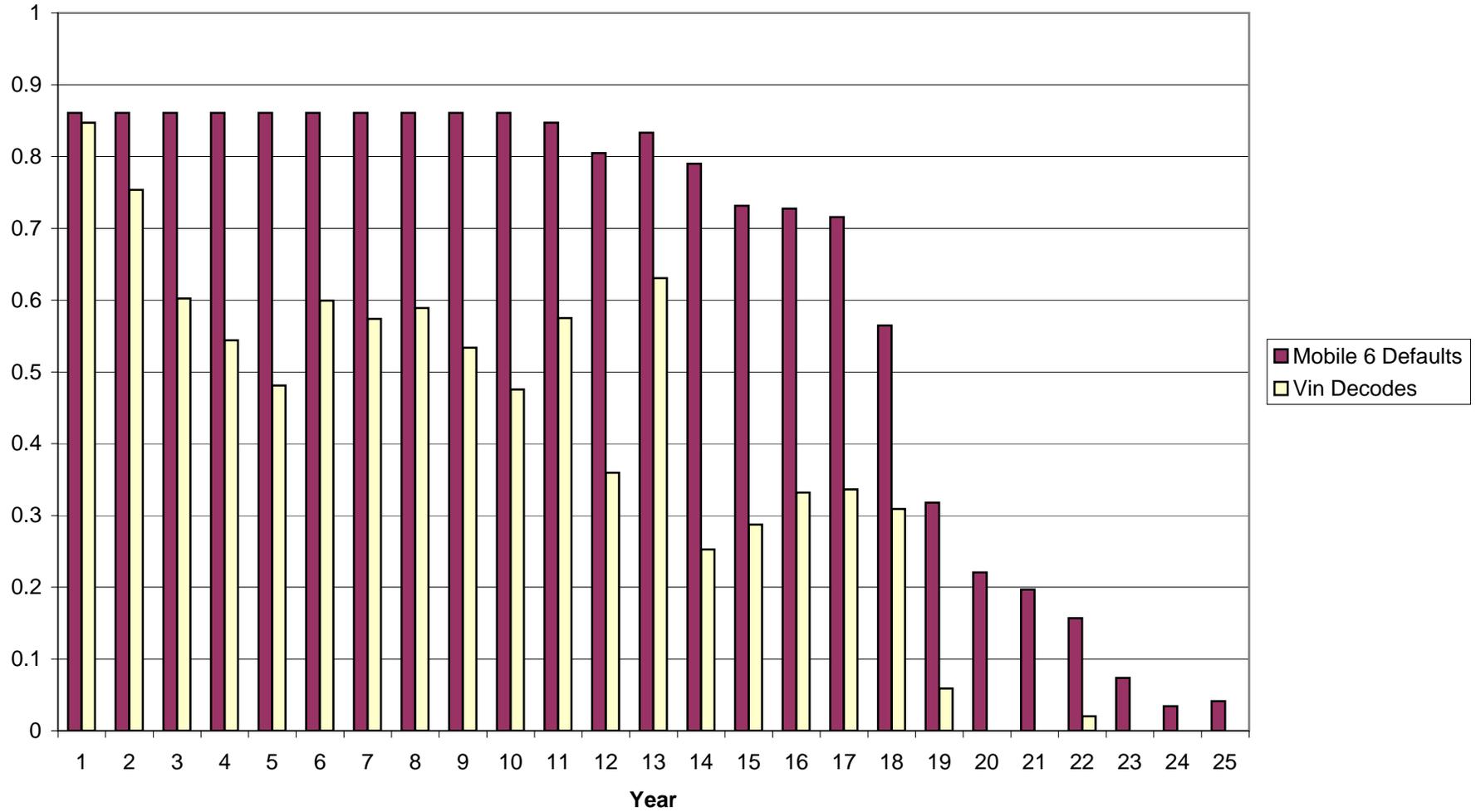
ATTACHMENT 8

Diesel Sales Fractions District of Columbia and Maryland Jurisdictions Combined Vehicle Type = HDV3



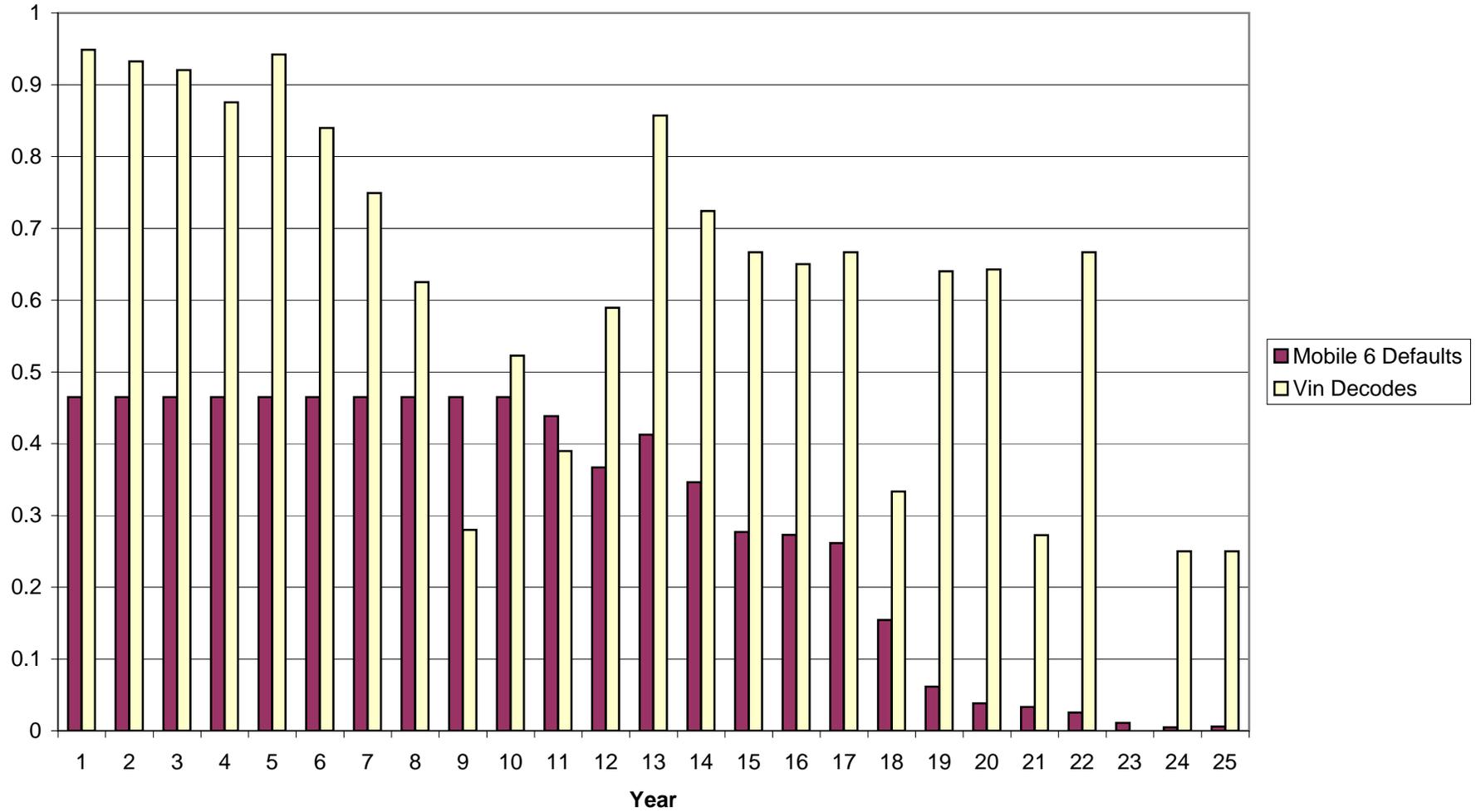
ATTACHMENT 8

Diesel Sales Fractions
District of Columbia and Maryland Jurisdictions Combined
Vehicle Type = HDV4



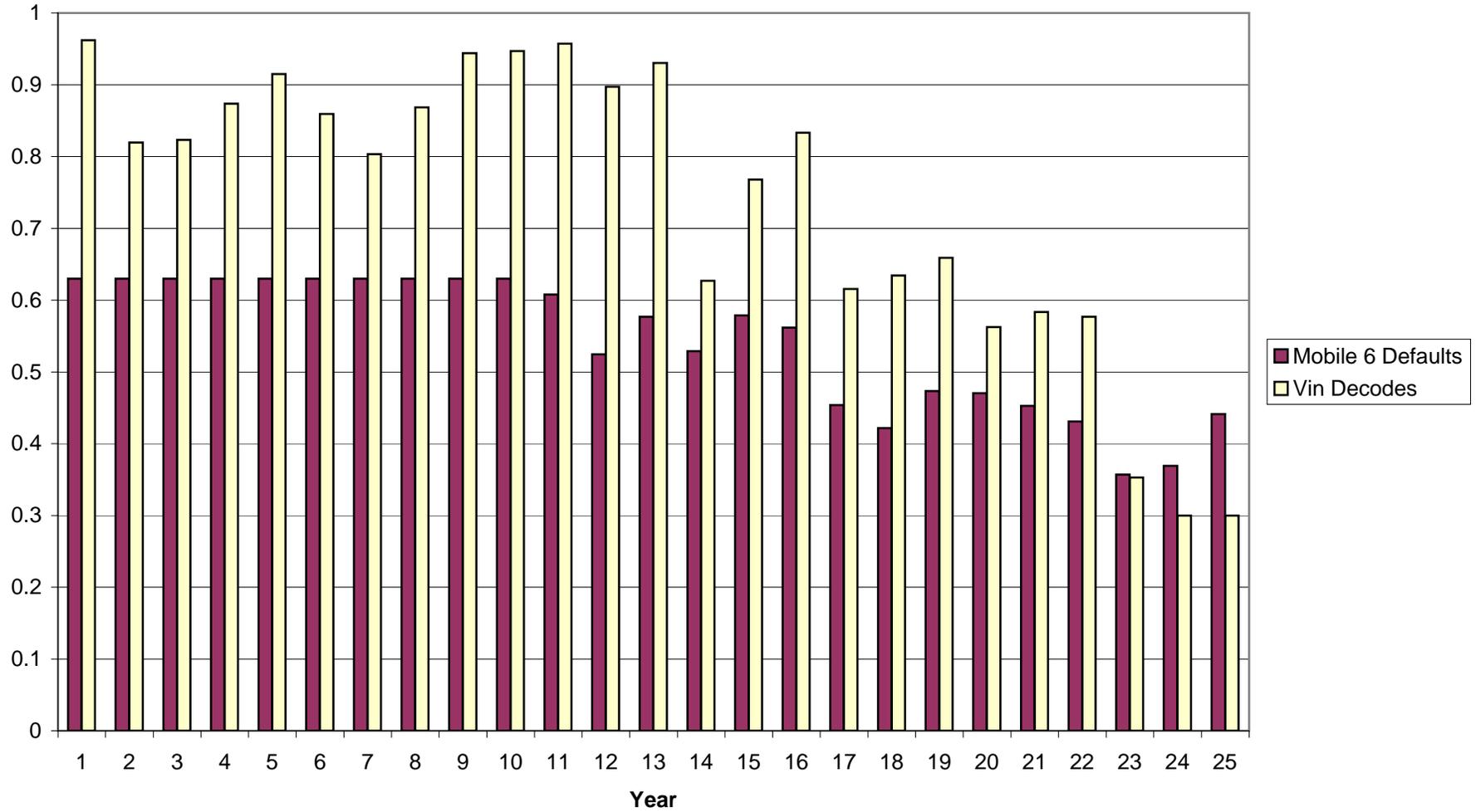
ATTACHMENT 8

Diesel Sales Fractions
District of Columbia and Maryland Jurisdictions Combined
Vehicle Type = HDV5



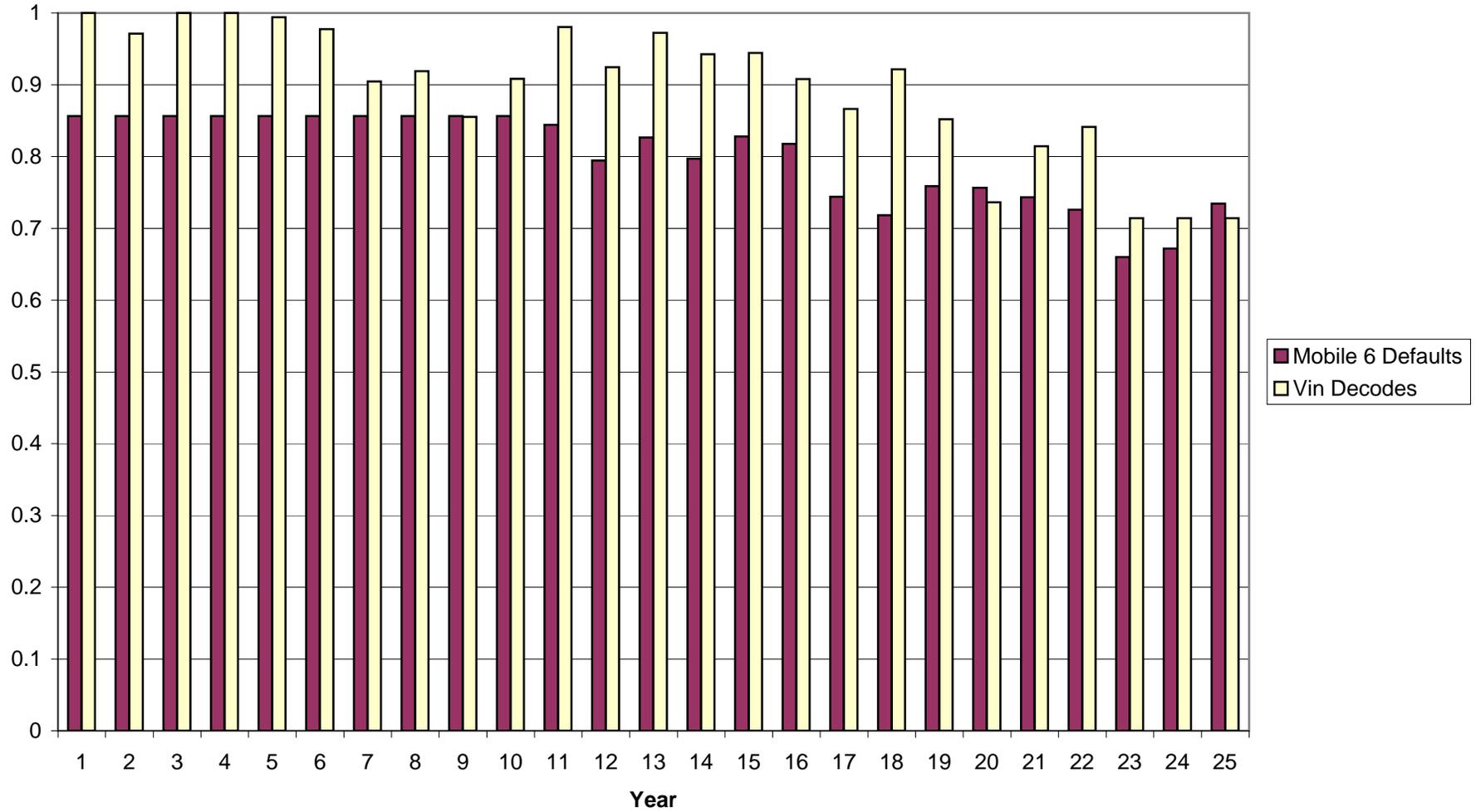
ATTACHMENT 8

Diesel Sales Fractions
District of Columbia and Maryland Jurisdictions Combined
Vehicle Type = HDV6



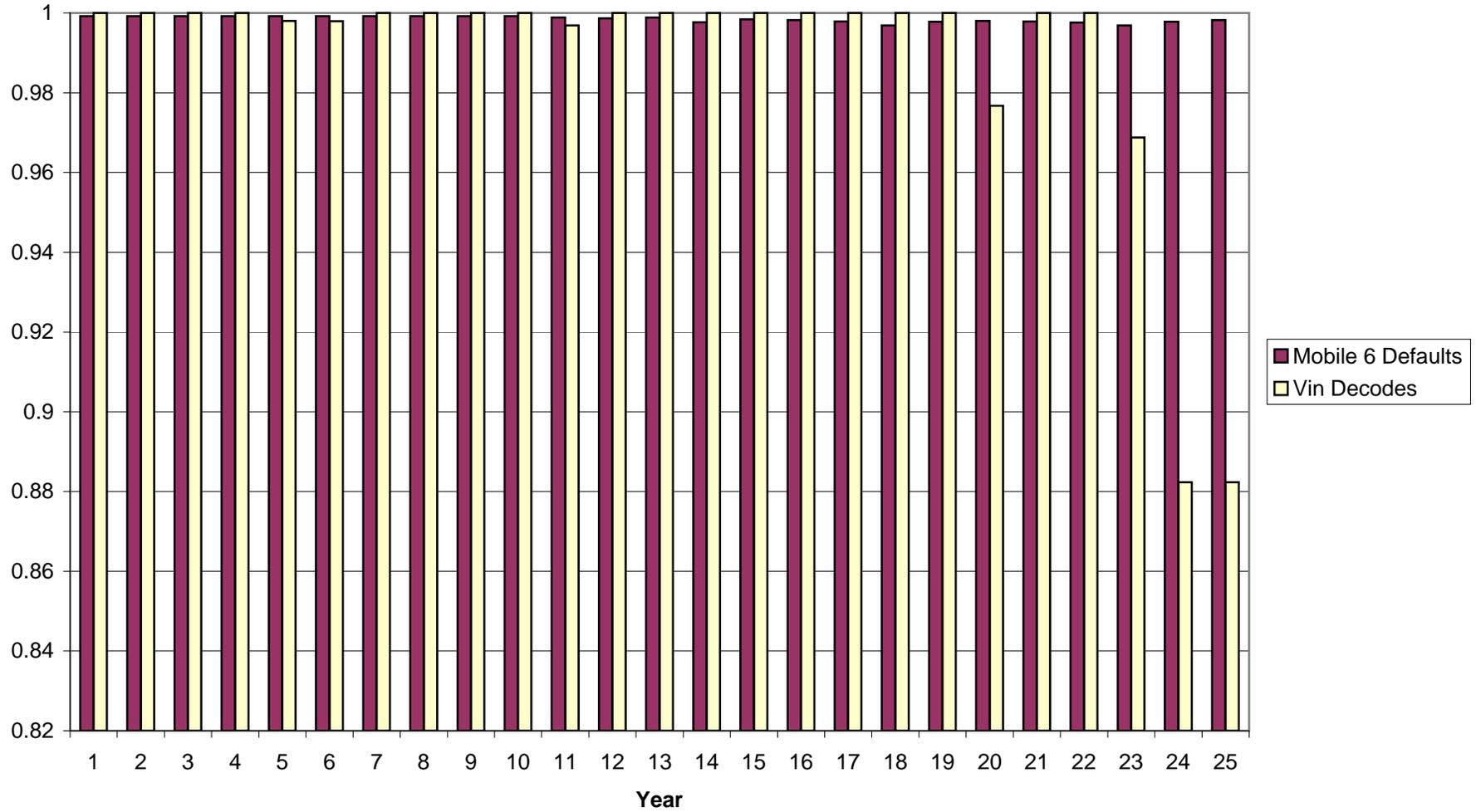
ATTACHMENT 8

Diesel Sales Fractions
District of Columbia and Maryland Jurisdictions Combined
Vehicle Type = HDV7



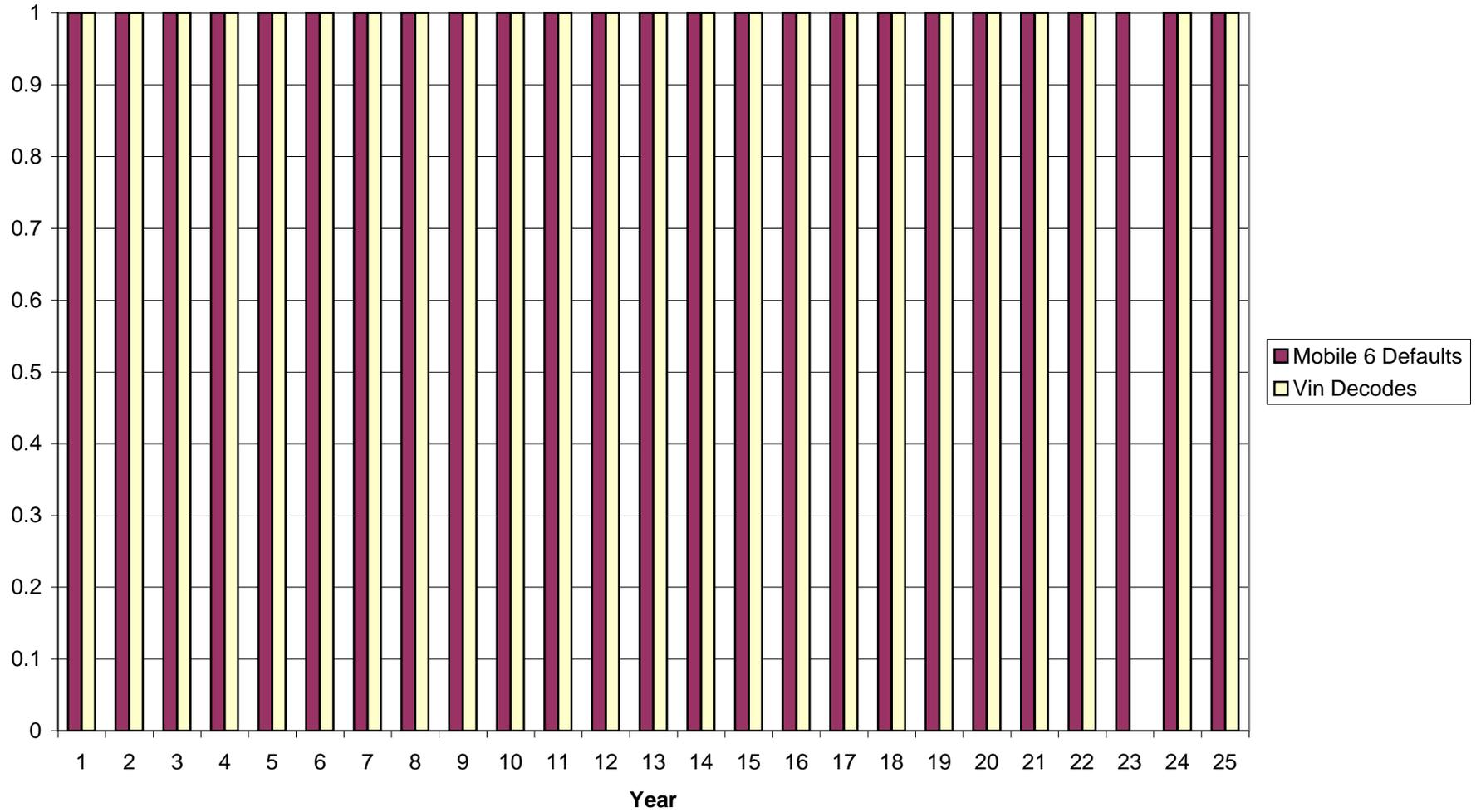
ATTACHMENT 8

Diesel Sales Fractions
District of Columbia and Maryland Jurisdictions Combined
Vehicle Type = HDV8A



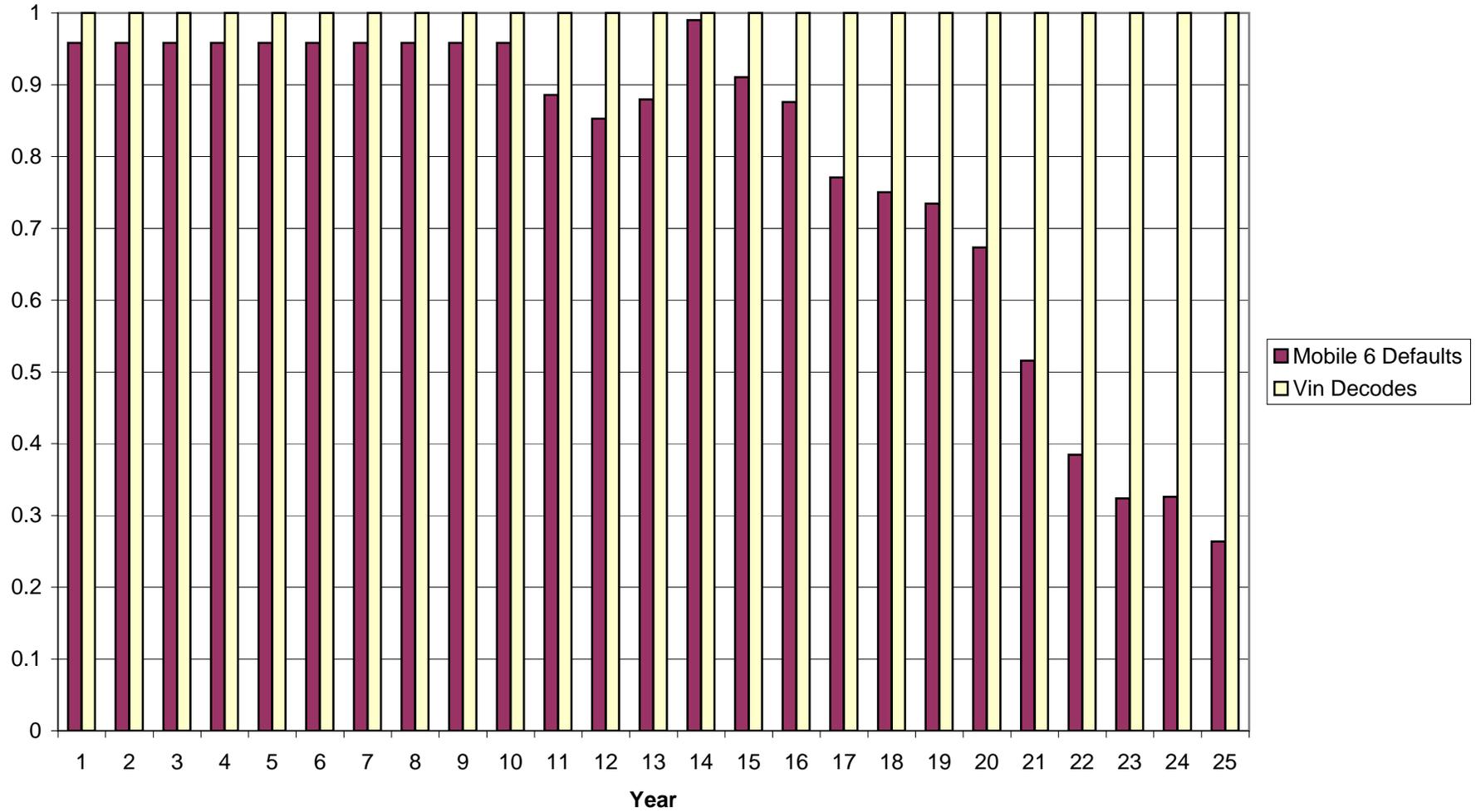
ATTACHMENT 8

Diesel Sales Fractions District of Columbia and Maryland Jurisdictions Combined Vehicle Type = HDV8B



ATTACHMENT 8

Diesel Sales Fractions
District of Columbia and Maryland Jurisdictions Combined
Vehicle Type = HDBS



dc.rdt

REG DIST

```

* LDV
  1 0.0369 0.0625 0.0679 0.0693 0.0726 0.0786 0.0707 0.0654 0.0677 0.0572
    0.0617 0.0513 0.0437 0.0381 0.0307 0.0295 0.0224 0.0187 0.0146 0.0098
    0.0071 0.0048 0.0025 0.0013 0.0149
* LDT1
  2 0.0435 0.0241 0.0900 0.1088 0.1017 0.0735 0.0735 0.0764 0.0894 0.0888
    0.0223 0.0129 0.0088 0.0153 0.0112 0.0112 0.0535 0.0265 0.0229 0.0123
    0.0059 0.0082 0.0018 0.0006 0.0168
* LDT2
  3 0.0503 0.0951 0.0869 0.0940 0.0845 0.0788 0.0689 0.0673 0.0610 0.0549
    0.0516 0.0437 0.0369 0.0234 0.0216 0.0162 0.0148 0.0136 0.0107 0.0064
    0.0046 0.0028 0.0015 0.0011 0.0095
* LDT3
  4 0.0485 0.1043 0.0968 0.0877 0.0874 0.0804 0.0899 0.0490 0.0484 0.0416
    0.0421 0.0438 0.0263 0.0205 0.0164 0.0186 0.0186 0.0209 0.0126 0.0095
    0.0092 0.0057 0.0029 0.0019 0.0170
* LDT4
  5 0.0449 0.1393 0.1062 0.0690 0.0885 0.1006 0.1128 0.1020 0.0749 0.0286
    0.0188 0.0188 0.0098 0.0066 0.0084 0.0098 0.0185 0.0181 0.0080 0.0035
    0.0038 0.0014 0.0010 0.0007 0.0061
* HDV2B
  6 0.0329 0.0689 0.0767 0.0662 0.0897 0.0863 0.0731 0.0593 0.0521 0.0508
    0.0405 0.0387 0.0228 0.0179 0.0262 0.0161 0.0329 0.0333 0.0280 0.0125
    0.0183 0.0130 0.0076 0.0040 0.0324
* HDV3
  7 0.0178 0.0687 0.1302 0.0663 0.0840 0.0651 0.0450 0.0876 0.0900 0.0130
    0.0474 0.0320 0.0402 0.0154 0.0059 0.0308 0.0320 0.0189 0.0367 0.0166
    0.0047 0.0059 0.0154 0.0036 0.0269
* HDV4
  8 0.0084 0.0175 0.0305 0.0843 0.0843 0.1375 0.0778 0.1148 0.0876 0.0512
    0.0389 0.0597 0.0298 0.0266 0.0227 0.0311 0.0259 0.0149 0.0110 0.0078
    0.0084 0.0065 0.0045 0.0013 0.0166
* HDV5
  9 0.0740 0.1850 0.0786 0.1249 0.0370 0.0740 0.1527 0.0139 0.0185 0.0139
    0.0231 0.0046 0.0046 0.0139 0.0093 0.0231 0.0093 0.0185 0.0185 0.0324
    0.0139 0.0139 0.0000 0.0046 0.0378
* HDV6
 10 0.0303 0.0353 0.0126 0.0681 0.0782 0.0605 0.0983 0.0328 0.0277 0.0353
    0.0656 0.0429 0.0328 0.0202 0.0479 0.0756 0.0353 0.0504 0.0504 0.0101
    0.0227 0.0227 0.0025 0.0050 0.0368
* HDV7
 11 0.0100 0.0201 0.0267 0.0836 0.0602 0.0669 0.0468 0.0234 0.0100 0.0100
    0.0970 0.0669 0.0602 0.0936 0.0401 0.0468 0.0401 0.0368 0.0602 0.0201
    0.0267 0.0167 0.0000 0.0000 0.0371
* HDV8A
 12 0.0654 0.0209 0.0444 0.0863 0.2797 0.0523 0.0392 0.0209 0.0366 0.0131
    0.0288 0.0288 0.0157 0.0157 0.0392 0.0627 0.0026 0.0784 0.0444 0.0078
    0.0026 0.0000 0.0052 0.0000 0.0091
* HDV8B
 13 0.0186 0.0186 0.0000 0.0000 0.0000 0.0558 0.0000 0.0186 0.3163 0.0186
    0.0186 0.1116 0.2233 0.0000 0.0186 0.0186 0.0000 0.0558 0.0186 0.0558
    0.0000 0.0000 0.0000 0.0000 0.0326
* HD8S
 14 0.0000 0.0000 0.0233 0.0583 0.0350 0.0311 0.0506 0.1284 0.0233 0.0739
    0.0661 0.0272 0.0194 0.0817 0.0506 0.0972 0.0972 0.0661 0.0272 0.0078
    0.0117 0.0039 0.0039 0.0000 0.0159
* HDBT
 15 0.0021 0.0021 0.0528 0.0085 0.0085 0.1141 0.0021 0.0063 0.5346 0.0021
    0.0232 0.0042 0.0106 0.1395 0.0169 0.0190 0.0127 0.0085 0.0021 0.0000
    0.0148 0.0000 0.0000 0.0042 0.0111
* MC
 16 0.0749 0.1194 0.1296 0.1162 0.0891 0.0542 0.0588 0.0340 0.1052 0.0216
    0.0266 0.0510 0.0257 0.0152 0.0129 0.0087 0.0060 0.0051 0.0051 0.0074
    0.0083 0.0028 0.0037 0.0037 0.0150

```

dcmd.dsf

*
* Diesel fractions are not read as an external file. The following
* input is an example of the diesel fraction input label followed by
* values representing the MOBILE6 default values for diesel sales
* fractions by vehicle class.
*
* The 350 values in fourteen rows represent each of 14 vehicle classes.
* The fourteen vehicle classes are:
*
* 1 LDV Light-Duty Vehicles (Passenger Cars)
* 2 LDT1 Light-Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW)
* 3 LDT2 Light Duty Trucks 2 (0-6,001 lbs. GVWR, 3751-5750 lbs. LVW)
* 4 LDT3 Light Duty Trucks 3 (6,001-8500 lbs. GVWR, 0-3750 lbs. LVW)
* 5 LDT4 Light Duty Trucks 4 (6,001-8500 lbs. GVWR, 3751-5750 lbs. LVW)
* 6 HDV2B Class 2b Heavy Duty Vehicles (8501-10,000 lbs. GVWR)
* 7 HDV3 Class 3 Heavy Duty Vehicles (10,001-14,000 lbs. GVWR)
* 8 HDV4 Class 4 Heavy Duty Vehicles (14,001-16,000 lbs. GVWR)
* 9 HDV5 Class 5 Heavy Duty Vehicles (16,001-19,500 lbs. GVWR)
* 10 HDV6 Class 6 Heavy Duty Vehicles (19,501-26,000 lbs. GVWR)
* 11 HDV7 Class 7 Heavy Duty Vehicles (26,001-33,000 lbs. GVWR)
* 12 HDV8A Class 8a Heavy Duty Vehicles (33,001-60,000 lbs. GVWR)
* 13 HDV8B Class 8b Heavy Duty Vehicles (>60,000 lbs. GVWR)
* 14 HDBS School Busses
*
* Urban/Transit busses are assumed to be all diesel and motorcycles are
* assumed to be all gasoline fueled and do not require a diesel fraction.
*
* Each row contains 25 values which represent the fraction of all vehicle
* sales in that class which were diesel vehicles in that model year. It is
* assumed that all non-diesel sales were gasoline fueled vehicles. The
* first value represents the 1996 and newer model years. The second value
* represents the 1995 model year, and so on, until the 25th value
* represents the 1972 and earlier model years. It is assumed that all
* diesel sales after 1996 are the same as the 1996 model year sales.
*
* This input only will match the default diesel sales fractions for the
* 1996 calendar year, since the user supplied values are read by age
* and *not* by model year.
*
* All values must be less than or equal to 1 and greater than or equal to
* zero. Values are read "free format," meaning any number may appear in
* any row with as many characters as needed (including a decimal) as long
* as 350 values (25 times 14) follow, each separated by a space. All
* 350 values must be entered each time in the proper order.
*
DIESEL FRACTIONS :
0.0069 0.0034 0.0033 0.0041 0.0024 0.0021 0.0031 0.0023 0.0014 0.0019
0.0018 0.0004 0.0013 0.0022 0.0052 0.0011 0.0007 0.0004 0.0254 0.0145
0.0810 0.1074 0.1951 0.2355 0.2355
0.0000 0.0000 0.0000 0.0000 0.0007 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0026 0.0000
0.0095 0.0000 0.0328 0.1364 0.1364
0.0009 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0008 0.0055
0.0042 0.0184 0.0071 0.0354 0.0354
0.0000 0.0003 0.0000 0.0000 0.0000 0.0000 0.0004 0.0011 0.0004 0.0025
0.0074 0.0025 0.0020 0.0004 0.0066 0.0054 0.0080 0.0100 0.0080 0.0169

dcmd.dsf

0.0183	0.0138	0.0492	0.0800	0.0800					
0.0000	0.0008	0.0000	0.0000	0.0000	0.0006	0.0005	0.0004	0.0059	0.0132
0.0143	0.0157	0.0055	0.0093	0.0162	0.0265	0.0101	0.0042	0.0565	0.0426
0.1039	0.3571	0.3077	0.0556	0.0556					
0.2842	0.2877	0.2267	0.2410	0.2146	0.1964	0.2813	0.2215	0.3259	0.2871
0.2288	0.2437	0.2892	0.1783	0.2108	0.1840	0.1704	0.1768	0.3180	0.2264
0.1842	0.1705	0.1351	0.1921	0.1921					
0.6920	0.5182	0.5888	0.5212	0.5059	0.5464	0.6452	0.3770	0.4036	0.5319
0.4307	0.3971	0.4370	0.4046	0.4078	0.4022	0.3784	0.3768	0.3828	0.3850
0.1802	0.2453	0.1400	0.0962	0.0962					
0.8471	0.7536	0.6021	0.5442	0.4812	0.5993	0.5740	0.5889	0.5336	0.4756
0.5749	0.3595	0.6304	0.2527	0.2874	0.3319	0.3364	0.3089	0.0588	0.0000
0.0000	0.0204	0.0000	0.0000	0.0000					
0.9489	0.9324	0.9206	0.8756	0.9423	0.8398	0.7490	0.6250	0.2800	0.5227
0.3896	0.5893	0.8571	0.7241	0.6667	0.6500	0.6667	0.3333	0.6400	0.6429
0.2727	0.6667	0.0000	0.2500	0.2500					
0.9620	0.8197	0.8232	0.8738	0.9151	0.8593	0.8032	0.8683	0.9441	0.9469
0.9574	0.8973	0.9304	0.6270	0.7679	0.8333	0.6154	0.6341	0.6588	0.5625
0.5833	0.5769	0.3529	0.3000	0.3000					
1.0000	0.9714	1.0000	1.0000	0.9940	0.9777	0.9048	0.9191	0.8552	0.9082
0.9806	0.9244	0.9722	0.9424	0.9444	0.9078	0.8663	0.9217	0.8519	0.7363
0.8144	0.8413	0.7143	0.7143	0.7143					
1.0000	1.0000	1.0000	1.0000	0.9980	0.9979	1.0000	1.0000	1.0000	1.0000
0.9969	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9767
1.0000	1.0000	0.9688	0.8824	0.8824					
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	0.0000	1.0000	1.0000					
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000