PCI COHORT—RESULTS

Outcomes After PCI in VA Patients

National Trends in Outcomes in VA Patients

National trends in outcomes over time. Adjusted outcomes after PCI are shown in Table I1. Since 1994 the percentage of patients undergoing revascularization procedures (either repeat PCI or CABG) following the index PCI remained essentially constant. Mortality rates following PCI (both within 30 days and within 1 year) and readmissions for AMI within 6 months also remained essentially constant over this time period. Length of stay has decreased.

Table I1
Adjusted Outcomes Following PCI: VA Patients all ages, all cohort years

	Cohort				Statistically[a] Significant Trend?
	FY 1994 (n=3321)	FY 1997 (n=4453)	FY 1998 (n=4839)	FY 1999 (n=4976)	
CABG following PCI within index admission (%)	2.3	1.6	1.4	1.3	No
CABG with 6 months of PCI (%)	6.7	5.4	5.1	4.8	No
Repeat PCI within index admission (%)	1.8	2.1	2.2	2.3	No
Repeat PCI within 30 days (%)	2.9	3.6	3.9	4.2	No
Repeat PCI within 6 months (%)	11.7	11.5	11.5	11.6	No
Length of stay (Days)	10.8	8.6	7.8	7.1	**Yes**
30 Day Mortality (%)	0.8	0.9	0.9	0.9	No
1 Year Mortality (%)	4.4	4.4	4.4	4.4	No
Readmission for AMI within 6 months (%)	1.8	1.9	1.9	2.0	No

[a] at the 10% level

Adjusted outcomes by demographic subgroups. Odds ratios (CABG, repeat PCI, mortality, and readmission) and absolute differences (length of stay) comparing male to female veterans and comparing African American and Hispanic veterans to white veterans[1] are reported in Table I2. As indicated earlier, these values were obtained from hierarchical regression models. Pooling data across all years (FY 1994, 1997-1999), there were few differences in outcomes following PCI between these demographic subgroups. However, small sample sizes limited our ability to detect differences and the 90% confidence intervals associated with these estimates are quite wide. There were however, a few significant differences in outcomes following PCI between these groups. African Americans had significantly longer lengths of stay during the admission within which the index PCI occurred compared to white veterans. Male veterans were significantly more likely to be readmitted for an AMI in the six months following the index PCI compared to female veterans.[2] Hispanic veterans were significantly less likely to be readmitted for AMI within 6 months compared to white veterans.[3]

[1] Race data were not available for approximately 4 to 9% of the veterans in each cohort and there were a small number of veterans representing other racial groups. We included these patients in the regression models, but because of difficulty in the interpretation of results for patients with missing race data and small numbers of patients in other racial categories, we only present comparisons of white, African American, and Hispanic patients.

[2] Due to small number of female veterans in the PCI cohorts, this difference was imprecisely measured.

[3] This difference was not significant at the 5% level.

Table I2
Adjusted Odds-Ratios and Absolute Differences Comparing Outcomes Following PCI in Demographic Subgroups (Combining data across cohorts)

	Gender	Race	
	Males vs Females	African American vs White	Hispanic vs White
CABG following PCI within index admission			
Odds ratio	0.93	0.76	0.57
90% CI	(0.48, 1.96)	(0.52, 1.09)	(0.31,1.02)
CABG within 6 months			
Odds ratio	1.01	0.84	0.94
90% CI	(0.65, 1.63)	(0.67, 1.06)	(0.69,1.26)
Repeat PCI within index admission			
Odds ratio	0.66	1.09	1.24
90% CI	(0.40, 1.17)	(0.82, 1.44)	(0.83, 1.83)
Repeat PCI within 30 Days			
Odds ratio	0.71	0.98	1.03
90% CI	(0.48, 1.10)	(0.78, 1.22)	(0.73, 1.41)
Repeat PCI within 6 months			
Odds ratio	0.87	1.00	1.08
90% CI	(0.64, 1.20)	(0.86, 1.16)	(0.87, 1.33)
Length of Stay			
Difference	-0.52	**2.89**	0.67
90% CI	(-2.70, 1.66)	**(1.93, 3.87)**	(-0.70, 2.07)
30-Day Mortality			
Odds ratio	1.19	0.90	1.11
90% CI	(0.46, 3.67)	(0.58, 1.35)	(0.61, 1.96)
1-year Mortality			
Odds ratio	1.66	0.93	0.85
90% CI	(0.94, 3.14)	(0.73, 1.15)	(0.59, 1.19)
Readmission for AMI within 6 months			
Odds ratio	**11.39**	0.89	**0.51**[a]
90% CI	**(2.06, 136.7)**	(0.63, 1.24)	**(0.27, 0.93)**

Bolded numbers represent significant differences at a 10% level.
[a] Not significant at 5% level.

Variation in Mortality and Utilization in VA Patients Across Networks

There was some variation across networks in outcomes following PCI (Table I3). For example, the percentage of patients undergoing a repeat PCI within 6 months of the index PCI differed by 10 percentage points—from a low of 8% in VISN 10 to a high of 18% in VISN 13. There was little variability in mortality following PCI (either at 30 days or 1 year) across VISNs. Specific data on each outcome are described next.

Table I3
Variation in Outcomes Following PCI across VISNs: 1999

	National Average (% or days)	Lowest VISN		Highest VISN		Difference (% or days)
		VISN	Outcome (% or days)	VISN	Outcome (% or days)	
CABG following PCI within index admission (%)	1.3	12	0.8	3	2.4	1.6
CABG with 6 months of PCI (%)	4.8	**16**	**3.2**	5	6.7	3.5
Repeat PCI within index admission (%)	2.3	**3**	**1.2**	**1**	**5.0**	3.8
Repeat PCI within 30 days (%)	4.2	**10**	**2.0**	**1**	**7.2**	5.2
Repeat PCI within 6 months (%)	11.6	**10**	**8.0**	**13**	**17.9**	9.9
Length of stay (Days)	7.1	**15**	**6.1**	**7**	**8.7**	2.6
30 Day Mortality (%)	0.9	14	0.7	12	1.5	0.8
1 Year Mortality (%)	4.4	8	3.3	3	6.2	2.9
Readmission for AMI within 6 months (%)	2.0	1	1.4	**13**	**4.0**	2.6

Bolded numbers represent VISNs with significantly lower or higher utilization of procedures or length stay compared to the national average at a 10% level.

Adjusted mortality post PCI. In 1999 the national 30-day mortality rate was 0.9% (Table I1) and this rate was consistent across VISNs (Figure I1a). From FY 1994 to 1999, the rate was essentially constant except in VISN 11 where the mortality rate increased (Figure I1b). At one year, the mortality rate was 4.4% and again there was little variability in mortality across VISNs (Figure I2a) or over time within each VISNs (Figures I2b). Thirty-day and 1-year mortality rates over time for each VISN are presented in Appendix I (Figure AI1-AI2).

Figure I1a

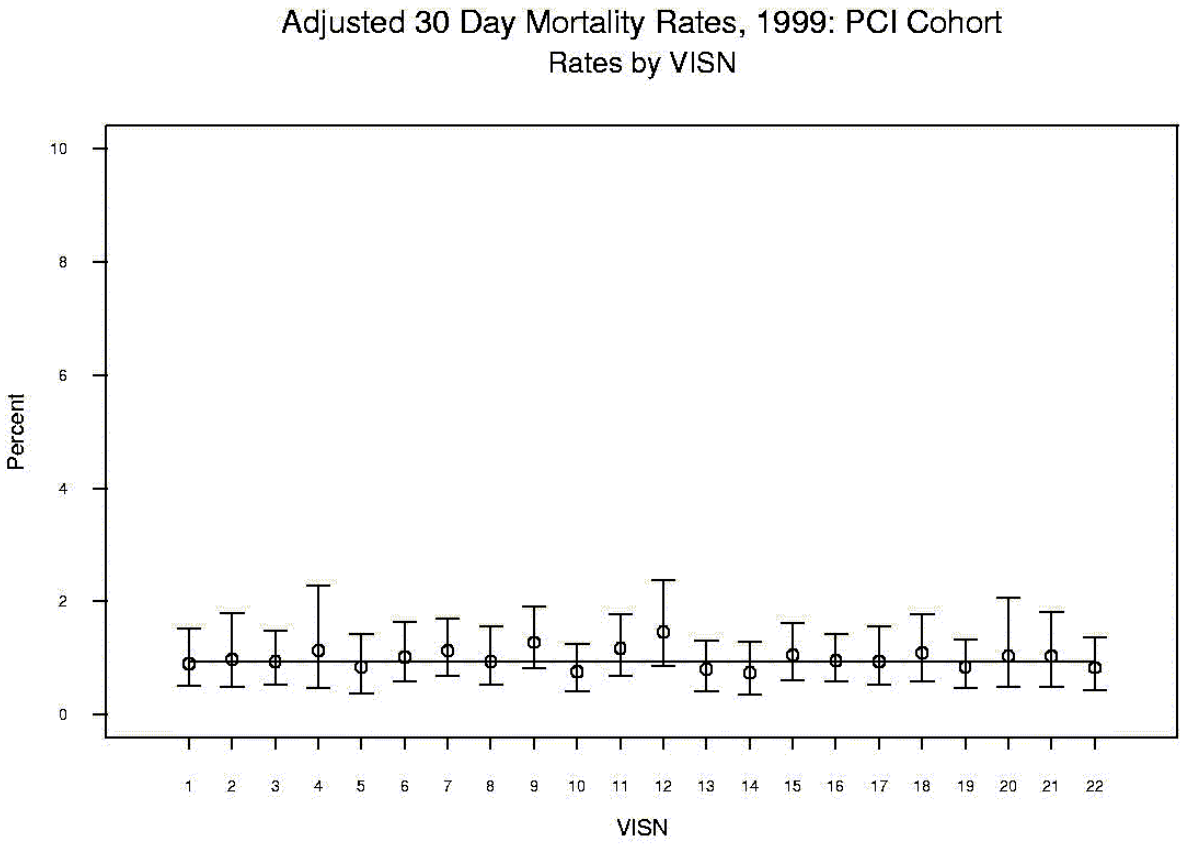


Figure I1b

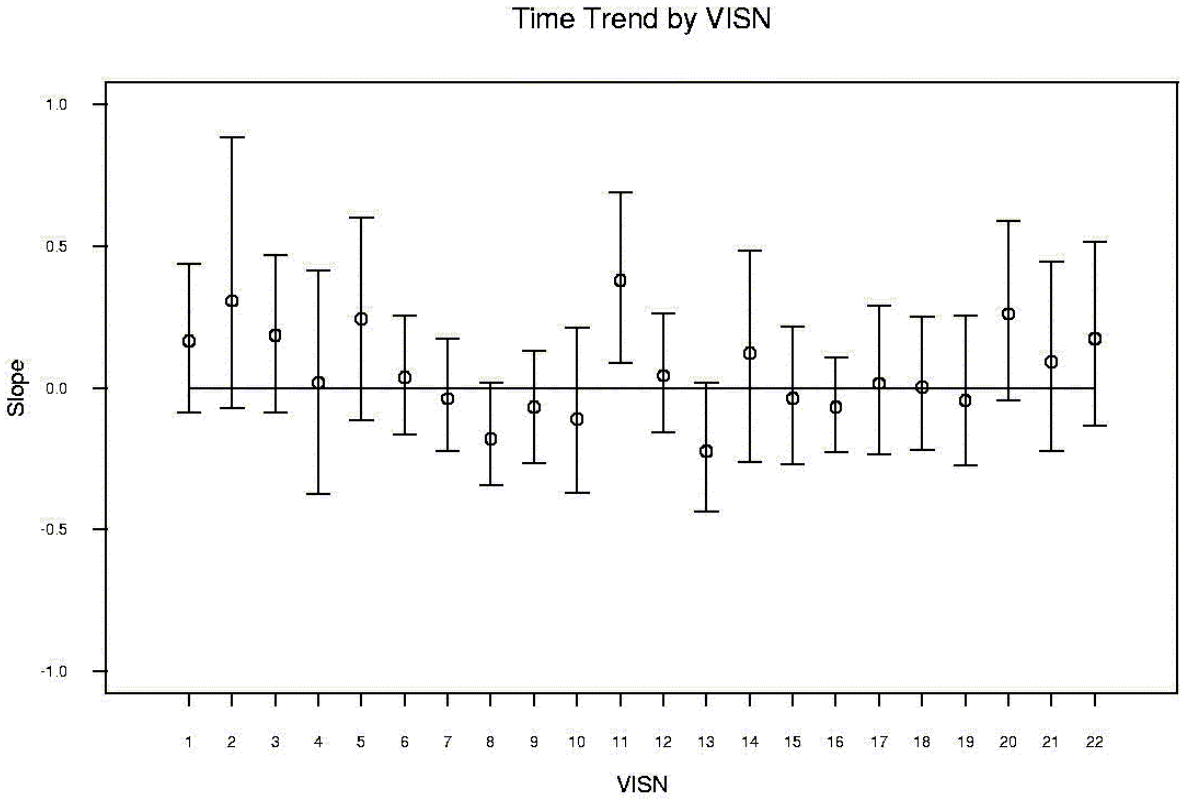


Figure I2a

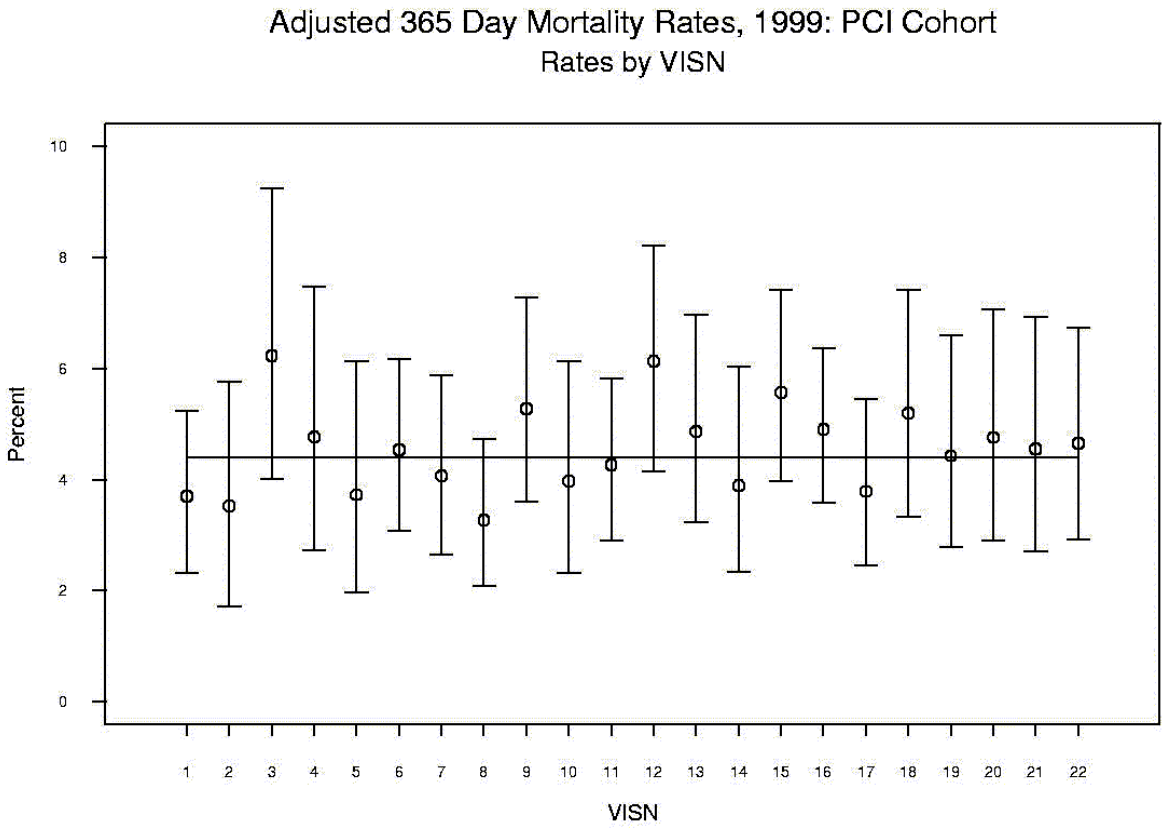
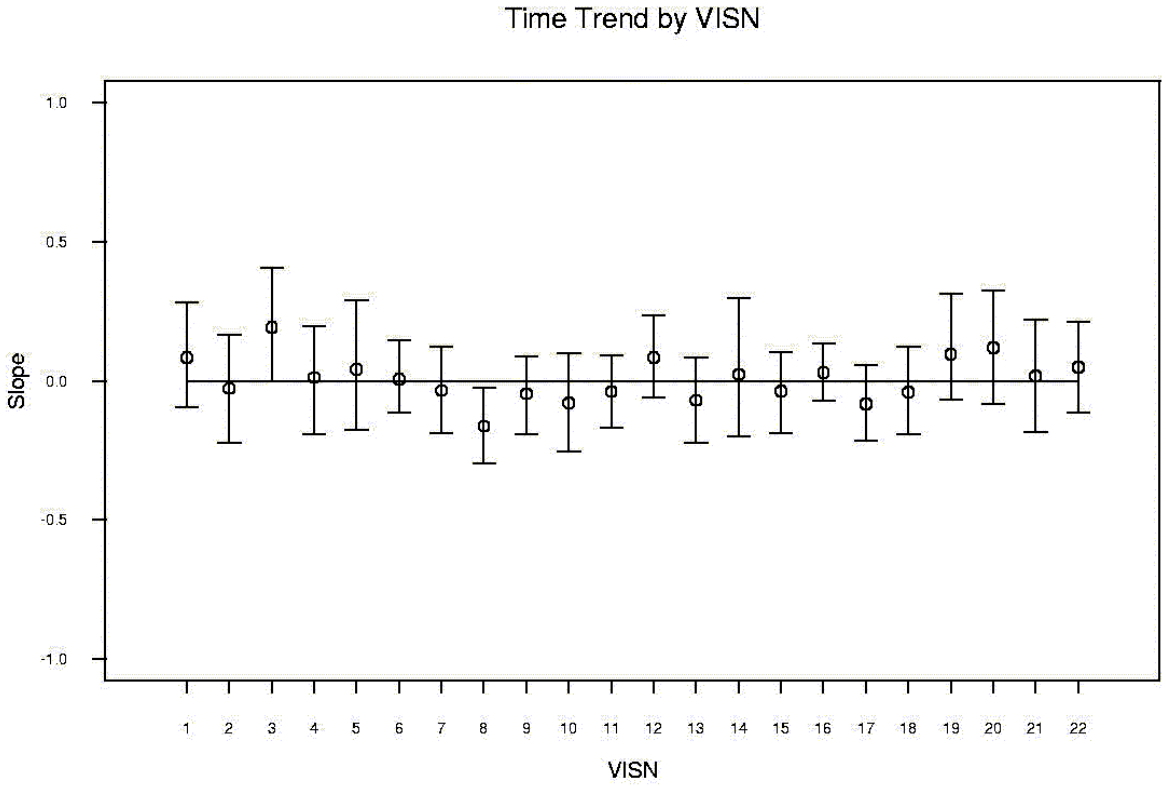


Figure I2b



Adjusted length of stay. Across VISNs the average length of stay for the admission within which the index PCI occurred in 1999 was 7.1 days (Table I1). Only VISN 7 had an average length of stay that was statistically significantly higher than the national average (Figure I3a). The average length of stay for VISNs 15 and 16 were statistically significantly lower than the national average. Over time, the average length of stay associated with the admission within which the index PCI occurred declined, except for VISN 7, where the average length of stay remained stable (Figure I3b). Average lengths of stay over time for each VISN are presented in Appendix I (Figure AI3).

Figure I3a

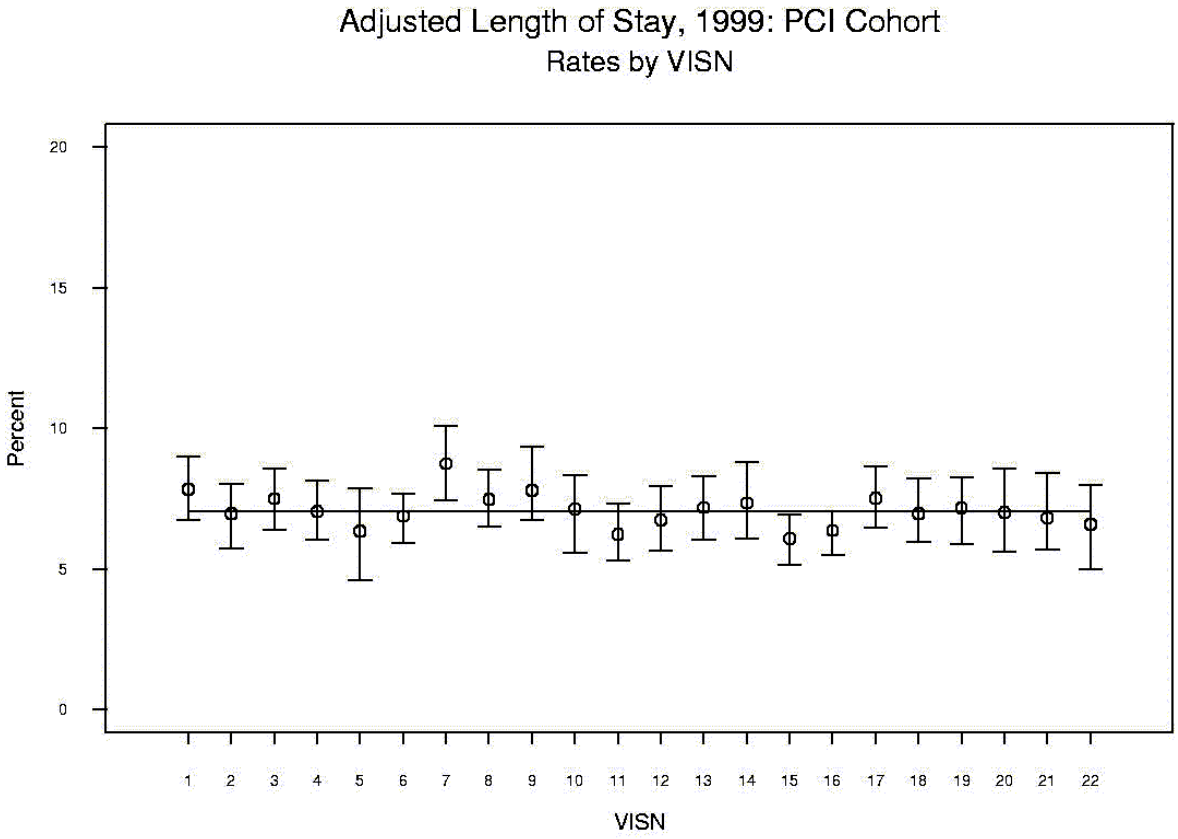
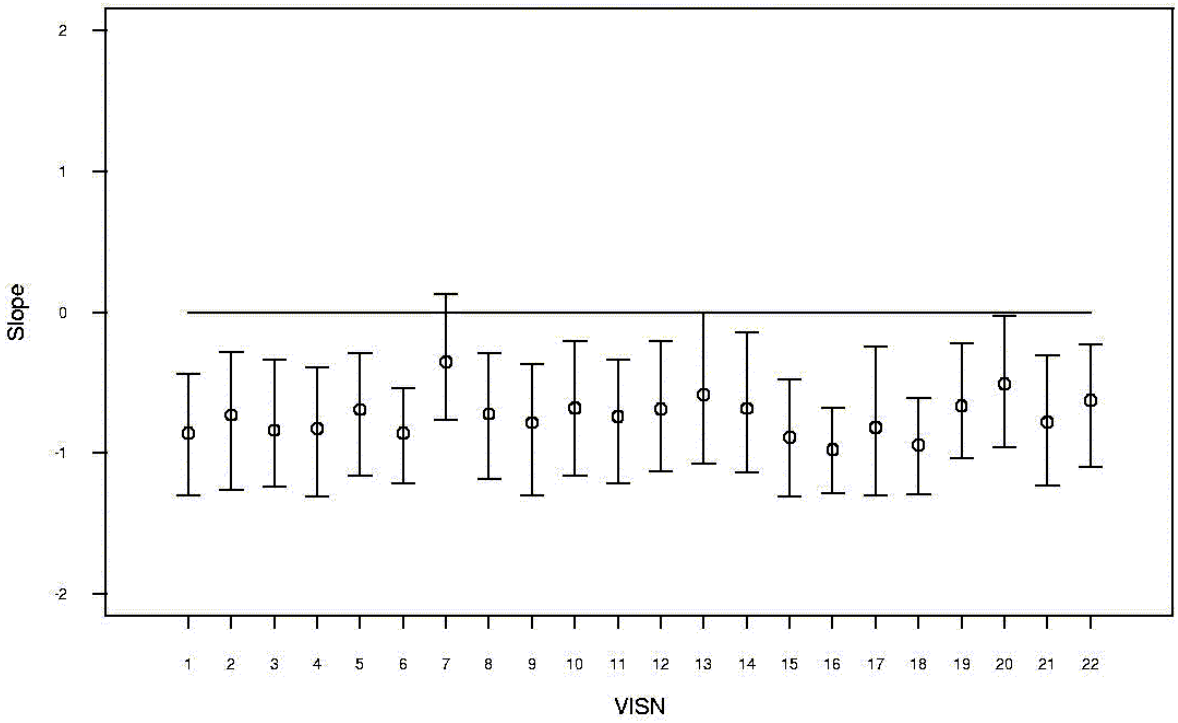


Figure I3b



Repeat PCIs. In FY 1999, repeat PCIs within the index admission were infrequent (national average is 2.3%; Table I1). In VISNs 1, 13, and 16 the percentage of patients undergoing a repeat PCI within the index admission were significantly higher than the national average, while the percentage in VISN 3 was statistically significantly lower (Figure I4a). Over time, the percentage of patients receiving a repeat PCI within the same admission was stable within each VISN, except in VISN 20, where the percentage increased over time (Figure I4b).

In 1999, the national average for repeat PCIs within 30 days of the index PCI was 4.2% (Table I1). The percentage of patients receiving a repeat PCI within 30 days in VISNs 1 and 16 were statistically significantly higher than the national average and the percentage in VISN 10 was statistically significantly lower (Figure I5a). Over time, the percentage of patients receiving a repeat PCI in VISN 20 increased and the percentage within all other VISNs remained stable (Figure I5b).

By 6 months from the index PCI, the percent of patients receiving a repeat PCI increased to 11.6% (Table I1). The percentage in VISNs 1, 13, and 19 were significantly higher than the national average, and VISN 10's percentage was statistically significantly lower (Figure I6a). Over time, the percentage of patients receiving a repeat PCI within 6 months of the index PCI remained stable within each VISN (Figure I6b)

The percentage of patients receiving a repeat PCI within the index admission, within 30 days of the index PCI, and within 6 months of the index PCI over time for each VISN are presented in Appendix I (Figures AI4-AI6).

Figure I4a

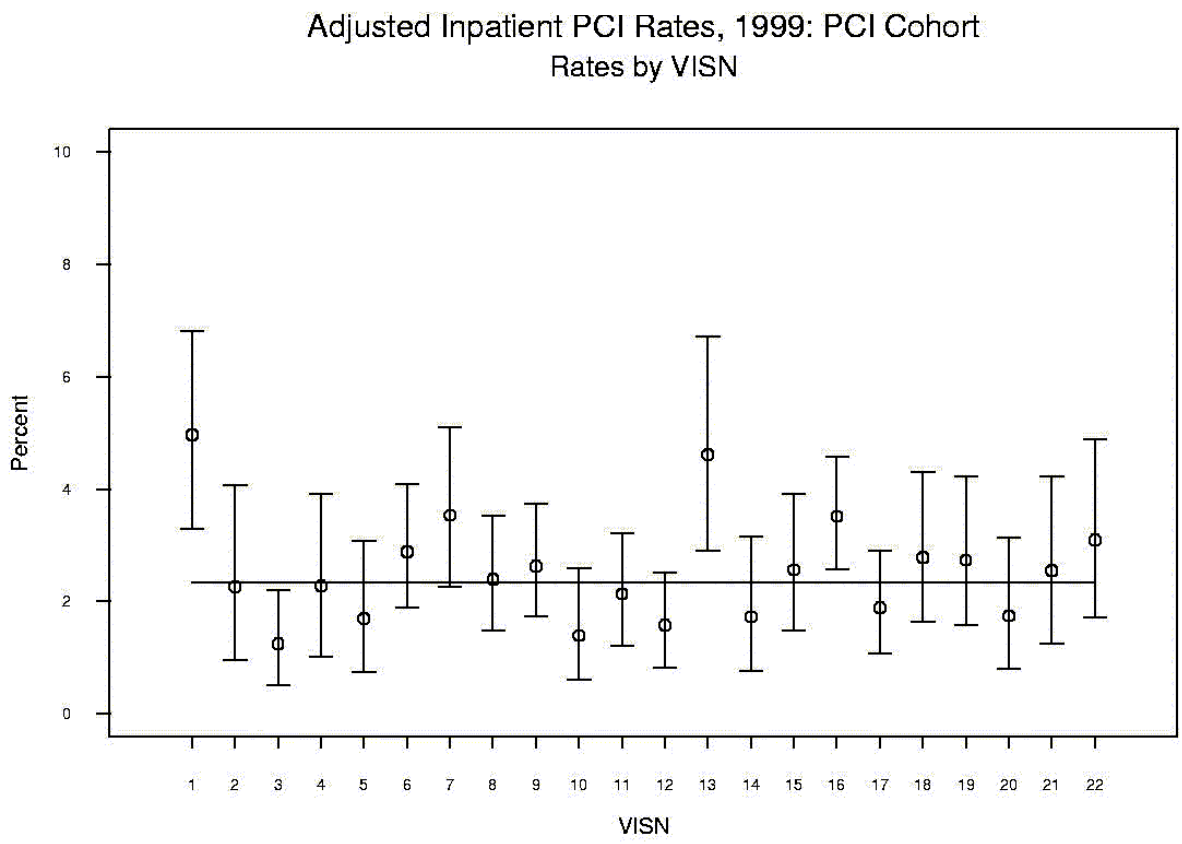


Figure I4b

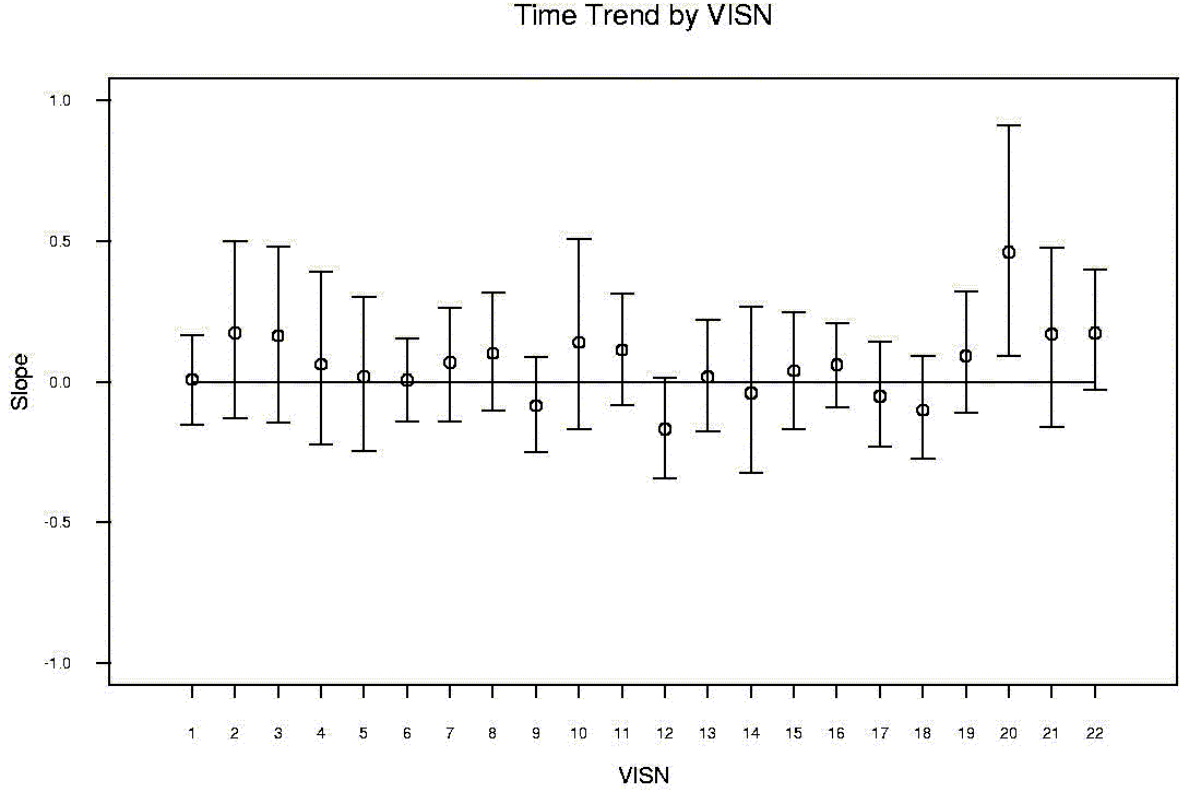


Figure I5a

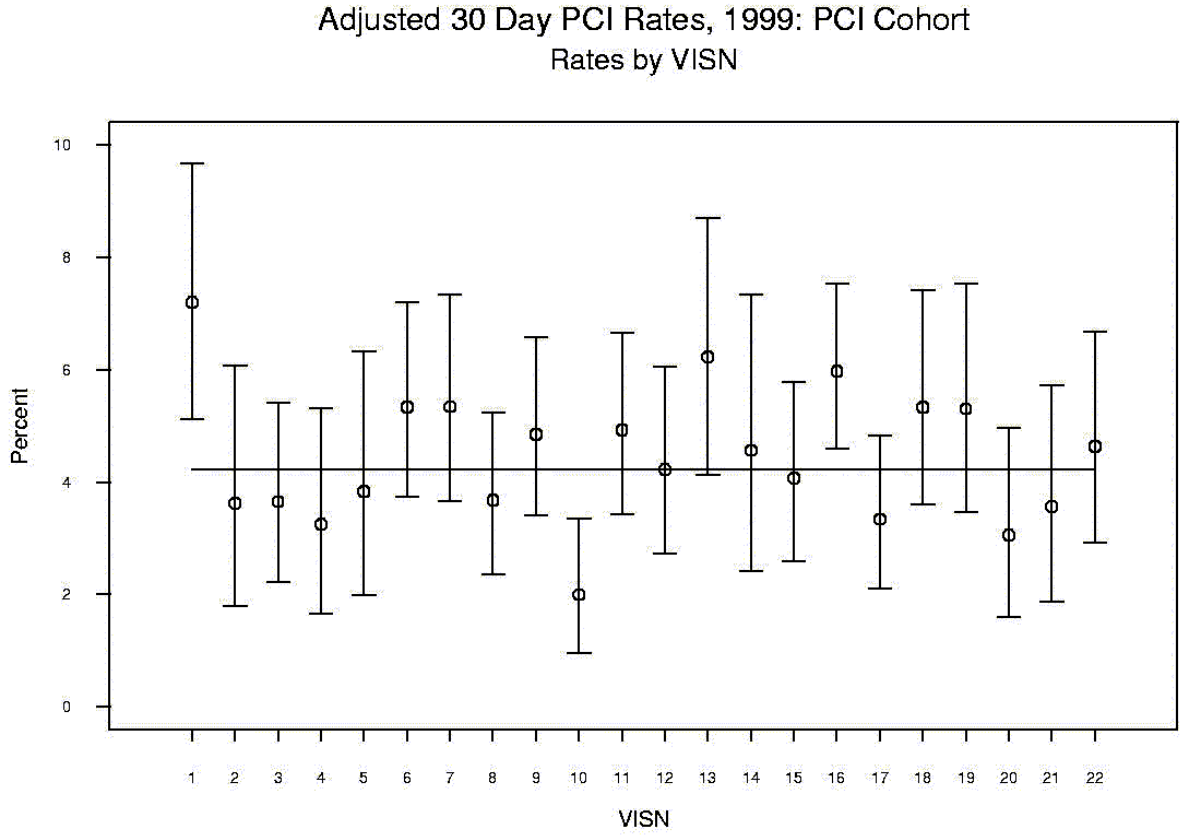


Figure I5b

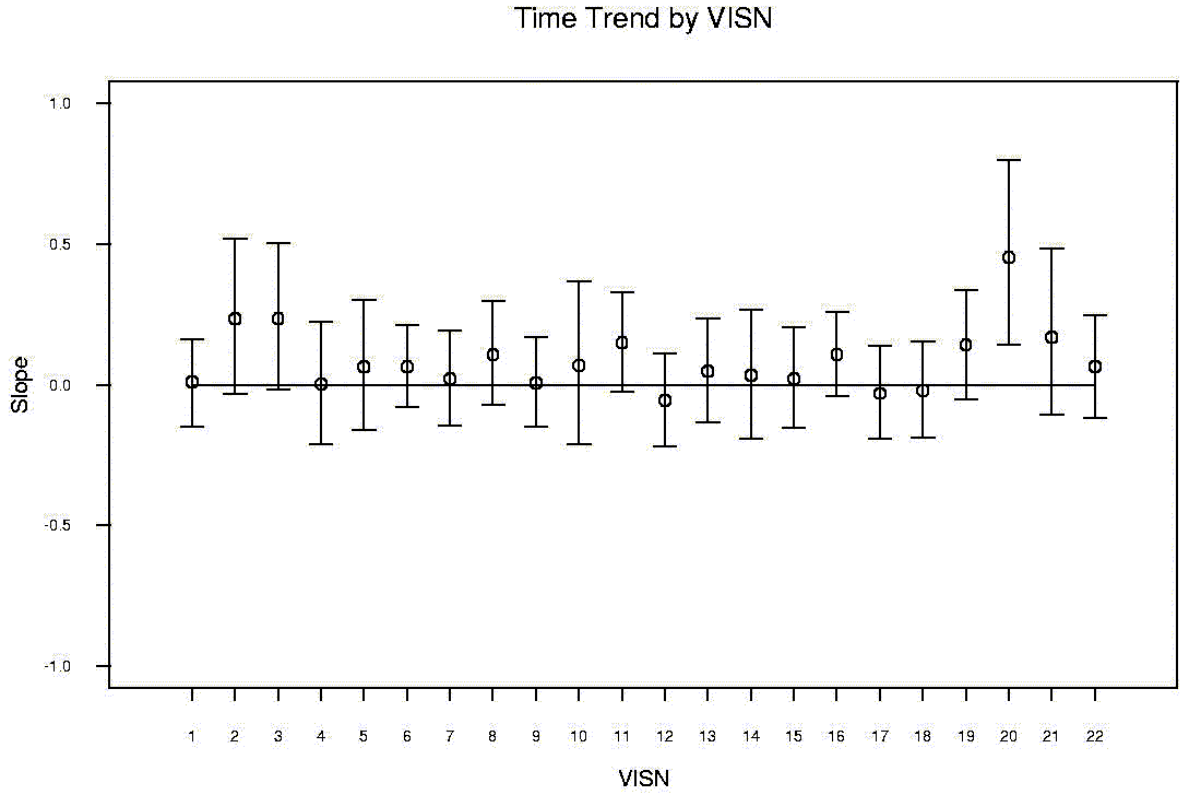


Figure I6a

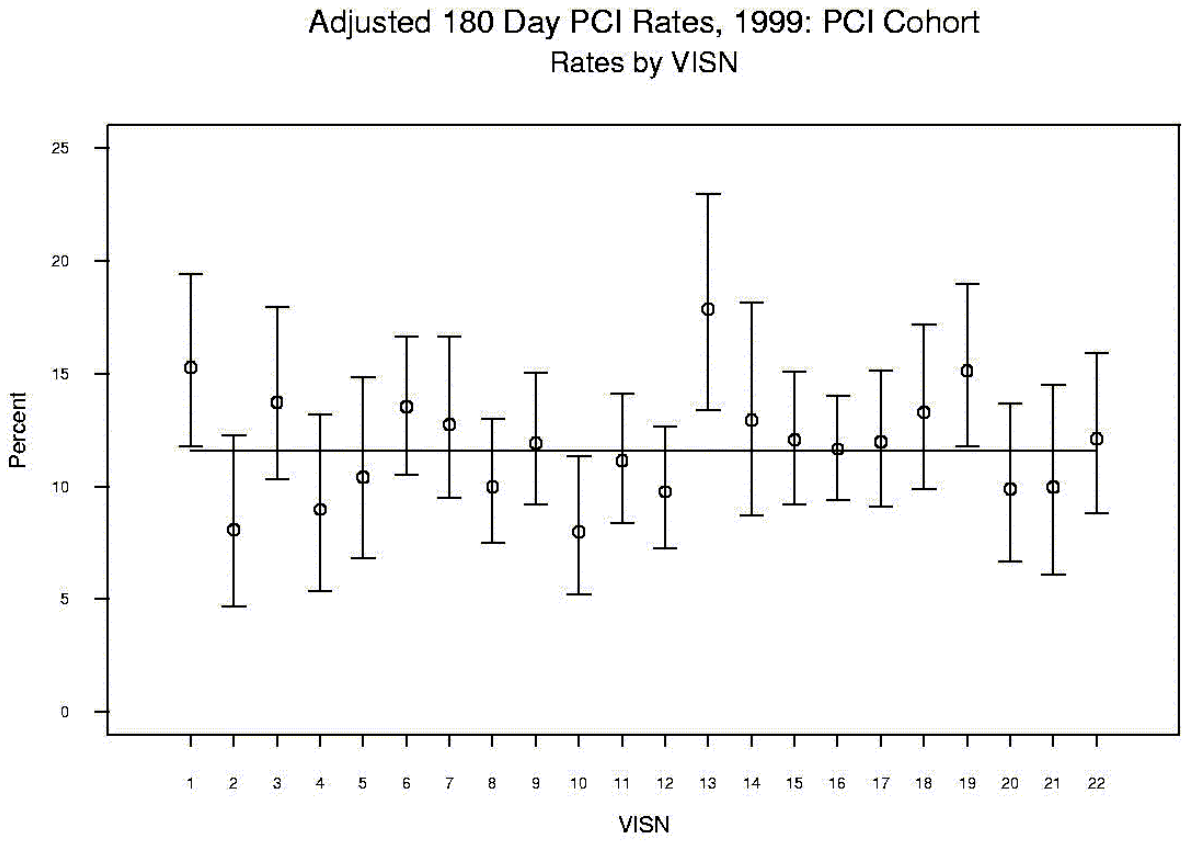
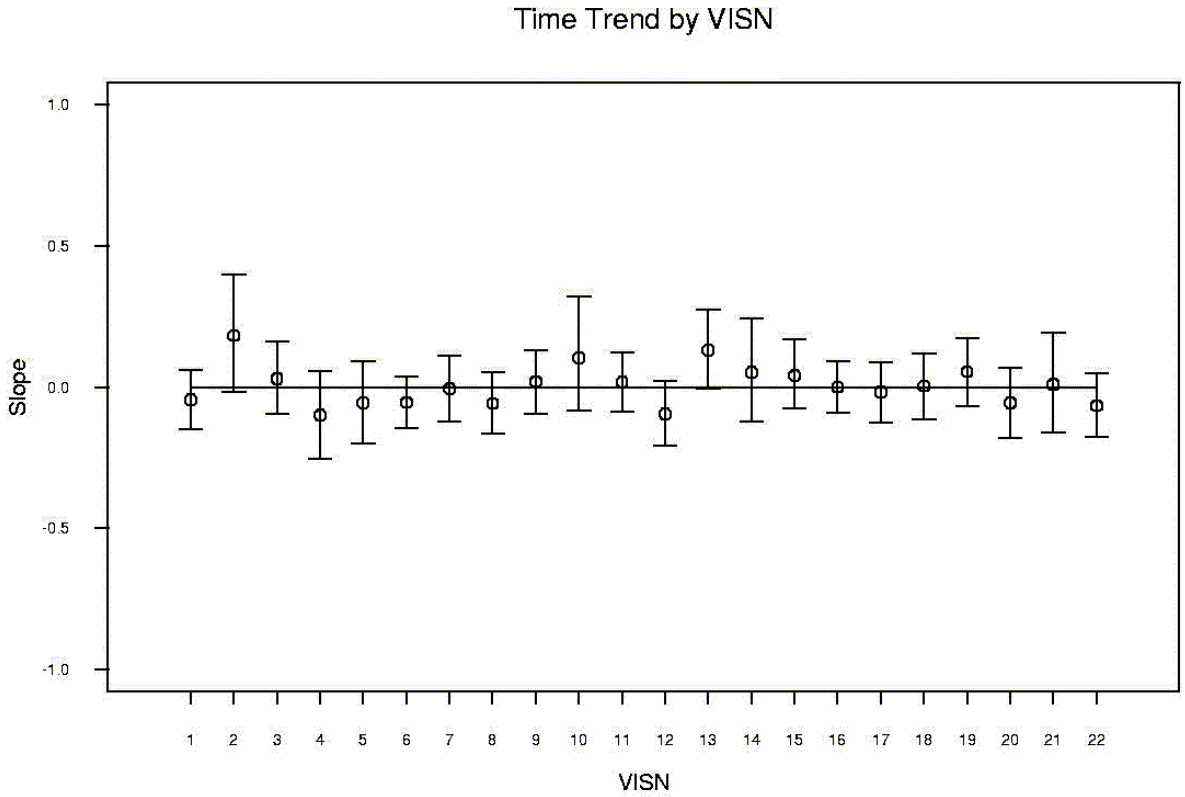


Figure I6b



Additional procedures. In FY 1999, less than 2% of patients underwent a CABG procedure within their index PCI admission (Table I1). This percentage was essentially constant across all VISNs in 1999 (Figure I7a). Over time, the percentage of patients receiving a CABG procedure following an index PCI declined in VISNs 6, 11, 12, and 15 and remained stable in all other VISNs (Figure I7b).

At six-months, the percentage of patients who underwent a CABG procedure following their index PCI was 4.8% (Table I1). Only VISN 16 had a statistically significantly lower percentage than the national average (Figure I8a). Over time, the percentage of patients receiving CABG following an index PCI declined in VISNs 12, 15, 16, and 18 (Figure I8b). This percentage did not increase over time within any VISN. The percentage of patients receiving a CABG procedure following the index PCI over time according to VISN are presented in Appendix I (Figures AI7-AI8).

Figure I7a

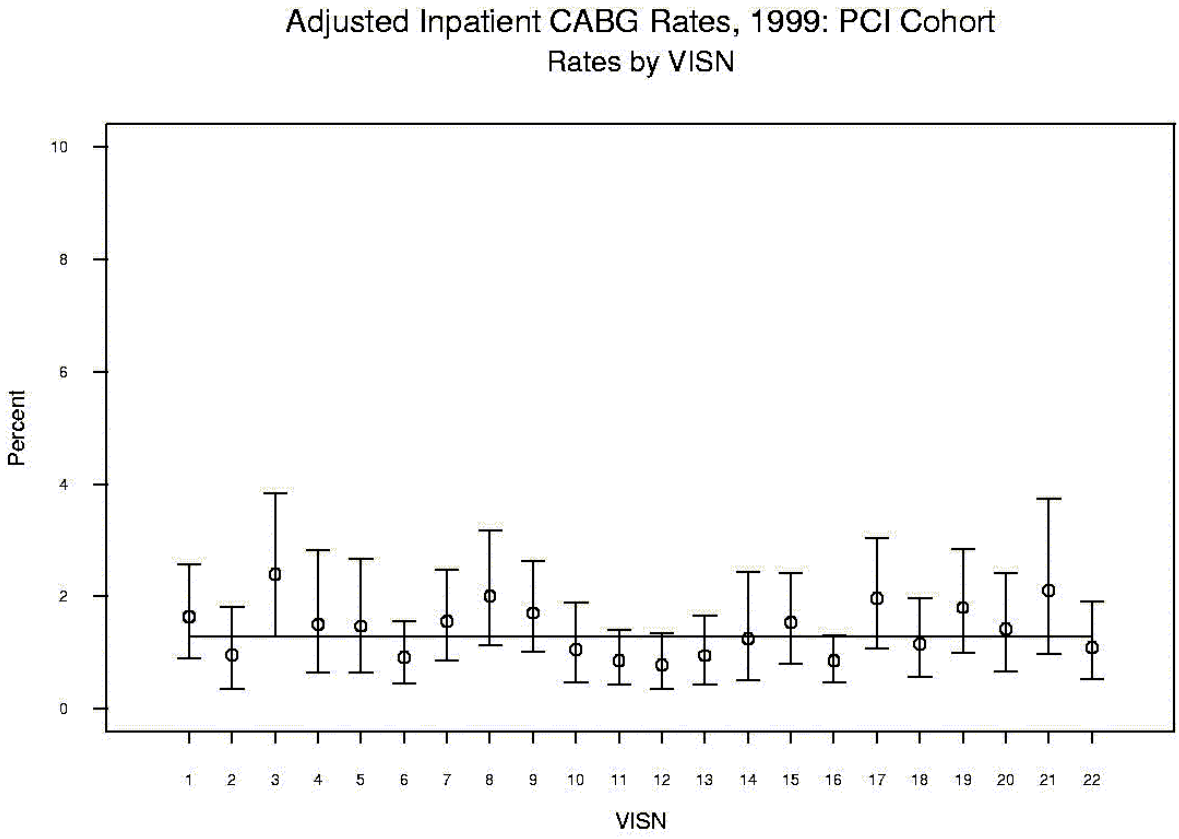


Figure I7b

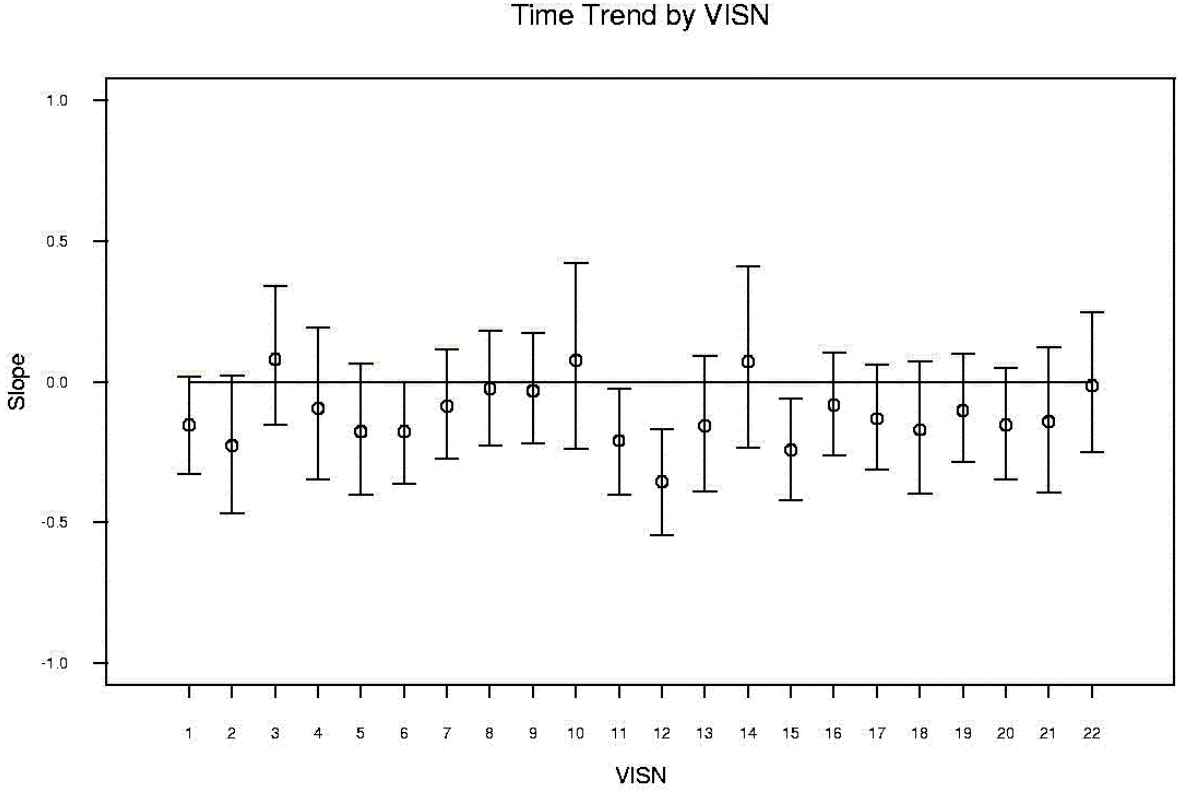


Figure I8a

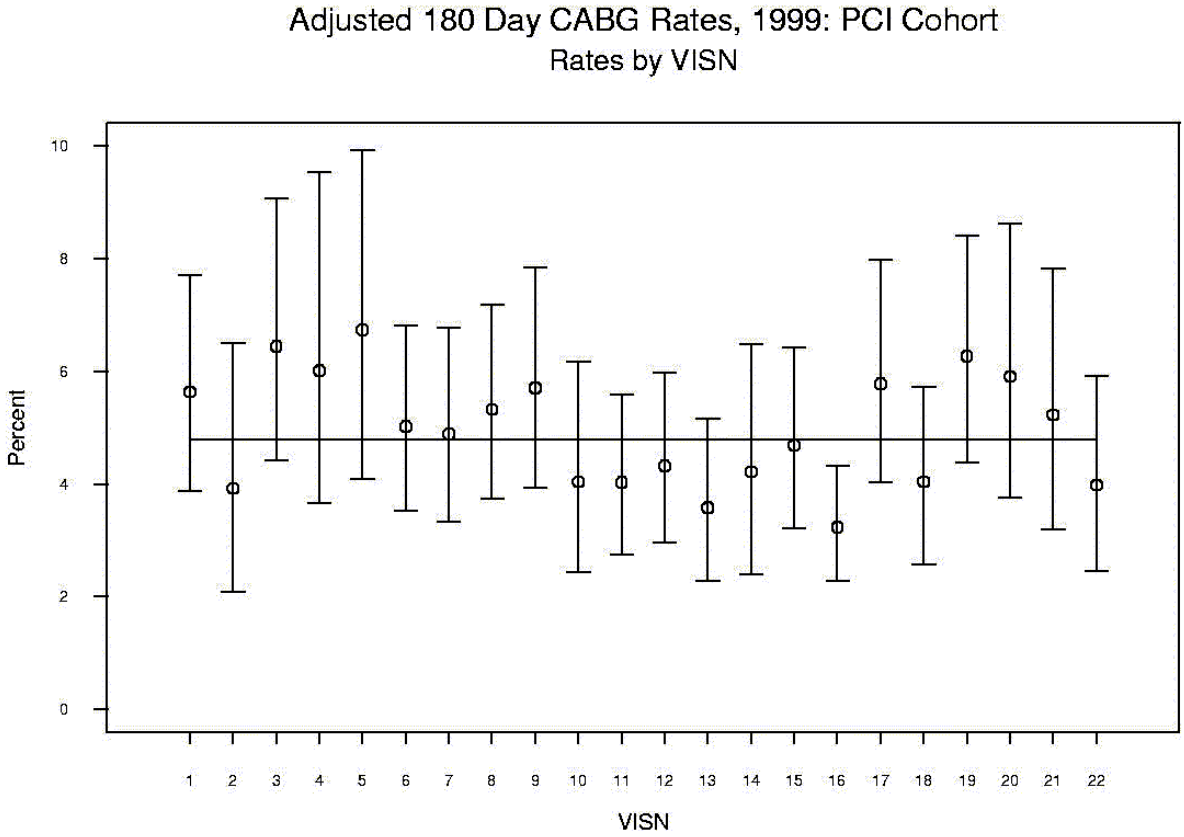
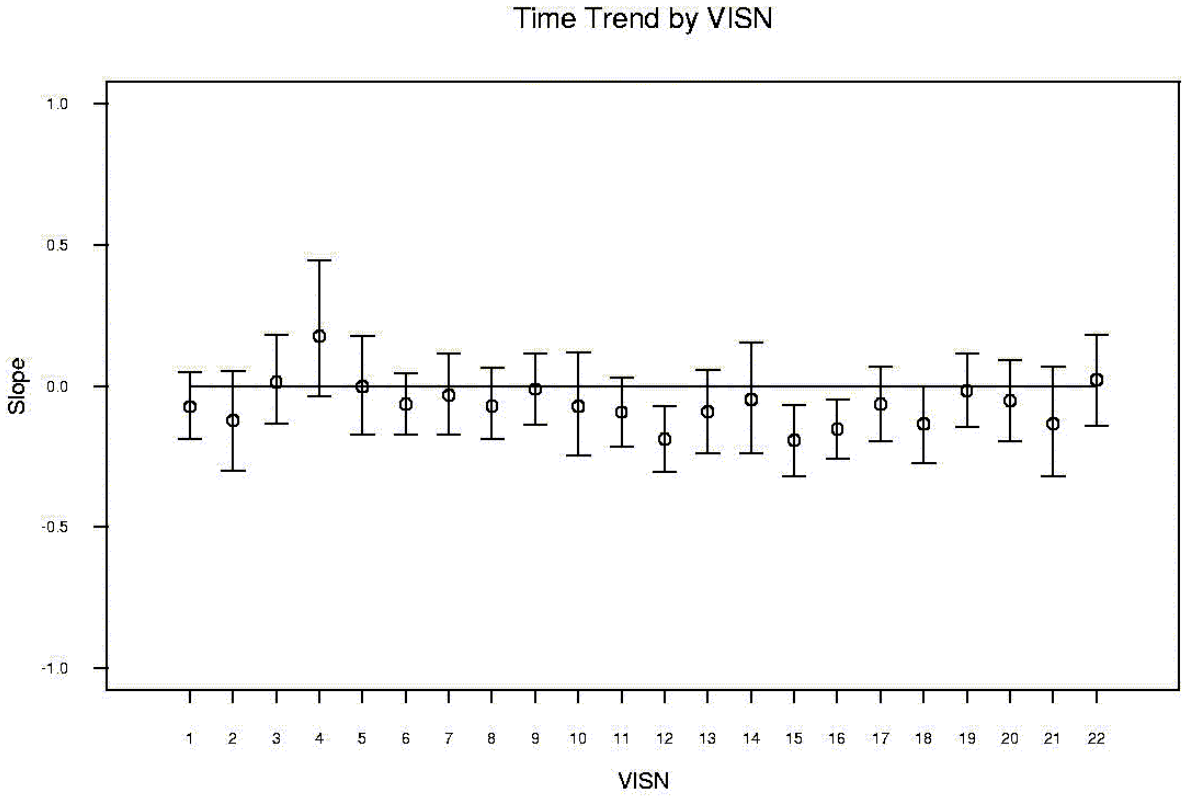


Figure I8b



Readmission for AMI within 6 months of index PCI**.** Across all VISNs the percentage of patients admitted for an AMI following the index PCI was about 2% in 1999 (Table I1). VISNs 6 and 13 had statistically higher percentages than the national average in 1999 (Figure I9a). Over time, the percentage of patients readmitted for AMI following the index PCI increased for VISN 13 only; the percentage remained stable within all other VISNs (Figure I9b). Percentage of patients admitted for AMI following the index PCI over time according to VISN are presented in Appendix I (Figure AI9).

Figure I9a

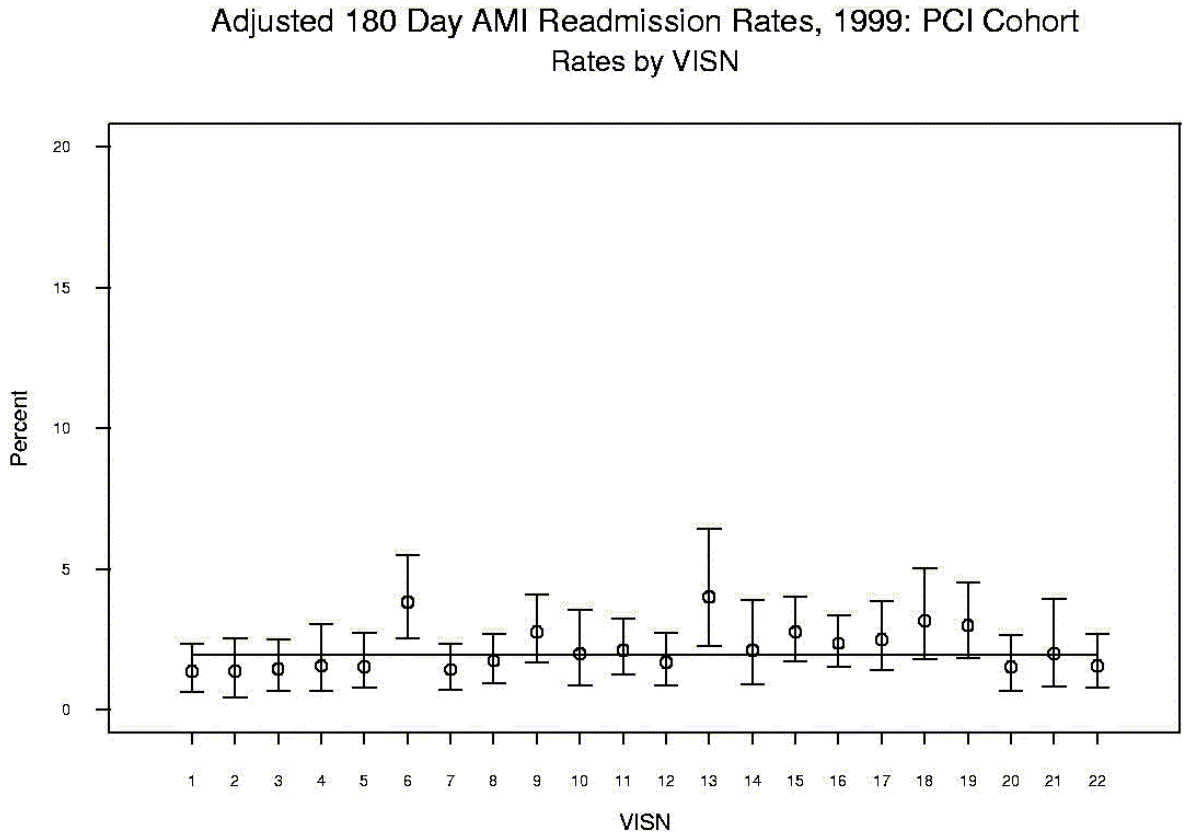
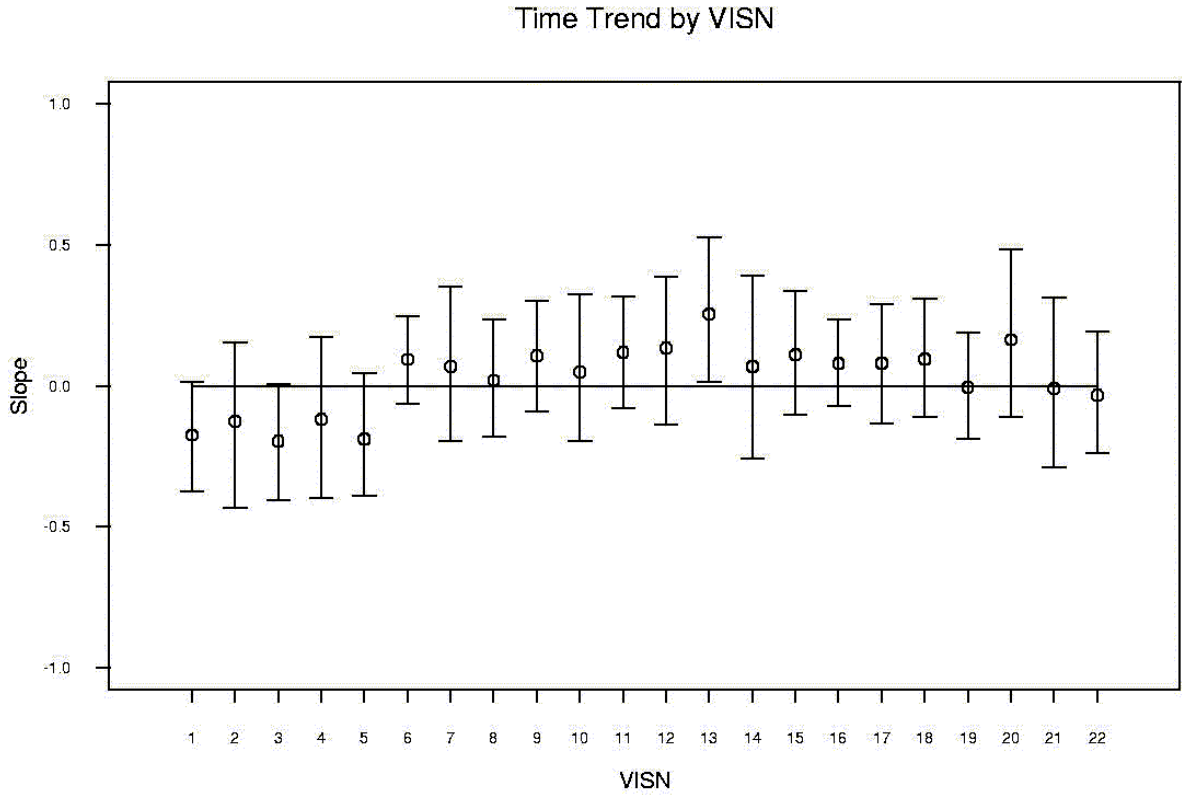


Figure I9b



Outcomes After PCI in Matched VA-Medicare Cohorts (Table I4)

National Trends in Outcomes in the Matched Cohorts

Follow-up CABG procedures. In FY 1997 and 1999 there was no difference between VA and Medicare patients in the percentage of patients having a CABG following PCI either within the index admission or within six months of the PCI.

Additional PCI procedures. From FY 1997-1999 a significantly higher percentage of Medicare patients had a repeat PCI within the index admission, within 30 days and within six months.

Mortality and readmission. The 30-day mortality was higher within the VA system compared to Medicare beneficiaries in FY 1997 and 1999. In FY 1999, mortality was higher at one year for VA patients compared to Medicare patients as was the percentage being readmitted for AMI within six months.

Table I4
Outcomes in Matched Cohorts: Males age 65 and older undergoing PCI, FY 1997-1999

	FY 1997			FY 1998			FY 1999		
	VA (n=1711)	MED (n=1711)	p-value	VA (n=1964)	MED (n=1964)	p-value	VA (n=2110)	MED (n=2110)	p-value
CABG following PCI within index admission (%)	2.2	2.1	0.91	**2.1**	**1.2**	**0.03**	1.1	1.6	0.18
CABG with 6 months of PCI (%)	6.4	5.1	.12	**6.1**	**4.7**	**0.06**	4.5	4.3	0.65
Repeat PCI within index admission (%)	**3.1**	**8.2**	**<0.001**	**3.2**	**7.0**	**<0.001**	**3.1**	**6.3**	**<.001**
Repeat PCI within 30 days (%)	**4.8**	**10.2**	**<0.001**	**4.9**	**9.4**	**<0.001**	**5.3**	**8.0**	**<.001**
Repeat PCI within 6 months (%)	**12.6**	**18.5**	**<0.001**	**11.9**	**17.4**	**<0.001**	**12.2**	**14.8**	**0.01**
Length of stay (Days)	**9.7**	**5.2**	**<0.001**	**8.5**	**4.9**	**<0.001**	**7.6**	**4.9**	**<.001**
30 Day Mortality (%)	**2.6**	**1.7**	**0.06**	2.1	1.5	0.12	**2.0**	**1.3**	**0.07**
1 Year Mortality (%)	9.6	8.6	0.29	8.7	8.2	0.56	**8.8**	**6.6**	**0.008**
Readmission for AMI within 6 months (%)	2.9	2.6	0.60	3.2	2.6	0.25	**4.0**	**2.5**	**0.005**

Bolded numbers represent significant differences at a 10% level

Within VISN Comparisons Between Elderly VA and Medicare Patients

Within service networks, there were few differences between outcomes following PCI in VA patients compared to matched Medicare patients (Figures I10-I16). However, samples sizes within networks were small, limiting our ability to detect differences.

Figure I10

30 Day Mortality, Matched PCI Cohort

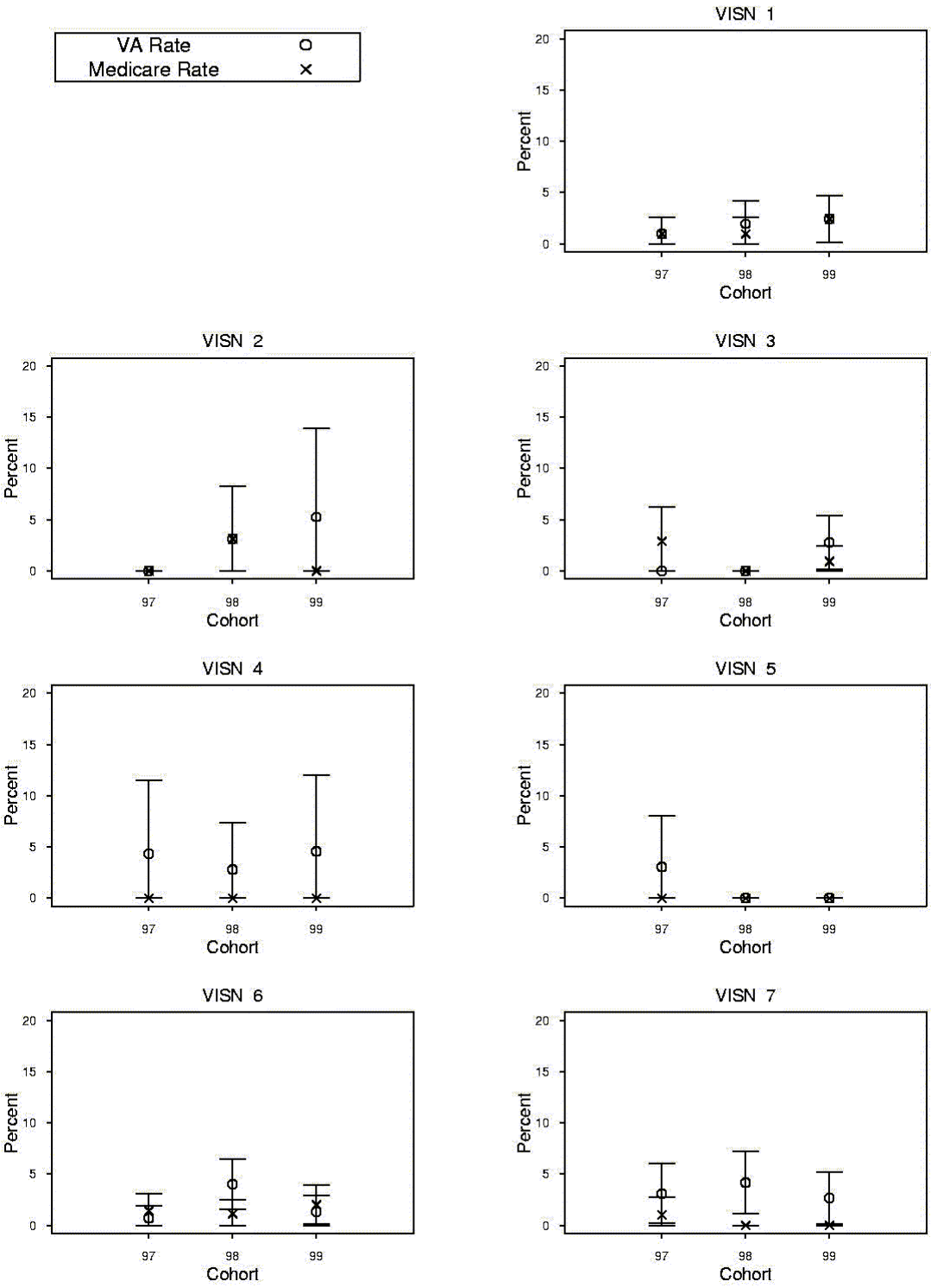


Figure I10

30 Day Mortality, Matched PCI Cohort

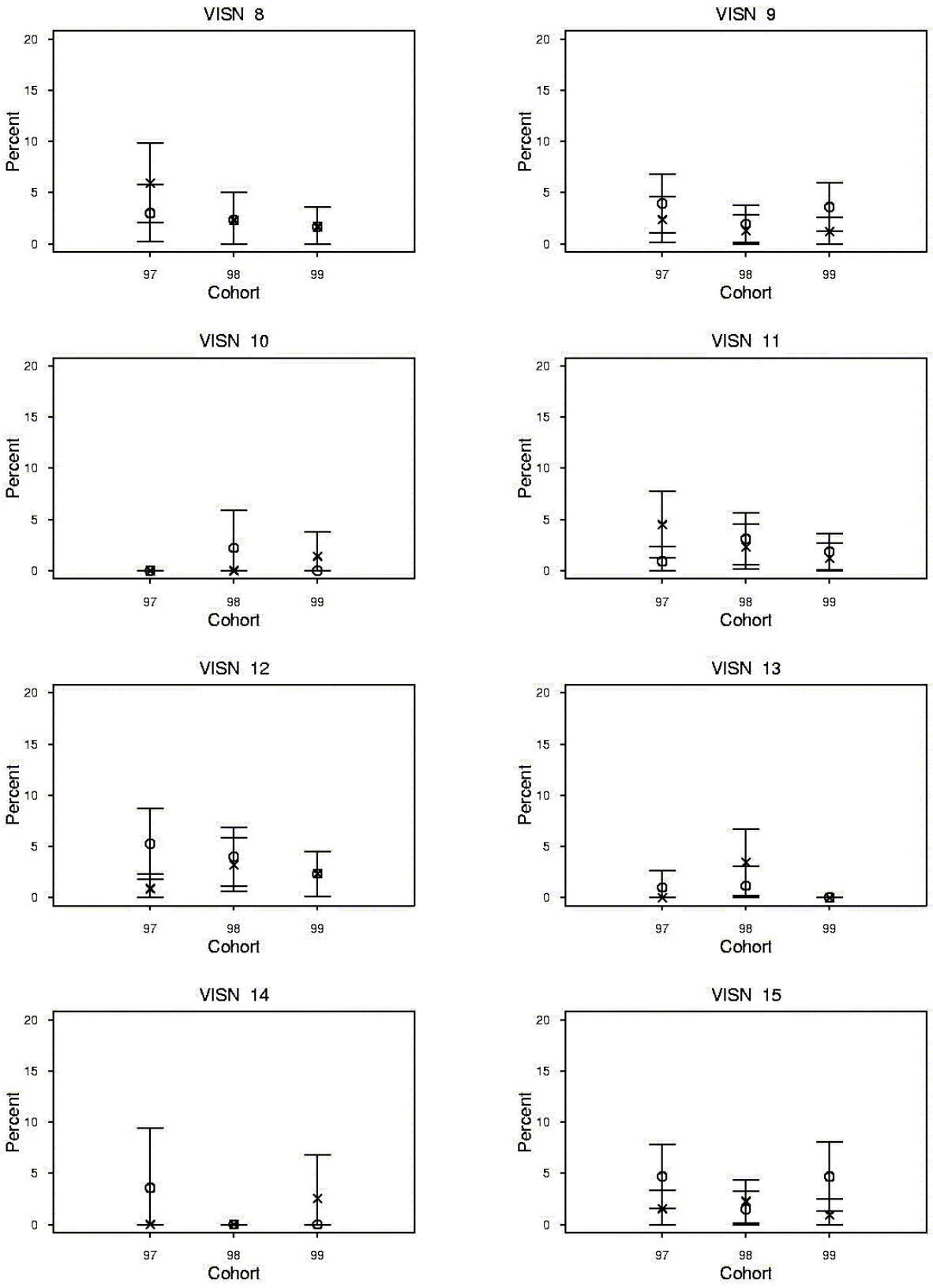


Figure I10

30 Day Mortality, Matched PCI Cohort

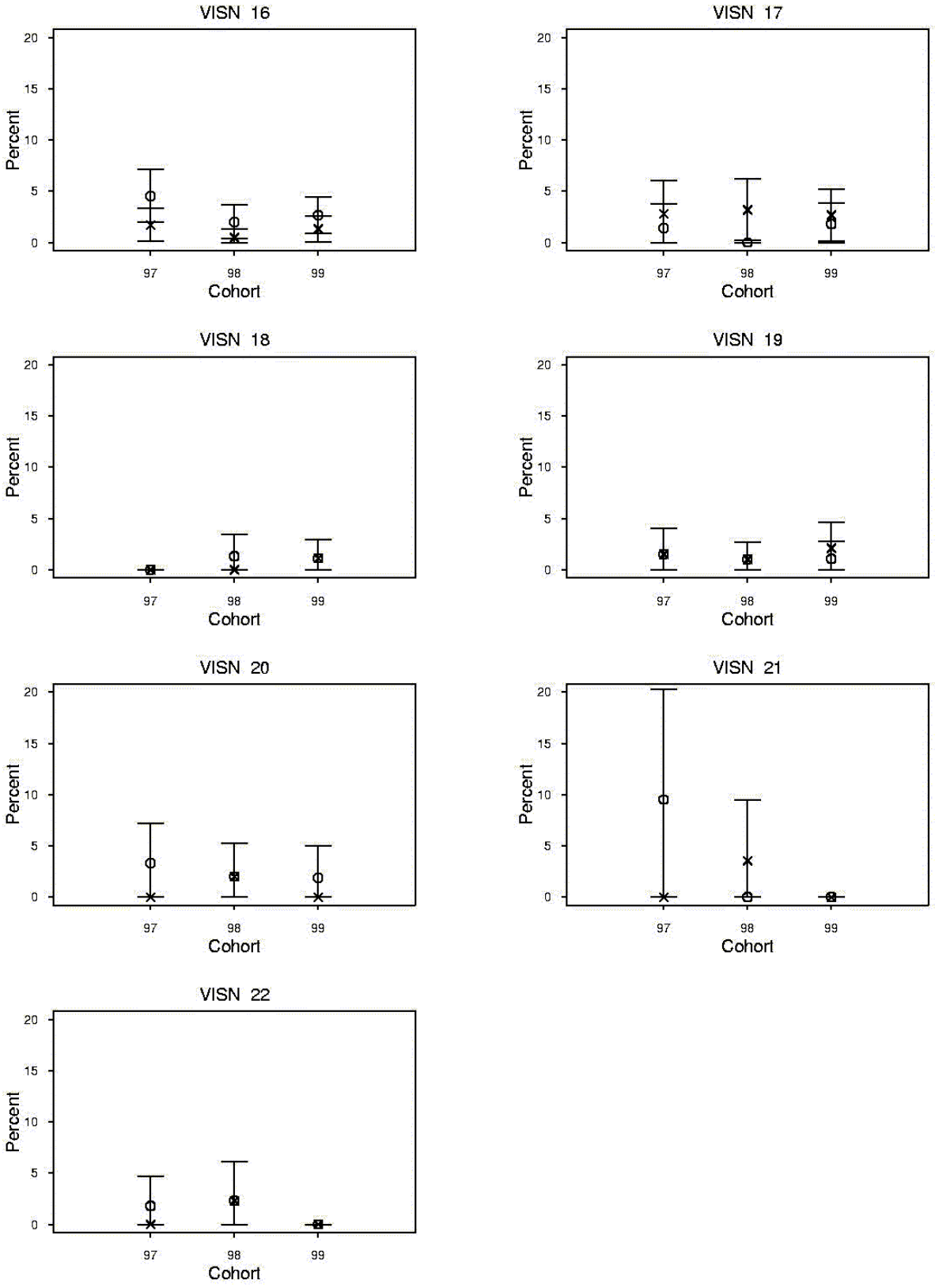


Figure I11

365 Day Mortality, Matched PCI Cohort

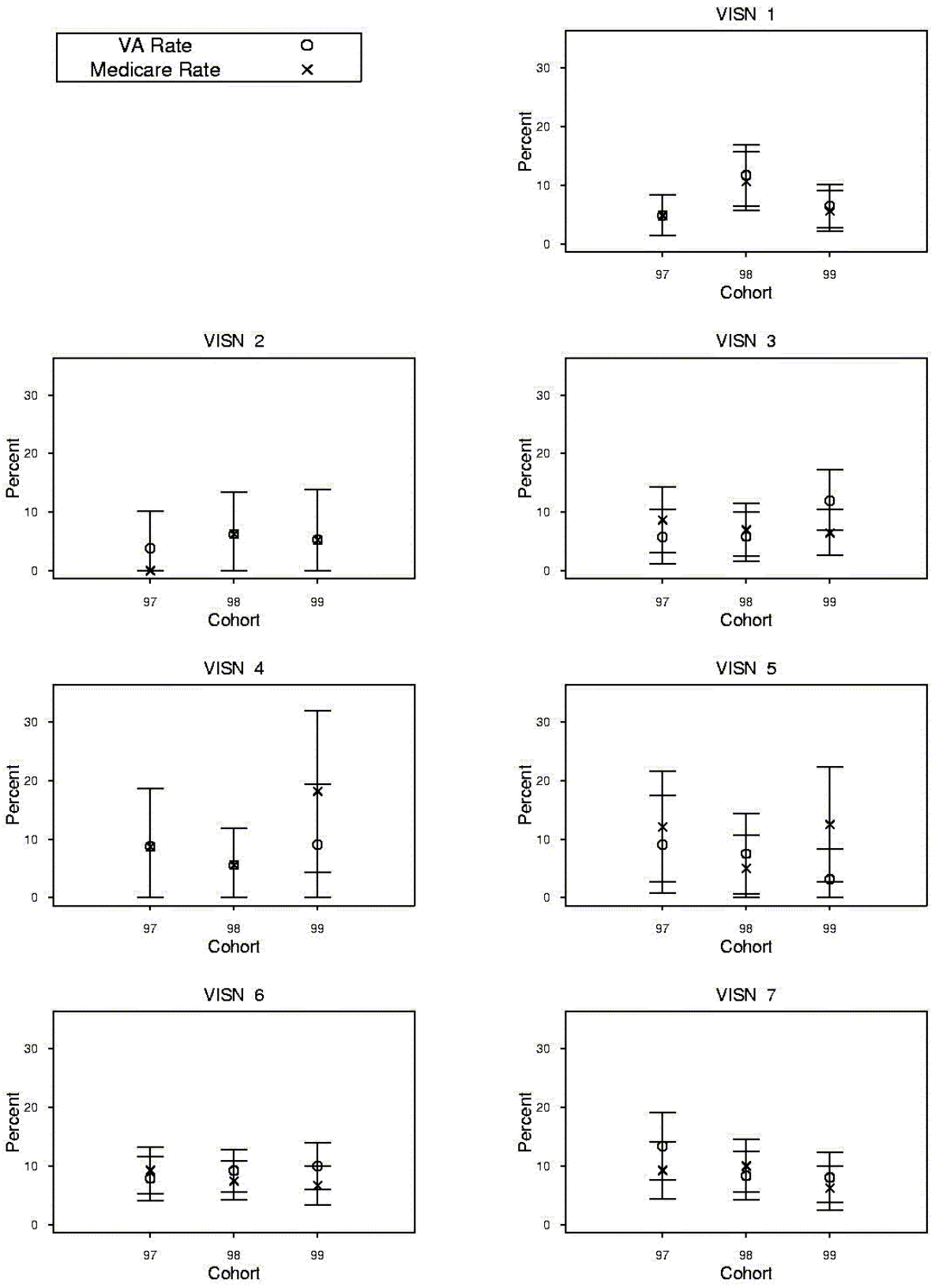


Figure I11

365 Day Mortality, Matched PCI Cohort

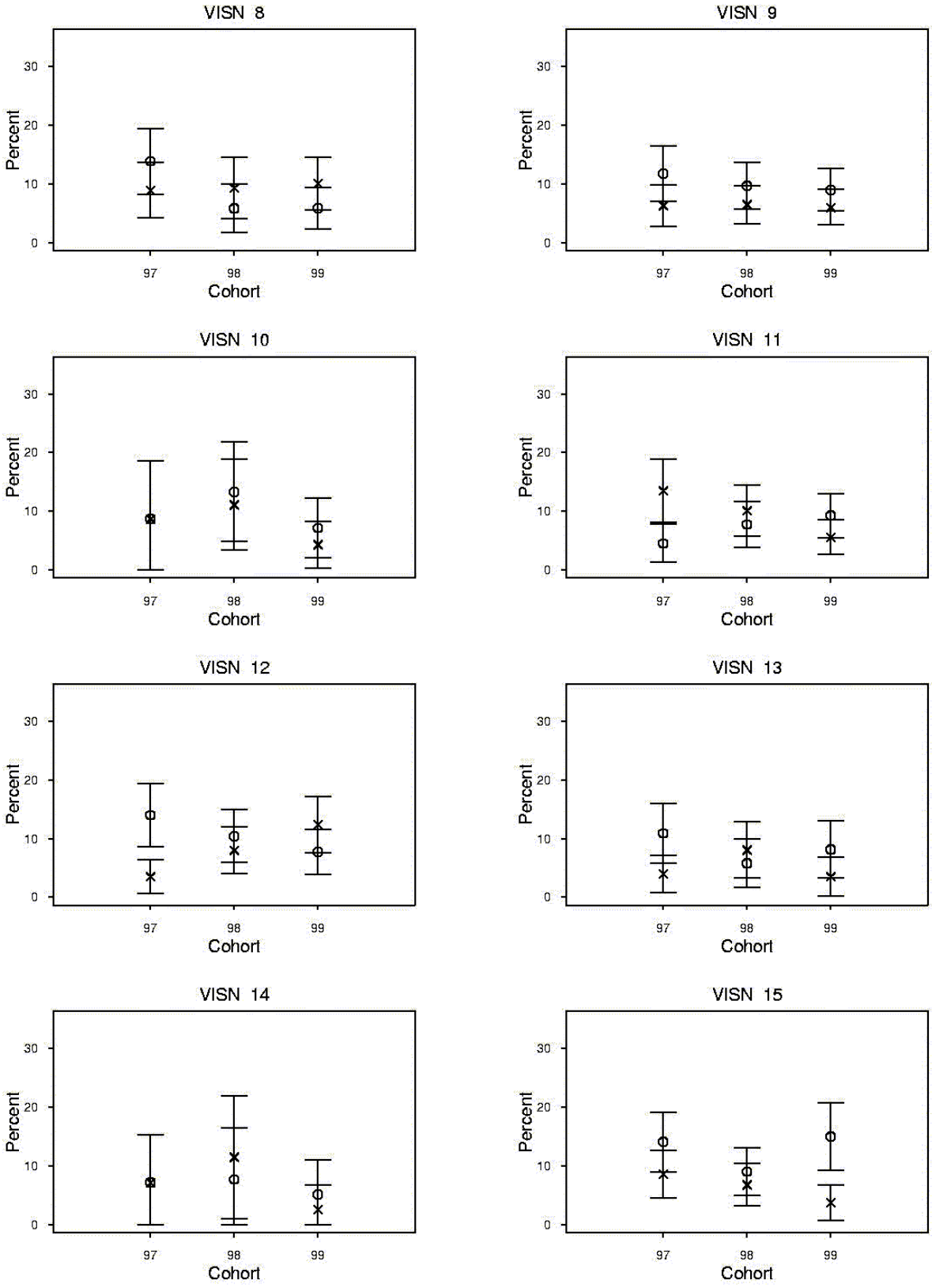


Figure I11

365 Day Mortality, Matched PCI Cohort

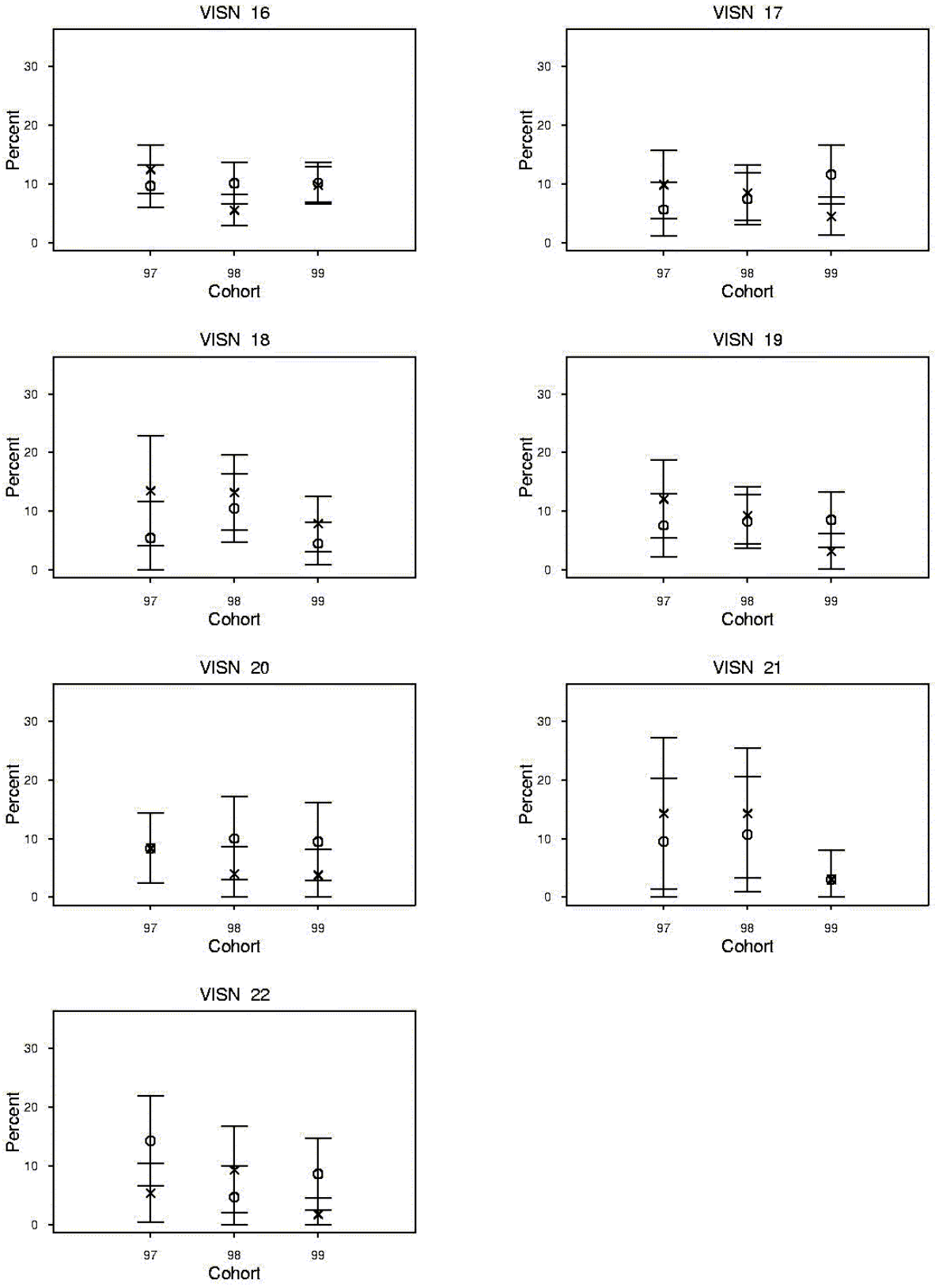


Figure I12

Inpatient Repeat PCI Rates, Matched PCI Cohort

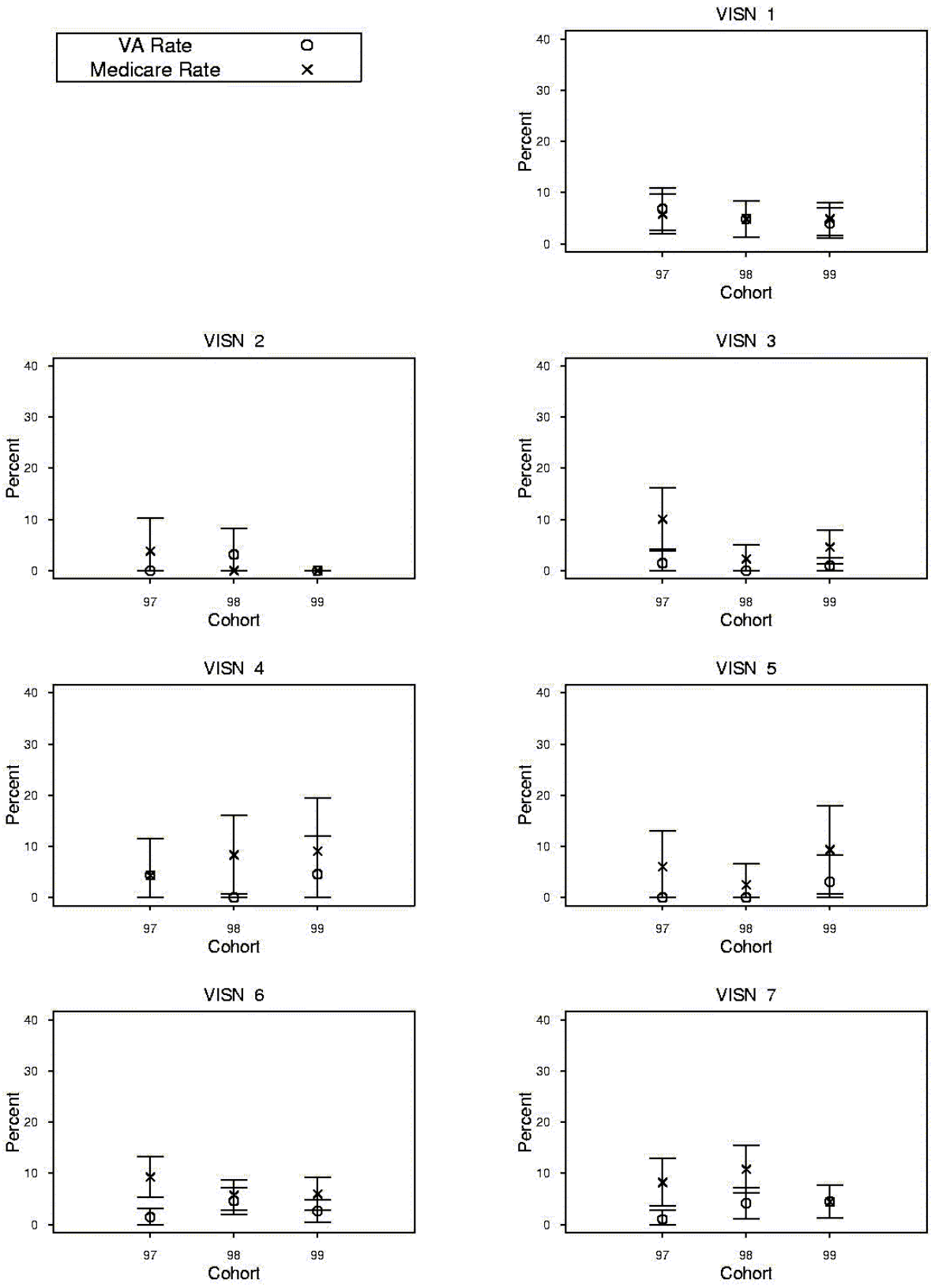


Figure I12

Inpatient Repeat PCI Rates, Matched PCI Cohort

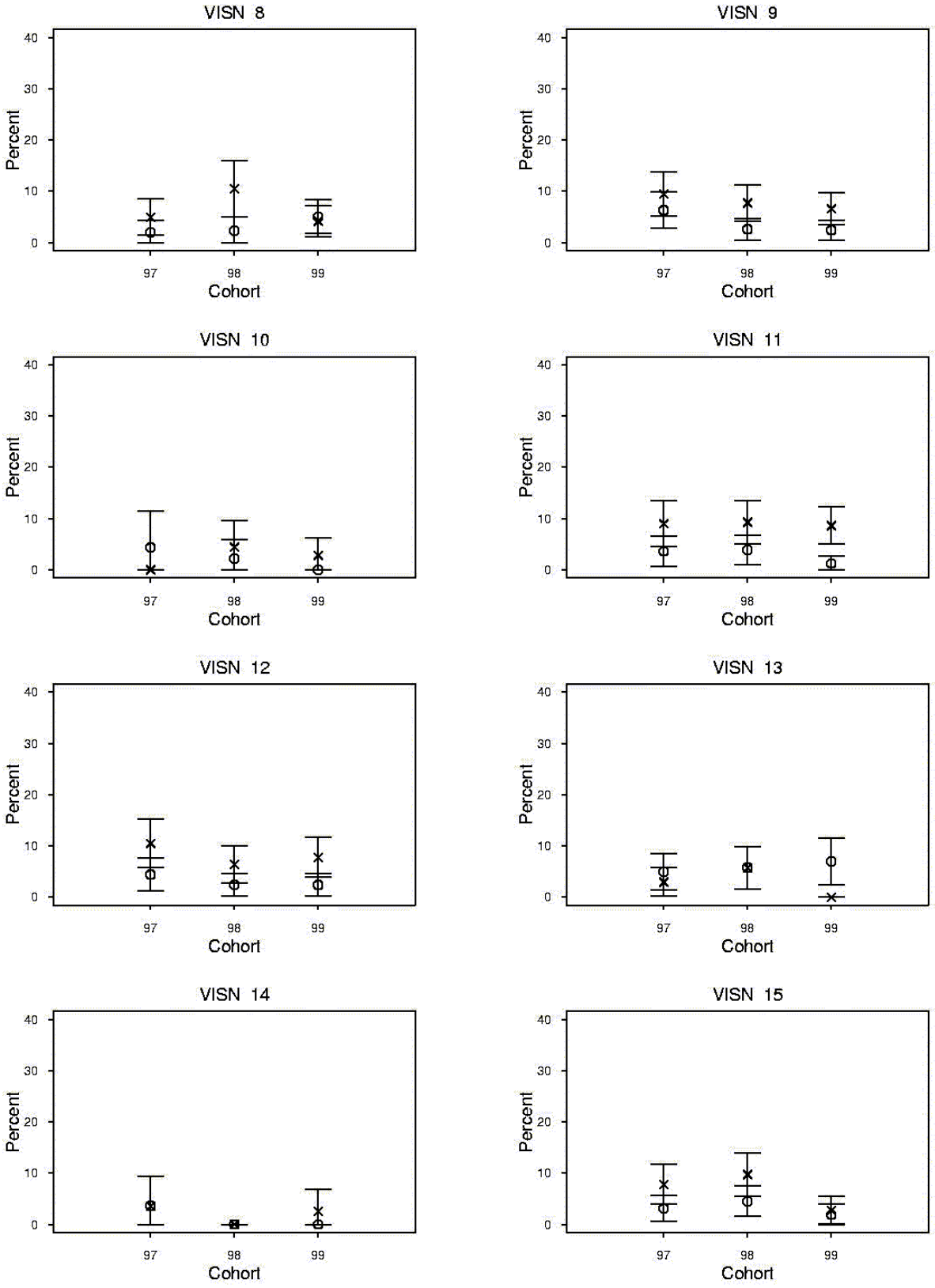


Figure I12

Inpatient Repeat PCI Rates, Matched PCI Cohort

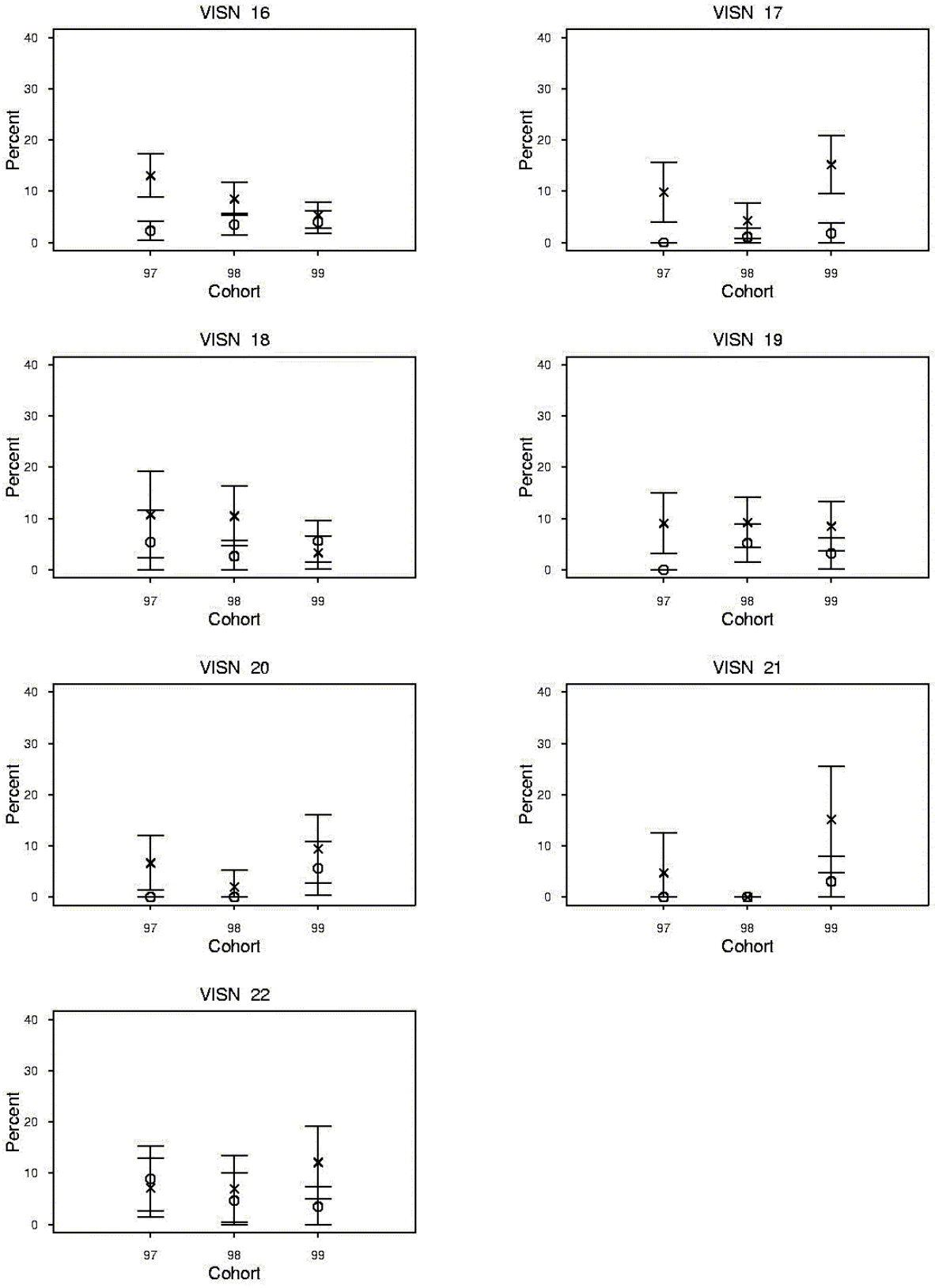


Figure I13

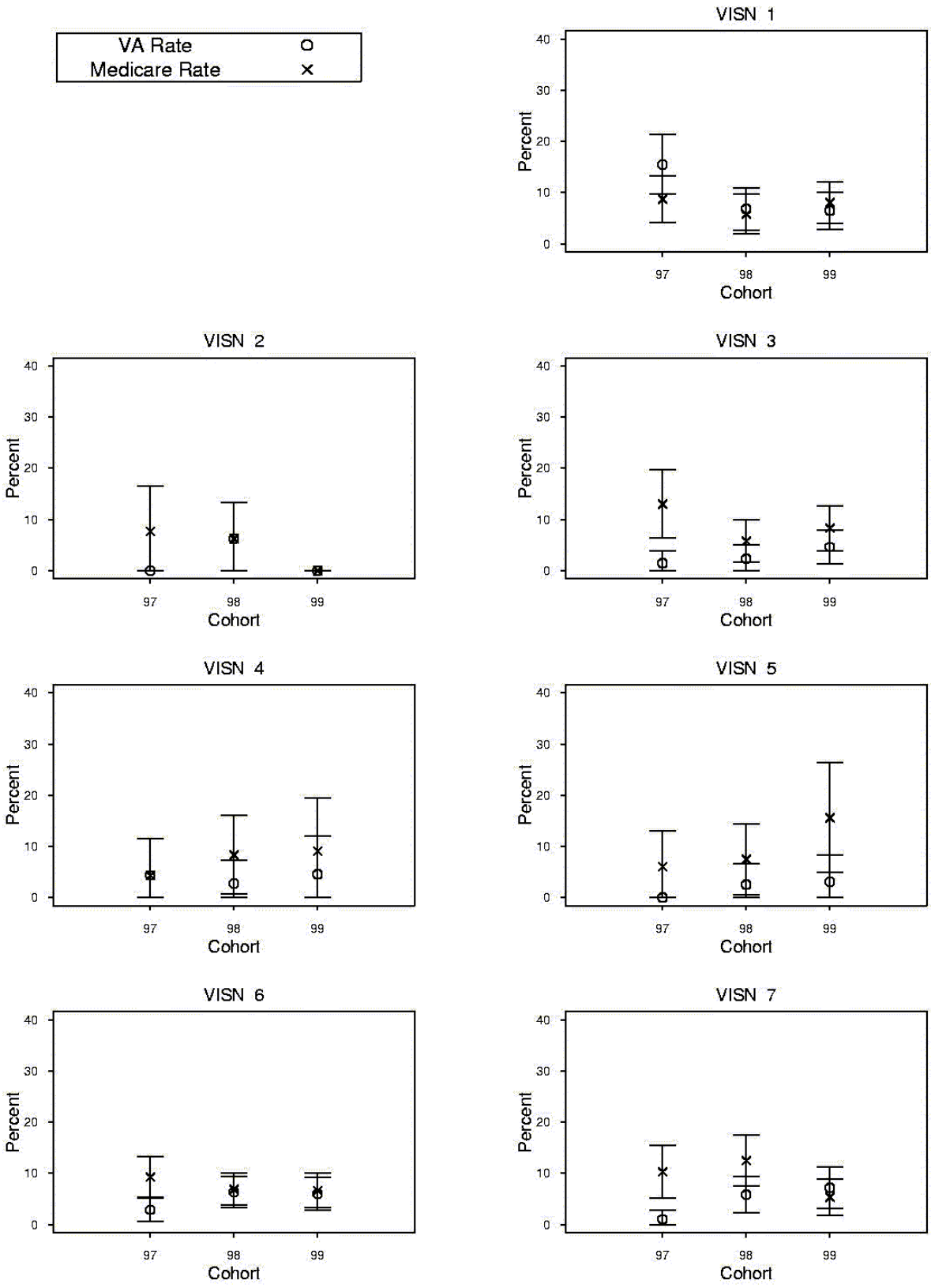

30 Day Repeat PCI Rates, Matched PCI Cohort
VA Rate
Medicare Rate
VISN 1
VISN 2
VISN 3
VISN 4
VISN 5
VISN 6
VISN 7
Percent
Cohort
0
10
20
30
40
97
98
99

Figure I13

30 Day Repeat PCI Rates, Matched PCI Cohort

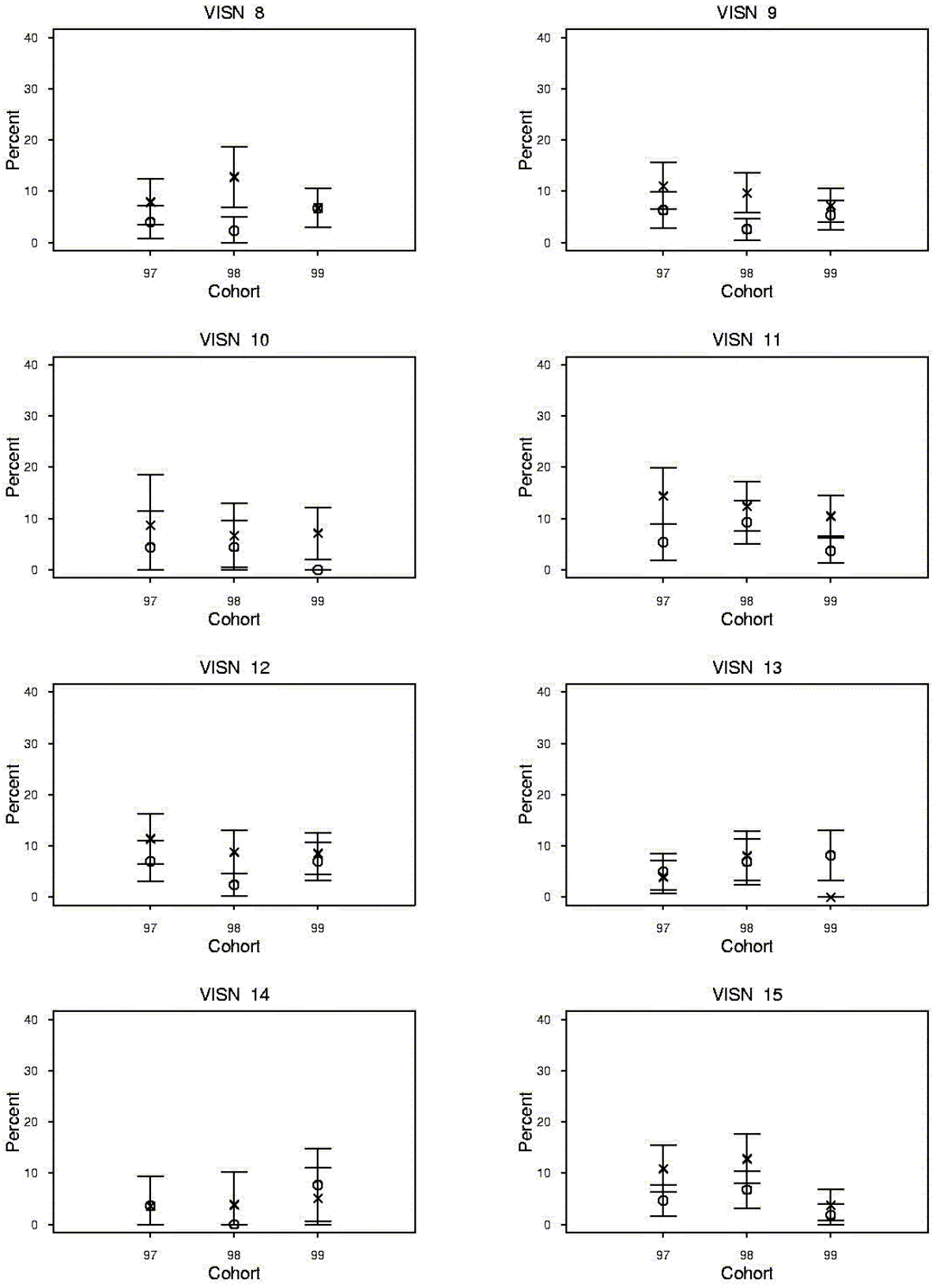


Figure I13

30 Day Repeat PCI Rates, Matched PCI Cohort

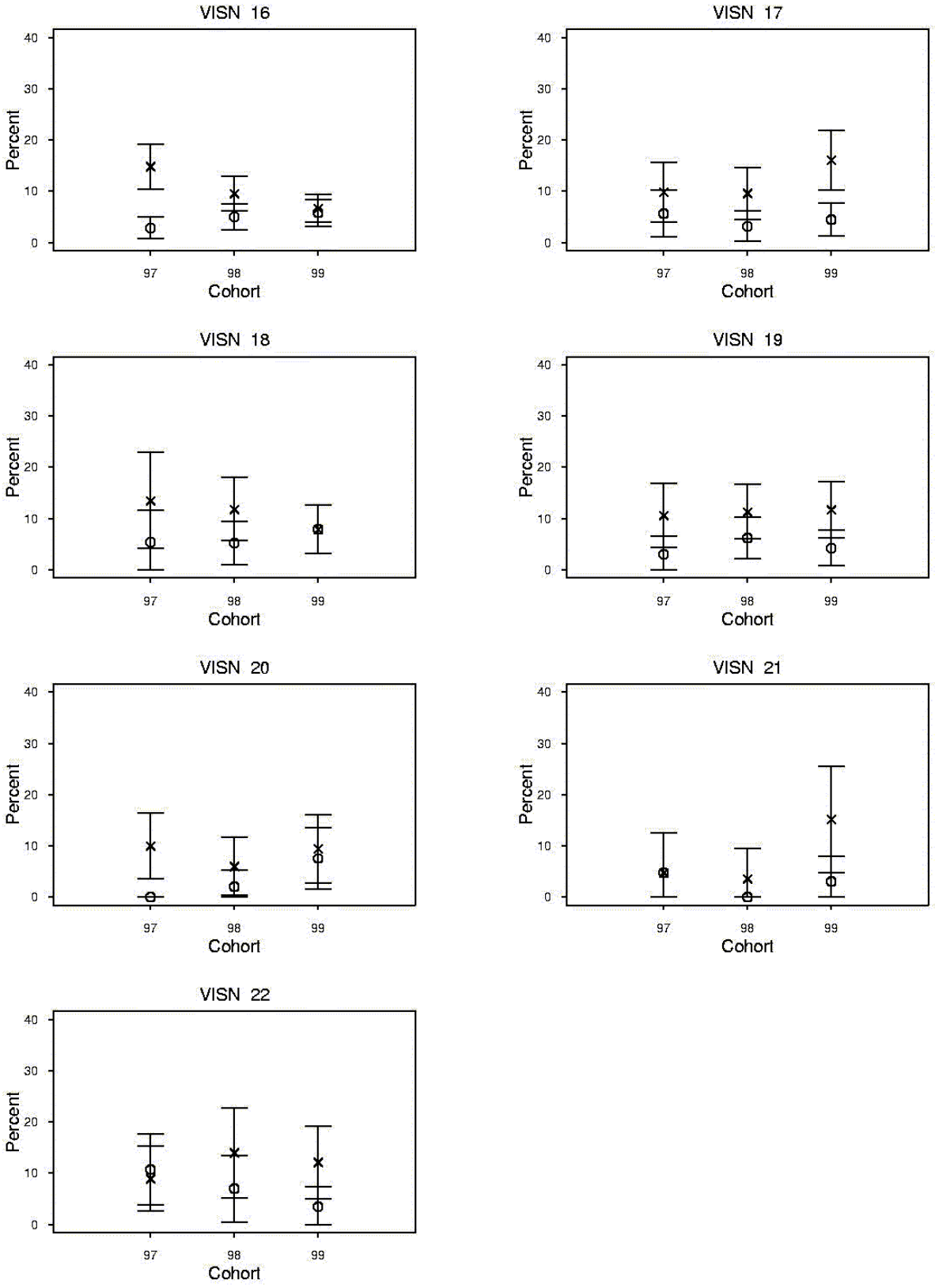


Figure I14

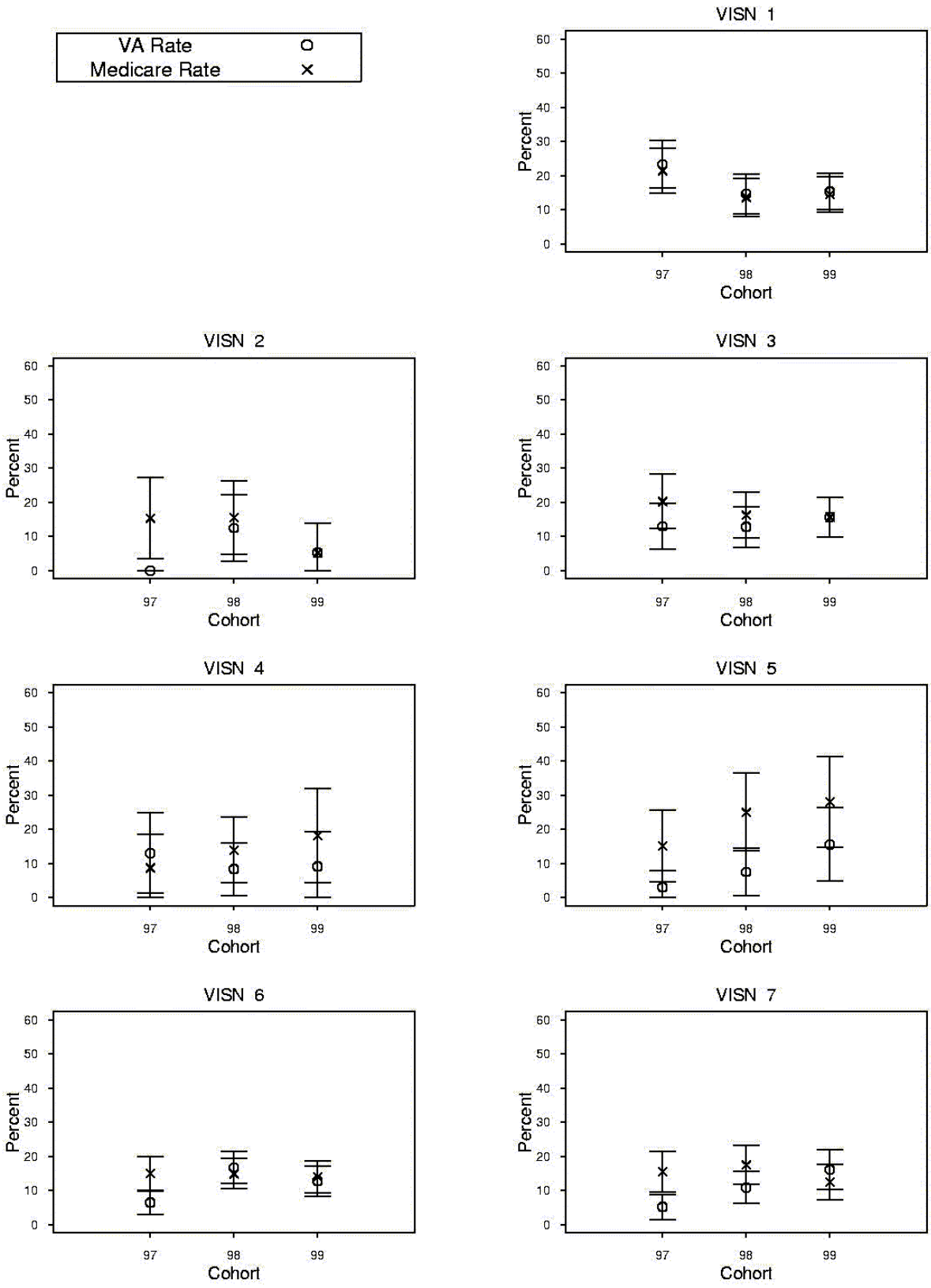

180 Day Repeat PCI Rates, Matched PCI Cohort
VA Rate
Medicare Rate
VISN 1
VISN 2
VISN 3
VISN 4
VISN 5
VISN 6
VISN 7
Percent
Cohort
0
10
20
30
40
50
60
97
98
99

Figure I14

180 Day Repeat PCI Rates, Matched PCI Cohort

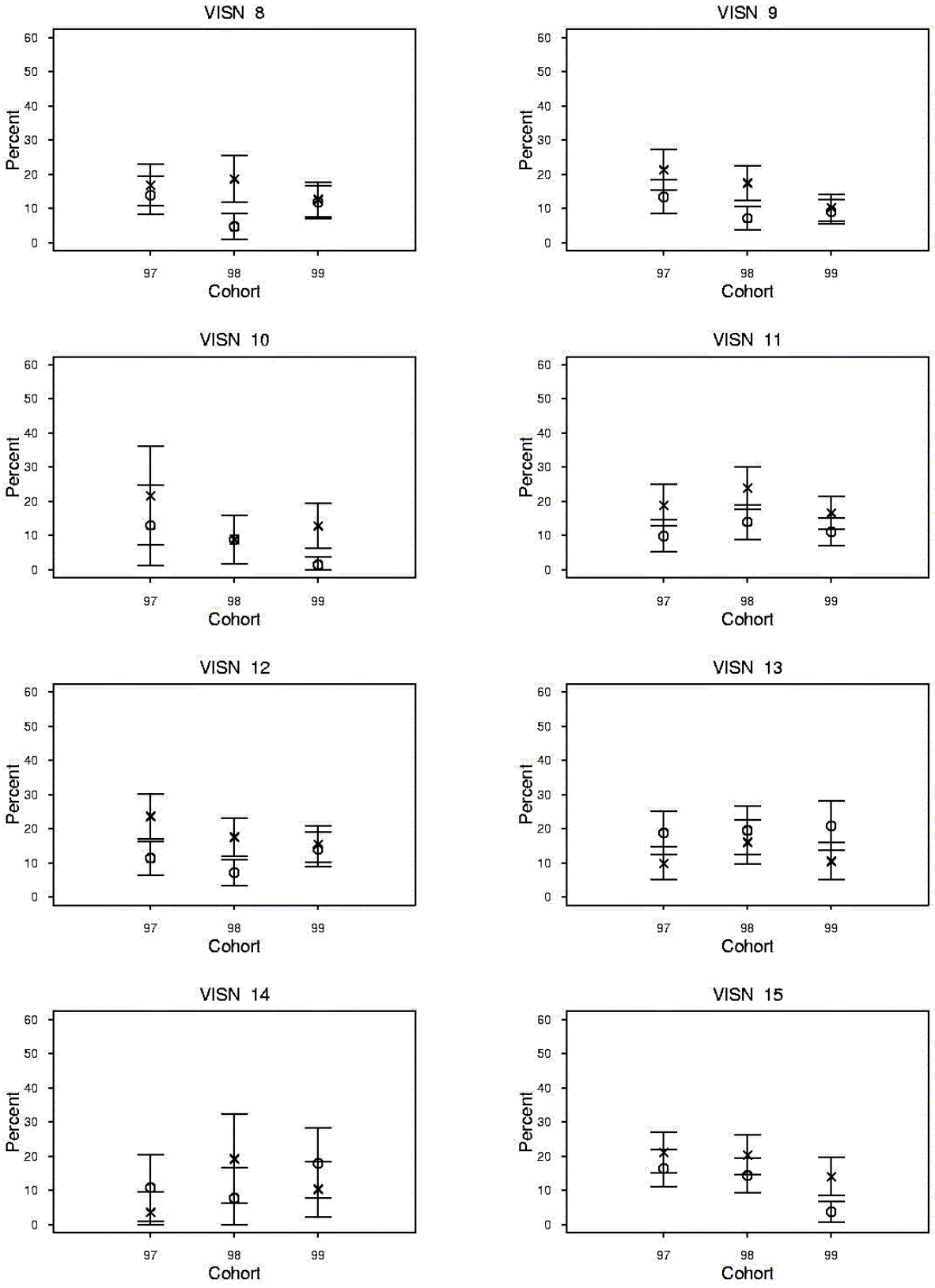


Figure I14

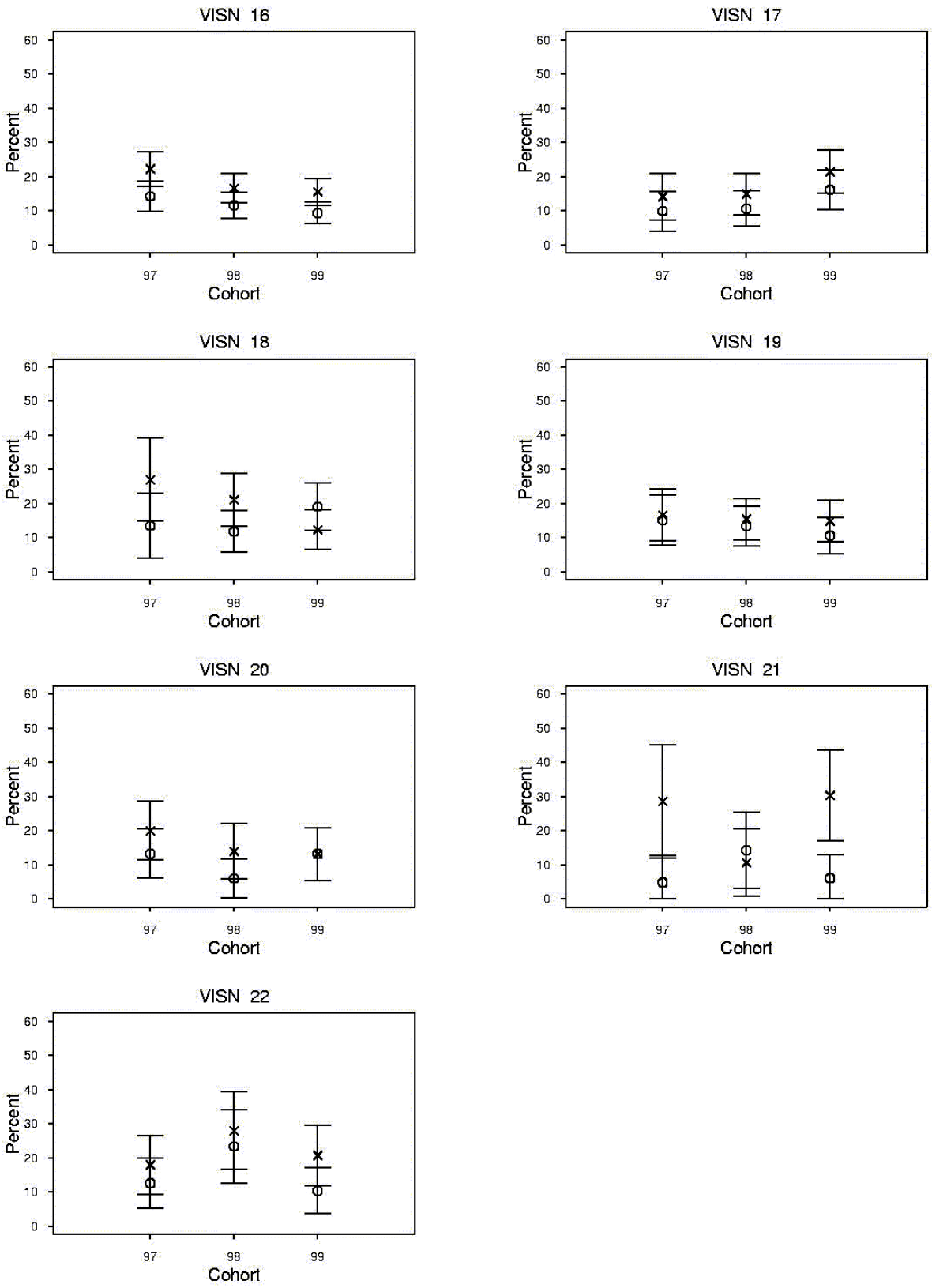

180 Day Repeat PCI Rates, Matched PCI Cohort
VISN 16
VISN 17
VISN 18
VISN 19
VISN 20
VISN 21
VISN 22
Percent
Cohort
0
10
20
30
40
50
60
97
98
99

Figure I15

Inpatient CABG Rates, Matched PCI Cohort

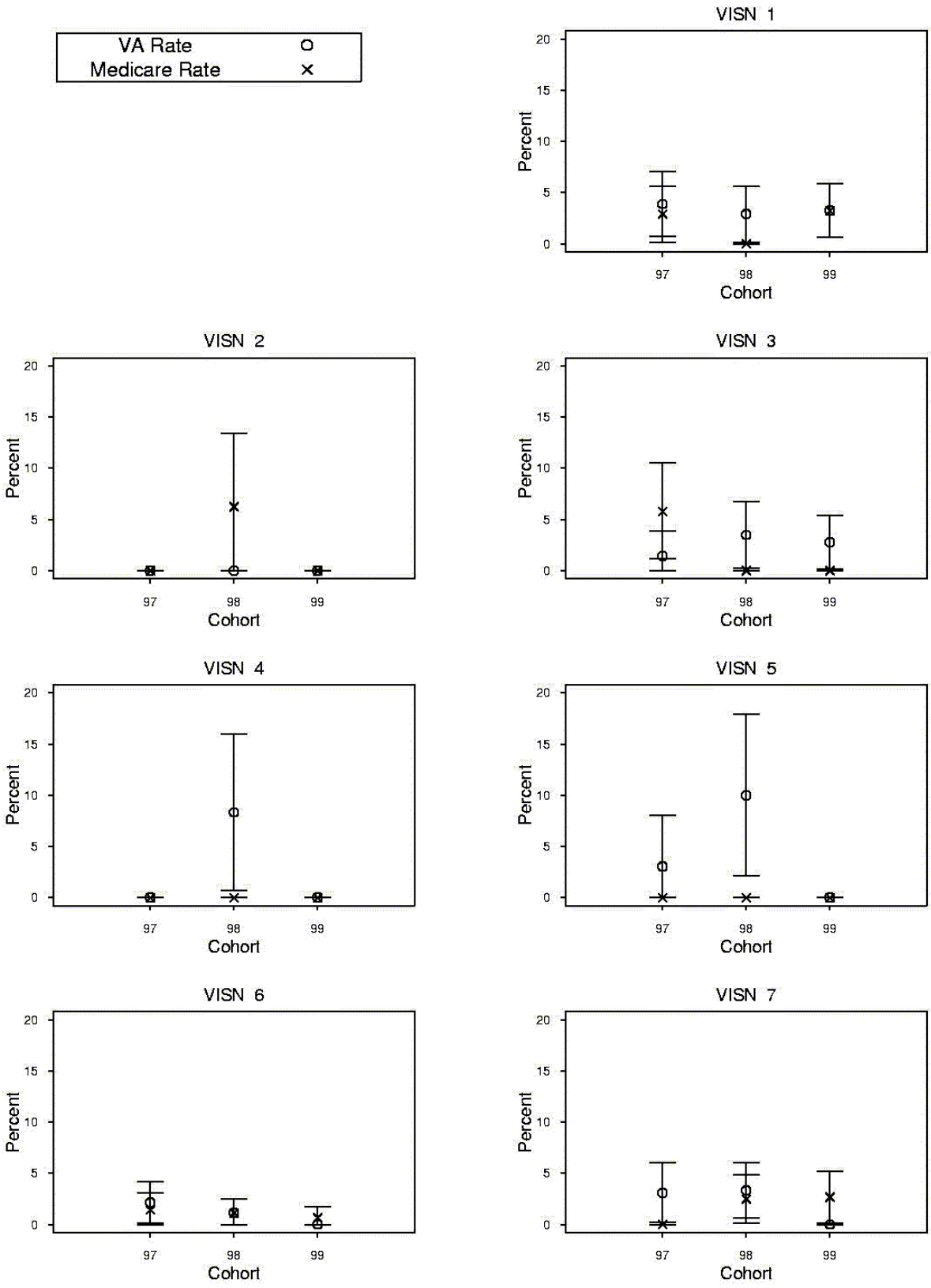


Figure I15

Inpatient CABG Rates, Matched PCI Cohort

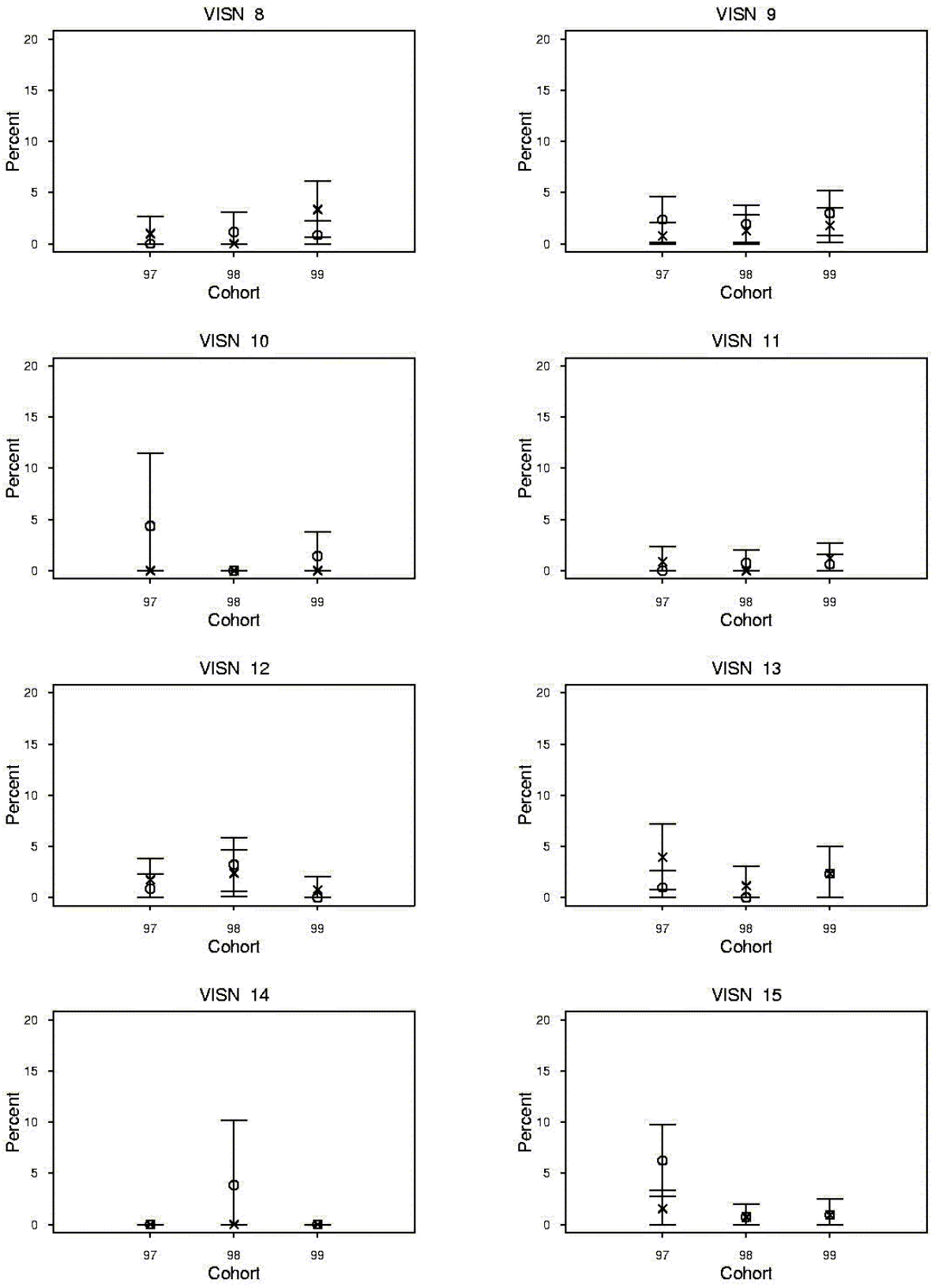


Figure I15

Inpatient CABG Rates, Matched PCI Cohort

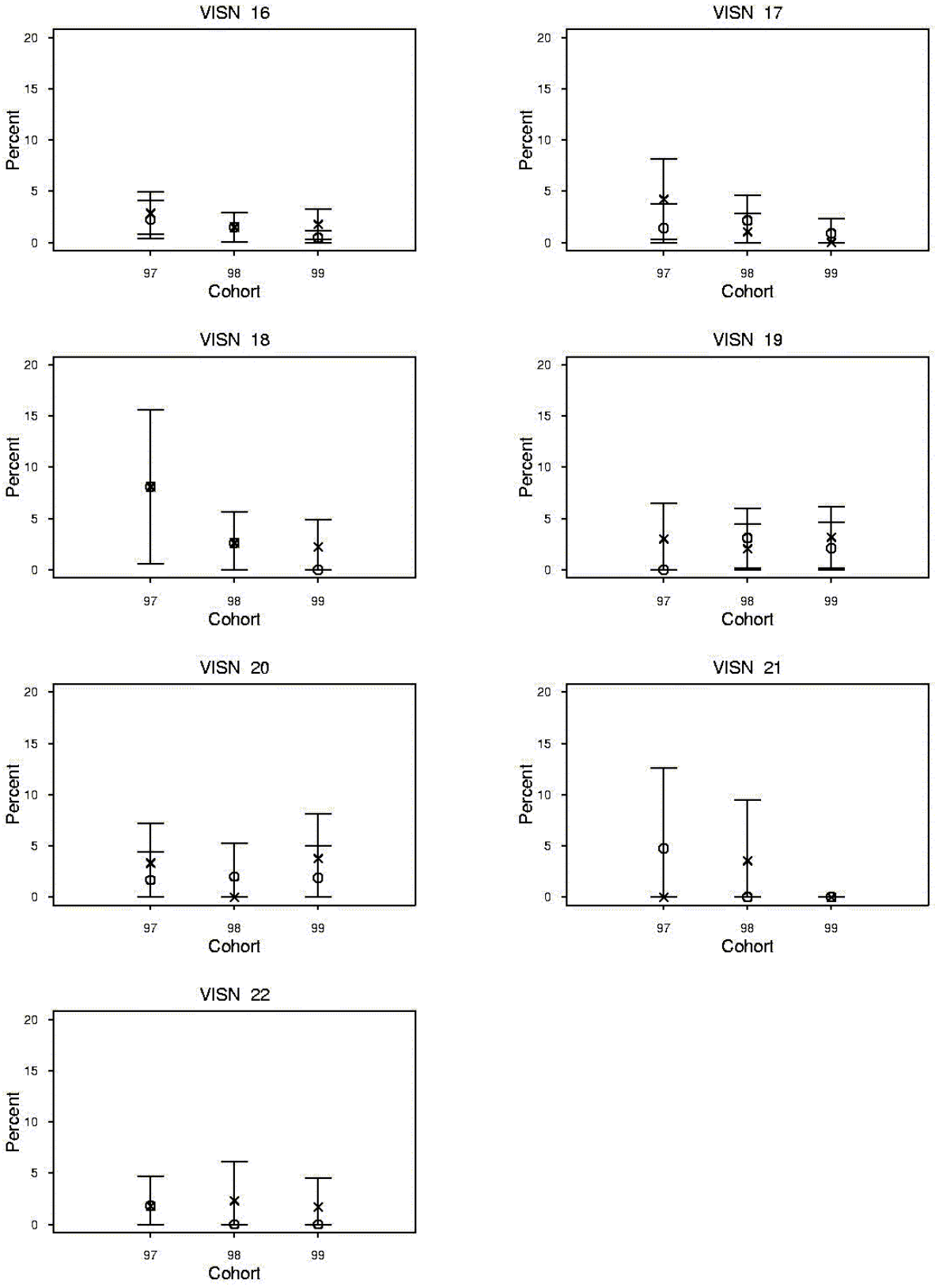


Figure I16

180 Day CABG Rates, Matched PCI Cohort

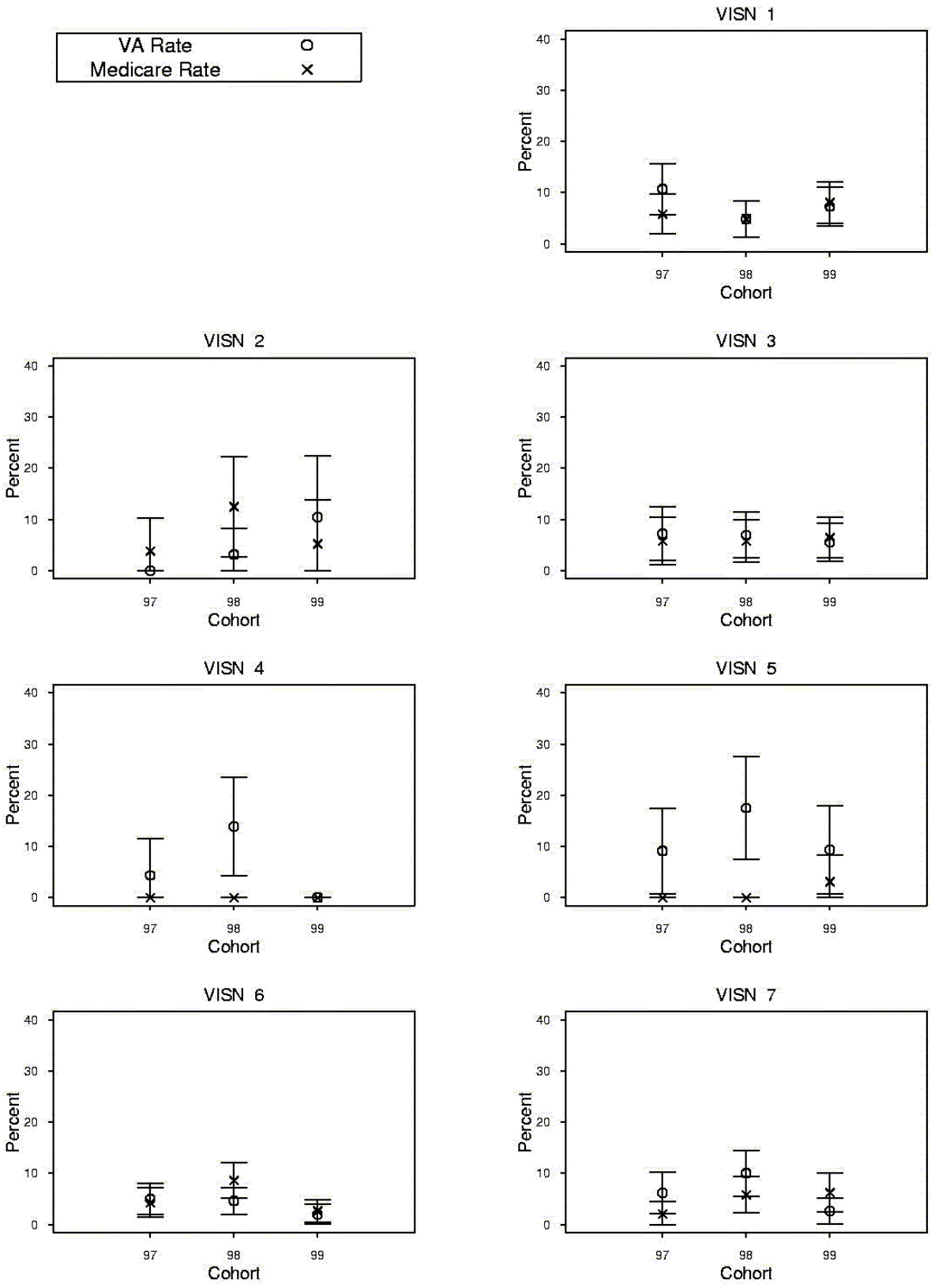


Figure I16

180 Day CABG Rates, Matched PCI Cohort

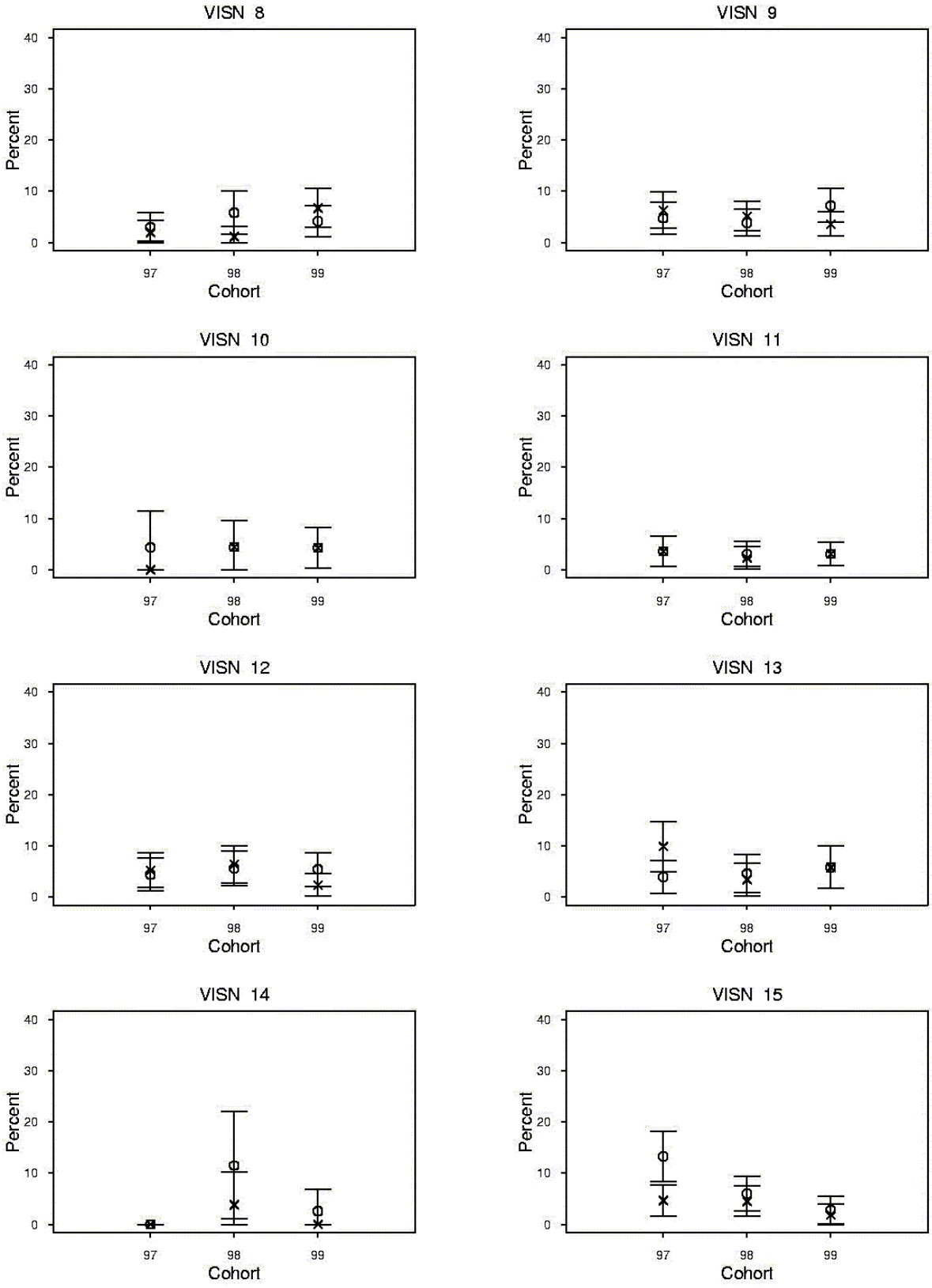


Figure I16

180 Day CABG Rates, Matched PCI Cohort