

Endocrine Data Web Conference
May 6 with Lab and Follow-up
1:00 CT; 2:00 ET

AGENDA

Objective: Using web conferencing or video conferencing, share the findings from the CAH and CH data collected from Region 4 states

Preparing attendees to fully participate: Participants will receive data packets via email or posting to Region 4 website prior to the event

- I. Introduction of attendees
(Roll call by Region 4 State – name and representation)
- II. Background and Overview – Charlie and Bill
Include brief summary of what activities have occurred since May 2007 meeting, anticipated results of this meeting
- III. Demographic Introduction
- IV. Presentation and discussion of Region 4 CAH Data
 - a. Background on CAH activities
 - b. Test results by demographics (Refer to Download A)
 - c. Summary of Initial Screening data (Refer to Download B)
 - d. Detection rates (Refer to Download C)
 - e. Background to CAH Screening
 - f. Second Tier Screening
 - g. Evaluation of CAH Screening Methods
- V. Presentation and discussion of Region 4 CH Data
 - a. Background on CH activities
 - b. Test results by demographics (Refer to Download A)
 - c. Summary of Initial Screening data (Refer to Download B)
 - d. Detection rates (Refer to Download C)
 - e. Background to CH Screening
 - f. Results of NICU protocol study
 - g. Results of Michigan's three year follow-up study
- VI. Michigan Study of False negatives (Refer to Download D)
- VII. Next Steps – Face-to-Face meeting at the Henry Center, Lansing, MI on Thursday, May 22, 2008 8 a.m. – 4 p.m.

A

For Discussion Purposes Only
Congenital Adrenal Hyperplasia and Congenital Hypothyroidism
Results of Initial Newborn Screening 2005 and 2006
From Michigan, Ohio, Minnesota, Indiana, and Wisconsin

Endocrine Project Report
Region 4 Genetics Collaborative
April 15, 2008
Okemos, Michigan

Charles J. Mundt, M.A.
William Young, Ph.D.

Preliminary Results

17-OHP Initial Screening Results

DRAFT

State "A" Initial CAH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 0 and 14 days

	N	Mean 17-OHP	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	249439	19.2150	0	236	15.7742	16	89	114	158
NICU									
Yes	26078	40.5745	2	236	35.6594	29	190	211	226
Not Yes	223361	16.7212	0	226	8.3627	15	44	51	67
Race									
White	162590	19.0691	0	236	14.7695	16	83	107	146
Black	42512	20.7737	2	236	19.7640	16	111	144	192
Gender									
Female	120759	17.6935	1	236	15.1219	14	84	111	157
Male	126285	20.6325	0	236	16.1714	17	93	117	157
Birth Weight									
<2500	23099	37.3982	2	236	36.1512	24	194	213	226
>=2500	226340	17.3593	0	236	10.1815	15	56	71	92
Age at Collection									
1-23	3456	38.5301	2	236	37.8633	25	208	222	226
24-36	212897	19.2376	0	236	14.6895	16	83	107	147
> 36	33086	17.0524	2	236	17.1491	13	98	121	166
Gestation Length									
< = 36 wks	35182	33.8682	2	236	32.1828	23	172	211	222
>=37 wks	214257	16.8089	0	236	8.8639	15	47	58	75
TPN									
Yes	4786	55.0784	2	236	46.9751	39	221	226	235
Not Yes	244653	18.5134	0	236	13.5971	16	76	97	131
Transfused									
Yes	373	58.6220	2	236	57.1464	36	236	236	236
Not Yes	249066	19.1560	0	236	15.5561	16	88	113	154
MultipleBirths									
Yes	8813	36.3419	2	236	32.9053	25	172	211	222
Not Yes	240626	18.5877	0	236	14.3927	16	80	104	144
Test Interpretations									
Normal	243367	18.4294	2	149	12.1763	16	72	87	107
Inconclusive	4549	21.8098	0	198	17.4209	17	96	112	130
Abnormal	1523	136.9961	60	236	46.5367	123	236	236	236
Mean age at collection									
	N	Mean age at collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	249441	29.4986	0	334	10.4966	26	59	73	112

State "B" Initial CAH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 0 and 14 days

	N	Mean 17-OHP	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	144457	17.7424	0	656	13.9959	15	72	95	129
NICU									
Yes	1886	51.1898	0	563	48.5781	35	223	277	352
Not Yes	142571	17.2999	0	656	12.3402	15	64	83	112
Race									
White	92739	17.5986	0	656	12.3790	15	64	83	114
Black	9930	17.2585	0	570	15.6822	14	81	107	152
Gender									
Female	70207	16.3048	0	570	13.1542	14	66	88	122
Male	73547	19.1152	0	656	14.6330	16	78	102	133
Birth Weight									
<2500	12217	32.6222	0	570	33.1841	22	163	196	245
>=2500	132240	16.3677	0	656	9.4822	15	48	60	79
Age at Collection									
1-23	1087	49.0883	0	425	44.2374	36	211	233	342
24-36	97844	18.0688	0	656	12.1040	16	62	82	112
> 36	45526	16.2923	0	534	15.3041	13	79	102	139
Gestation Length									
< 36 wks	26391	26.2314	0	656	25.9574	19	131	163	209
>=37 wks	118066	15.8448	0	467	8.3281	15	43	51	63
TPN									
Yes	2047	47.4397	0	570	45.1031	34	217	245	305
Not Yes	142410	17.3155	0	656	12.5146	15	65	84	116
Transfused									
Yes	773	54.1061	0	570	59.8046	35	305	425	534
Not Yes	143684	17.5467	0	656	13.0602	15	69	89	120
MultipleBirths									
Yes	2832	27.4075	2	246	24.1278	20	129	148	203
Not Yes	141625	17.5491	0	656	13.6477	15	70	92	125
Test Interpretations									
Negative	143288	17.4302	0	570	12.6340	15	67	86	116
Unsatisfactory	1079	48.5802	0	425	43.5039	36	208	231	342
Positive	85	138.2941	51	656	89.2388	116	656	656	656

Age at Collection

	N	Mean age at Collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	144457	36.1719	0	336	27.9421	31	171	307	329

State "C" Initial CAH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 0 and 14 days

	N	Mean 17-OHP	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	298081	19.5485	0	632	15.5103	16	82	109	153
NICU									
Yes	24386	39.6231	0	632	38.8020	28	194	233	273
Not Yes	273695	17.7599	0	562	9.4211	16	48	54	75
Race									
White	215988	19.3993	0	632	14.7208	16	78	103	141
Black	43881	20.5566	0	525	19.1839	16	105	143	189
Gender									
Female	143284	17.9916	0	632	14.7089	15	76	104	148
Male	150081	21.0438	0	562	16.0813	18	87	114	160
Birth Weight									
<2500	26256	36.3363	1	632	36.8299	24	189	225	268
>=2500	271825	17.9270	0	562	10.1458	16	51	63	86
Age at Collection									
1-23	1730	50.6503	4	525	48.0791	36	247	282	363
24-36	223501	19.6615	0	562	13.4896	17	67	94	133
> 36	72850	18.4633	0	632	18.6284	14	99	128	171
Gestation Length									
< 36 wks	47986	30.3397	0	632	30.3792	21	163	197	252
>=37 wks	250095	17.4780	0	562	9.1117	16	47	53	71
TPN									
Yes	5619	55.1716	1	632	51.3256	38	253	277	328
Not Yes	292462	18.8641	0	562	13.0284	16	67	90	122
Transfused									
Yes	260	63.9346	2	289	66.9544	38	265	285	289
Not Yes	297821	19.5098	0	632	15.3349	16	81	108	150
MultipleBirths									
Yes	10520	32.5549	1	632	30.0263	24	158	188	224
Not Yes	287561	19.0727	0	562	14.4905	16	74	101	143
Test Interpretations									
Low	294337	18.7660	0	240	11.9987	16	62	79	111
Inconclusive	1863	41.0097	2	243	33.9034	31	181	192	213
High	1880	120.7590	60	632	60.5576	102	354	382	525

Age at Collection

	N	Mean age at Collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	298288	33.2719	1	336	16.0397	28	93	117	165

State "D" Initial CAH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 0 and 14 days

	N	Mean 17-OHP	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	125508	16.1823	0	728	14.0621	13	69	93	133
NICU									
Yes	6469	37.1465	0	426	38.9782	24	197	240	319
Not Yes	119039	15.0430	1	728	10.0376	13	48	61	83
Race									
White	109721	16.1446	1	728	13.5690	13	66	87	127
Black	10379	17.0000	0	387	18.9450	13	101	130	180
Gender									
Female	59883	14.9954	0	728	13.5744	12	65	90	133
Male	63034	17.3259	1	585	14.4659	14	72	98	133
Age at Collection									
1-23	5036	35.6265	0	365	32.0834	26	168	198	276
24-36	10278	18.3151	1	728	15.8391	16	63	95	152
> 36	110194	15.0947	1	585	11.6579	13	55	75	107
Gestation Length									
< 36 wks	5399	35.4125	0	426	35.4943	24	180	221	295
>=37 wks	120109	15.3179	1	728	11.5169	13	54	72	101
Transfused									
Yes	137	53.5547	1	324	54.7767	37	303	324	324
Not Yes	125371	16.1414	0	728	13.8987	13	68	92	131
MultipleBirths									
Yes	3520	24.4011	2	363	24.5694	18	126	170	210
Not Yes	121988	15.9451	0	728	13.5657	13	66	88	128
Test Interpretations									
Normal	124057	15.2443	1	135	9.2941	13	48	59	77
Borderline	1100	75.8736	38	159	24.6704	68	152	155	158
Increased	349	161.4699	0	728	76.5194	146	426	585	728

Age at Collection

	N	Mean age at Collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	125509	51.9375	0	336	22.5810	48	152	167	204

State "E" Initial CAH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 1 and 14 days

	N	Mean 17-OHP	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	138852	14.9969	0	399	12.8029	13	63	90	133
NICU									
Yes	0	0	0	0	0	0	0	0	0
Not Yes	138852	14.9969	0	399	12.8029	13	63	90	133
Race									
White	99971	14.9381	0	362	11.9067	13	58	81	121
Black	14591	16.1289	0	399	17.8224	12	96	140	191
Gender									
Female	66836	13.7291	0	254	11.8800	12	58	83	127
Male	70181	16.1868	0	399	13.4897	14	67	94	140
Birth Weight									
<2500	14770	25.9288	1	399	29.5393	17	163	207	223
>=2500	124082	13.6957	0	223	7.9780	12	40	47	64
Age at Collection									
1-23	2394	31.5422	2	237	34.7435	14	207	223	236
24-36	60792	15.9836	0	251	10.4968	11	47	64	100
> 36	75666	13.6807	0	399	12.7641	12	64	92	131
Gestation Length									
< 36 wks	15183	27.3262	1	399	29.3159	18	161	206	223
>=37 wks	123669	13.4833	0	223	7.5881	12	38	44	56
TPN									
Yes	639	50.3067	1	399	49.9917	33	236	237	251
Not Yes	138213	14.8337	0	362	12.1386	13	58	82	125
Transfused									
Yes	233	46.9828	2	399	56.4058	25	223	236	399
Not Yes	138619	14.9432	0	362	12.5357	13	62	88	131
MultipleBirths									
Yes	1413	28.0389	2	223	27.7954	19	147	172	222
Not Yes	137439	14.8628	0	399	12.4859	13	60	87	131
Test Interpretations									
Normal	138232	14.5570	0	188	10.3613	13	51	69	99
Borderline	515	108.0816	55	399	56.8031	87	237	254	285
Positive	105	137.6286	90	362	43.1010	133	224	362	362

Age at Collection

	N	Mean Age at Collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	138854	41.6973	0	336	22.0163	38	141	161	212

Healthy White Females
17-OHP Results For the Period 1-1/05-12/31/2006
Tests where age at collection between 24 and 36 hours

State	N	% of Total	Mean 17-OHP	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
State "A"	59786	24%	15.7750	1	214	7.3123	15	40	45	56
State "B"	29064	20%	15.9934	0	275	7.8992	15	41	48	61
State "C"	71748	24%	16.8694	1	382	7.9547	15	43	49	56

Record Selection Criteria

Race White
 Gender Female
 Birth wgt >=2500
 Nicu not indicated as yes (non-NICU)

Total is all cases where age at collection is less than or equal to 14 days.

17-OHP Results For the Period 1-1/05-12/31/2006
Tests where age at collection between 24 and 36 hours

State	N	% of Total	Mean 17-OHP	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
State "A"	53380	21%	15.4723	1	236	7.2765	14	39	46	59
State "B"	24124	17%	15.4062	0	275	7.1508	14	37	42	51
State "C"	60214	20%	16.4017	1	227	7.4031	15	41	46	53
State "D"										
State "E"	16920	12%	13.8470	1	134	6.5720	13	34	39	47

Record Selection Criteria

Race White
 Gender Female
 Birth wgt >=2500
 Gestational age over 37 weeks

Total is all cases where age at collection is less than or equal to 14 days.

TSH Initial Screening Results

State "A" Initial CH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 0 and 14 days

	N	Mean TSH	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	249437	11.8757	0	588	9.2283	11	31	36	44
NICU									
Yes	26076	10.6745	0	588	12.9832	9	41	50	76
Not Yes	223361	12.0159	1	588	8.6740	11	31	34	41
Race									
White	162589	11.9140	0	588	8.8855	11	31	36	43
Black	42511	12.2242	0	588	9.1073	11	33	40	47
Gender									
Female	120756	11.3580	0	588	10.1371	10	31	36	45
Male	126286	12.3533	0	588	8.0779	11	31	36	44
Birth Weight									
<2500	23098	10.8678	0	573	12.0498	9	36	45	59
>=2500	226339	11.9785	1	588	8.8838	11	31	35	43
Age at Collection									
1-23	3455	16.0894	0	496	17.7167	12	83	100	138
24-36	212896	12.2083	1	588	9.0188	11	31	35	42
> 36	33086	9.2954	0	573	8.7557	8	27	31	38
Gestation Length									
< = 36 wks	35181	10.9389	0	588	12.3385	9	34	42	57
>=37 wks	214256	12.0295	1	588	8.6012	11	31	35	43
TPN									
Yes	4785	7.7659	0	573	14.9893	5	30	41	46
Not Yes	244652	11.9561	1	588	9.0608	11	31	36	44
Transfused									
Yes	373	8.6434	0	524	28.8273	4	55	107	524
Not Yes	249064	11.8805	0	588	9.1669	11	31	36	44
MultipleBirths									
Yes	8812	10.6295	1	573	14.9192	9	32	38	54
Not Yes	240625	11.9213	0	588	8.9483	11	31	36	44
Test Interpretations									
Normal	239437	11.5337	1	37	5.7058	11	28	30	31
Inconclusive	7732	12.4053	0	49	8.0540	11	41	45	47
Abnormal	1918	52.6731	14	588	71.1827	37	524	554	573
Mean age at collection									
	N	Mean age at collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	249441	29.4986	0	334	10.4966	26	59	73	112

State "B" Initial CH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 0 and 14 days

	N	Mean TSH	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	144457	9.7692	0	919	9.4224	9	27	31	37
NICU									
Yes	1885	5.0053	0	43	5.0404	4	25	28	35
Not Yes	142572	9.8322	0	919	9.4507	9	28	31	37
Race									
White	92739	9.8703	0	651	8.9005	9	28	31	36
Black	9930	9.7065	0	358	6.7288	9	27	31	37
Gender									
Female	70207	9.1868	0	919	10.9098	8	27	30	37
Male	73547	10.3243	0	801	7.7251	9	28	31	37
Birth Weight									
<2500	12217	8.4054	0	538	11.0279	7	28	34	47
>=2500	132240	9.8952	0	919	9.2500	9	27	30	36
Age at Collection									
1-23	1087	13.4029	0	111	12.4822	10	67	85	99
24-36	97844	10.8482	0	919	10.0894	10	28	32	37
> 36	45526	7.3636	0	651	7.1142	6	23	26	30
Gestation Length									
< 36 wks	26391	9.0296	0	801	10.5018	8	27	31	43
>=37 wks	118066	9.9345	0	919	9.1557	9	28	31	36
TPN									
Yes	2047	6.0562	0	65	5.6236	5	27	32	40
Not Yes	142410	9.8226	0	919	9.4553	9	28	31	37
Transfused									
Yes	773	6.1449	0	99	8.3559	4	46	64	87
Not Yes	143684	9.7887	0	919	9.4241	9	27	31	37
MultipleBirths									
Yes	2832	8.5625	0	358	10.7306	7	27	33	56
Not Yes	141625	9.7933	0	919	9.3929	9	28	31	37
Test Interpretations									
Negative	142983	9.5514	0	538	5.5339	9	26	28	31
Borderline	340	38.9676	24	64	7.1628	38	58	59	64
Positive	85	235.0941	13	919	210.9432	131	919	919	919

Age at Collection

	N	Mean age at Collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	144457	36.1719	0	336	27.9421	31	171	307	329

State "C" Initial CH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 0 and 14 days

	N	Mean TSH	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	298081	11.0120	0	1220	10.2783	10	29	34	41
NICU									
Yes	24386	8.2962	0	860	14.7876	6	35	46	67
Not Yes	273695	11.2540	0	1220	9.7394	10	29	33	39
Race									
White	215988	10.8730	0	1220	10.2006	10	29	33	40
Black	43881	11.3249	0	484	6.9671	10	32	37	43
Gender									
Female	143284	10.5558	0	1220	12.0227	9	29	34	42
Male	150081	11.4543	0	807	8.2886	11	30	34	40
Birth Weight									
<2500	26256	9.2423	0	974	11.7281	8	32	40	56
>=2500	271825	11.1829	0	1220	10.1109	10	29	34	40
Age at Collection									
1-23	1730	17.1983	0	111	14.9932	13	75	82	99
24-36	223501	11.9718	0	1220	10.4014	11	30	34	40
> 36	72850	7.9205	0	860	9.0395	7	24	28	34
Gestation Length									
< 36 wks	47986	9.6236	0	807	10.3948	8	30	37	48
>=37 wks	250095	11.2784	0	1220	10.2343	10	29	34	40
TPN									
Yes	5619	6.1538	0	666	13.4433	4	25	32	40
Not Yes	292462	11.1053	0	1220	10.1852	10	30	34	41
Transfused									
Yes	260	7.1423	0	68	9.5221	4	50	59	68
Not Yes	297821	11.0154	0	1220	10.2783	10	29	34	41
MultipleBirths									
Yes	10520	9.1692	0	394	8.7017	8	29	36	46
Not Yes	287561	11.0794	0	1220	10.3252	10	30	34	41
Test Interpretations									
Low	295996	10.7238	0	34	5.5628	10	27	29	31
Moderate	1716	30.7395	0	50	14.0814	36	49	49	50
High	368	150.8614	28	1220	196.0136	61	890	974	1220

Age at Collection

	N	Mean age at Collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	298288	33.2719	1	336	16.0397	28	93	117	165

State "D" Initial CH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 0 and 14 days

	N	Mean TSH	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	125336	7.3438	0	1378	10.1283	6	27	36	54
NICU									
Yes	6393	7.3552	0	558	13.6636	4	61	84	112
Not Yes	118943	7.3432	0	1378	9.9027	6	26	32	46
Race									
White	109575	7.2145	0	997	9.2937	6	27	34	51
Black	10360	8.6715	0	273	8.5788	7	36	50	75
Gender									
Female	59807	6.7952	0	997	11.0263	5	27	36	58
Male	62940	7.8628	0	1378	8.7578	6	28	36	51
Age at Collection									
1-23	5036	19.6007	0	186	16.4630	15	87	107	125
24-36	10276	9.9662	0	791	9.6665	9	27	31	35
> 36	110024	6.5379	0	1378	9.3574	5	22	24	29
Gestation Length									
< 36 wks	5351	7.1282	0	558	13.2940	4	60	75	100
>=37 wks	119985	7.3534	0	1378	9.9637	6	26	33	47
Transfused									
Yes	125	5.3520	0	112	10.9215	3	41	112	112
Not Yes	125211	7.3458	0	1378	10.1273	6	27	36	54
MultipleBirths									
Yes	3511	6.6454	0	144	8.5436	5	43	61	84
Not Yes	121825	7.3639	0	1378	10.1696	6	27	35	52
Risk									
Normal	123756	6.8361	0	142	4.6130	6	22	23	24
Borderline	1413	34.7841	23	65	9.3499	32	63	64	65
Increased	164	154.1463	52	1378	183.1892	94	997	1378	1378

Age at Collection

	N	Mean age at Collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	125506	51.9377	0	336	22.5812	48	152	167	204

State "E" Initial CH Screening
For the Period 1-1/05-12/31/2006

Tests where age at collection between 1 and 14 days

	N	Mean TSH	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	138849	8.4036	1	586	9.1357	7	27	31	38
NICU									
Yes	0	0	0	0	0	0	0	0	0
Not Yes	138849	8.4036	1	586	9.1357	7	27	31	38
Race									
White	99968	8.3317	1	586	9.0692	7	26	30	37
Black	14591	8.9920	2	329	6.6937	8	29	33	39
Gender									
Female	66834	7.8375	1	586	10.3490	6	26	30	38
Male	70181	8.9346	2	557	7.8487	8	27	31	37
Birth Weight									
<2500	14770	7.4969	2	364	7.4787	6	28	33	44
>=2500	124079	8.5116	1	586	9.3075	7	27	30	37
Age at Collection									
1-23	2394	12.0096	2	129	10.4575	9	56	66	82
24-36	60789	10.1695	2	557	8.9144	6	28	32	38
> 36	75666	6.8709	1	586	8.9771	6	23	26	31
Gestation Length									
< 36 wks	15183	7.0514	2	535	9.2644	5	27	32	45
>=37 wks	123666	8.5697	1	586	9.1060	7	27	30	37
TPN									
Yes	639	4.9218	2	60	5.0060	3	23	25	31
Not Yes	138210	8.4197	1	586	9.1474	7	27	31	38
Transfused									
Yes	233	6.0300	2	66	6.7699	4	31	41	66
Not Yes	138616	8.4076	1	586	9.1387	7	27	31	37
MultipleBirths									
Yes	1413	7.0906	2	303	10.4888	5	27	30	55
Not Yes	137436	8.4171	1	586	9.1198	7	27	31	37
Test Interpretations									
Normal	138184	8.1514	1	36	5.3352	7	25	27	29
Borderline	399	33.0476	30	43	3.3886	32	42	42	43
Positive	139	158.4101	20	586	173.0573	64	557	586	586
Call	127	41.2598	37	49	3.5994	41	49	49	49

Age at Collection

	N	Mean Age at Collection	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
All cases	138854	41.6973	0	336	22.0163	38	141	161	212

Healthy White Females
CH Results for the Period 1-1/05-12/31/2006
 Tests where age at collection between 24 and 36 hours

State	N	% of								
		Total	Mean TSH	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
State "A"	59785	24%	11.7433	2	588	8.7011	11	30	32	40
State "B"	29064	20%	10.3005	0	638	10.3922	9	27	30	36
State "C"	71748	24%	11.3123	0	1220	11.0196	10	29	32	38

Selection Criteria

Race White
 Gender Female
 Birth wgt >=2500
 Nicu not indicated as yes (non-NICU)

Total is all cases where age at collection is less than or equal to 14 days.

CH Results for the Period 1-1/05-12/31/2006
 Tests where age at collection between 24 and 36 hours

State	N	% of								
		Total	Mean TSH	Min	Max	Std Dev	Median	99 Pctl	99.5 Pctl	99.8 Pctl
State "A"	53379	21%	11.8043	2	588	8.2427	11	30	32	40
State "B"	24124	17%	10.3746	0	638	10.4971	9	27	30	36
State "C"	60214	20%	11.4201	0	1220	11.1769	10	29	32	39
State "D"										
State "E"	16919	12%	9.5125	2	506	8.9980	8	27	31	37

Selection Criteria

Race White
 Gender Female
 Birth wgt >=2500
 Gestational age over 37 weeks

Total is all cases where age at collection is less than or equal to 14 days.

B

For Discussion Purposes Only

**Congenital Adrenal Hyperplasia and Congenital Hypothyroidism
Results of Initial Newborn Screening 2005 and 2006
From Michigan, Ohio, Minnesota, Indiana, and Wisconsin**

**Endocrine Project Report
Region 4 Genetics Collaborative
April 15, 2008
Okemos, Michigan**

**Charles J. Mundt, M.A.
William Young, Ph.D.**

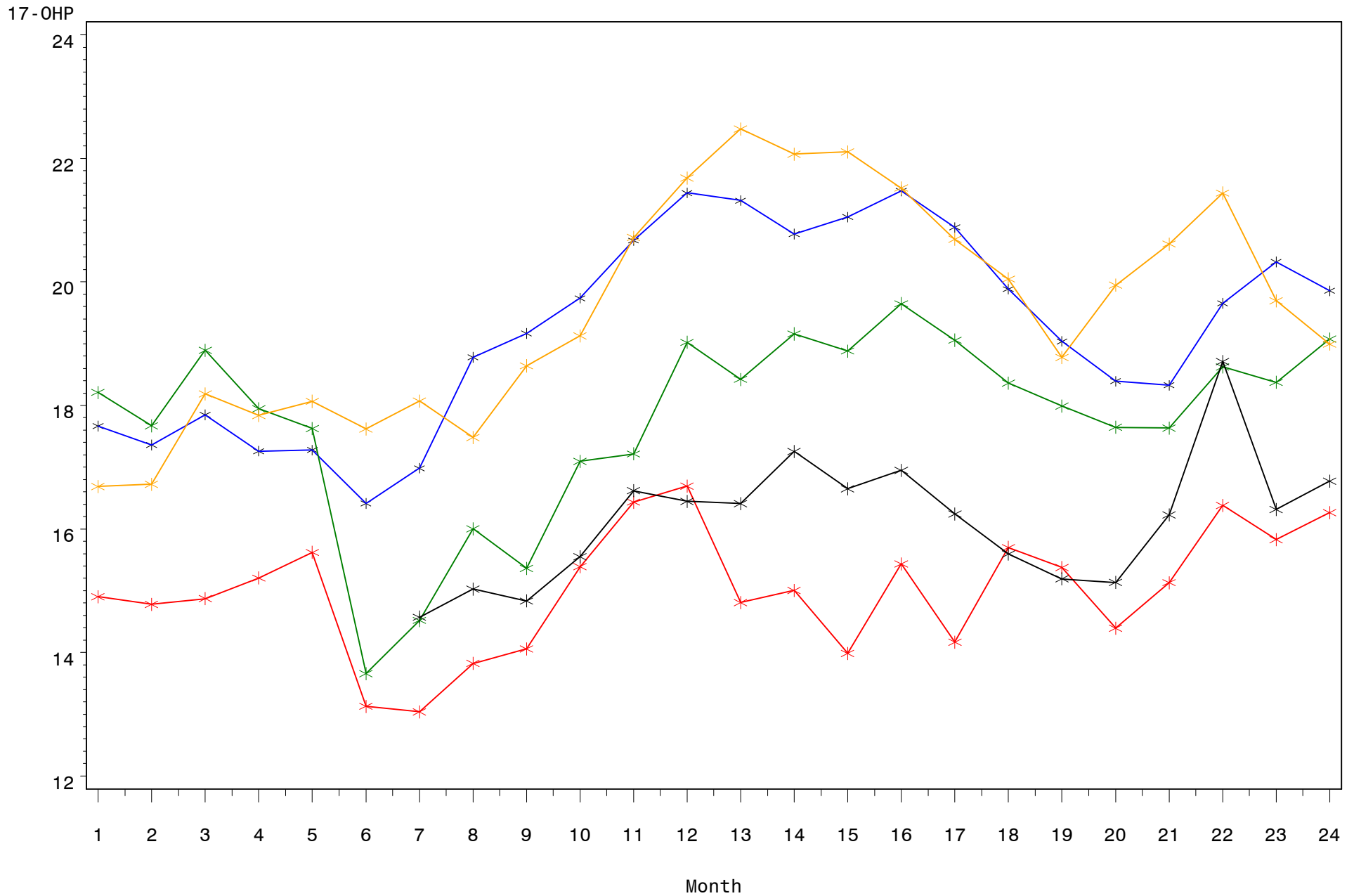
Preliminary Results

17-OHP

Five States

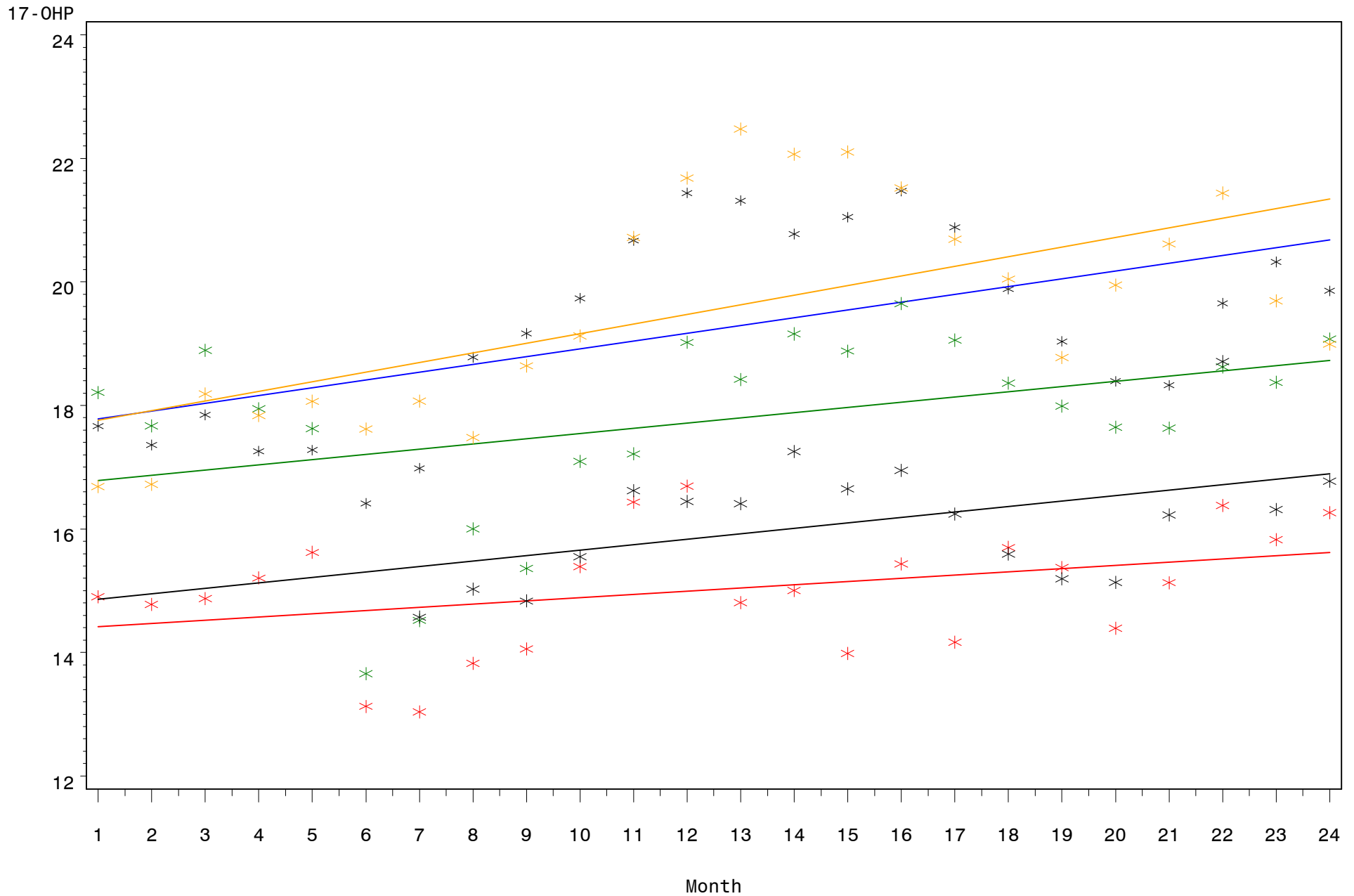
All States 17-OHP Means by Month

For the period Jan 2005 through Dec 2006



All States 17-OHP Means by Month

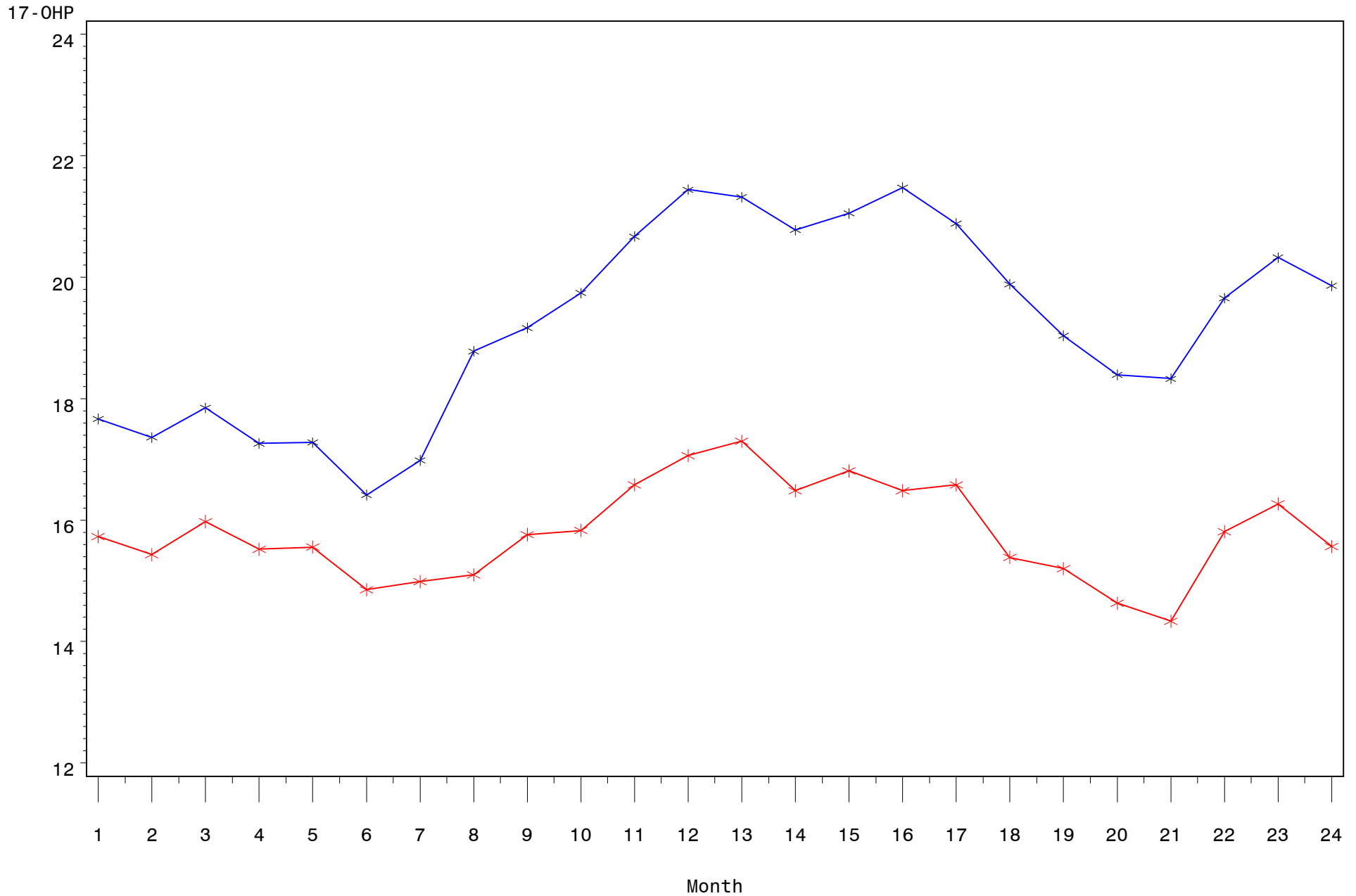
For the period Jan 2005 through Dec 2006



State “A”

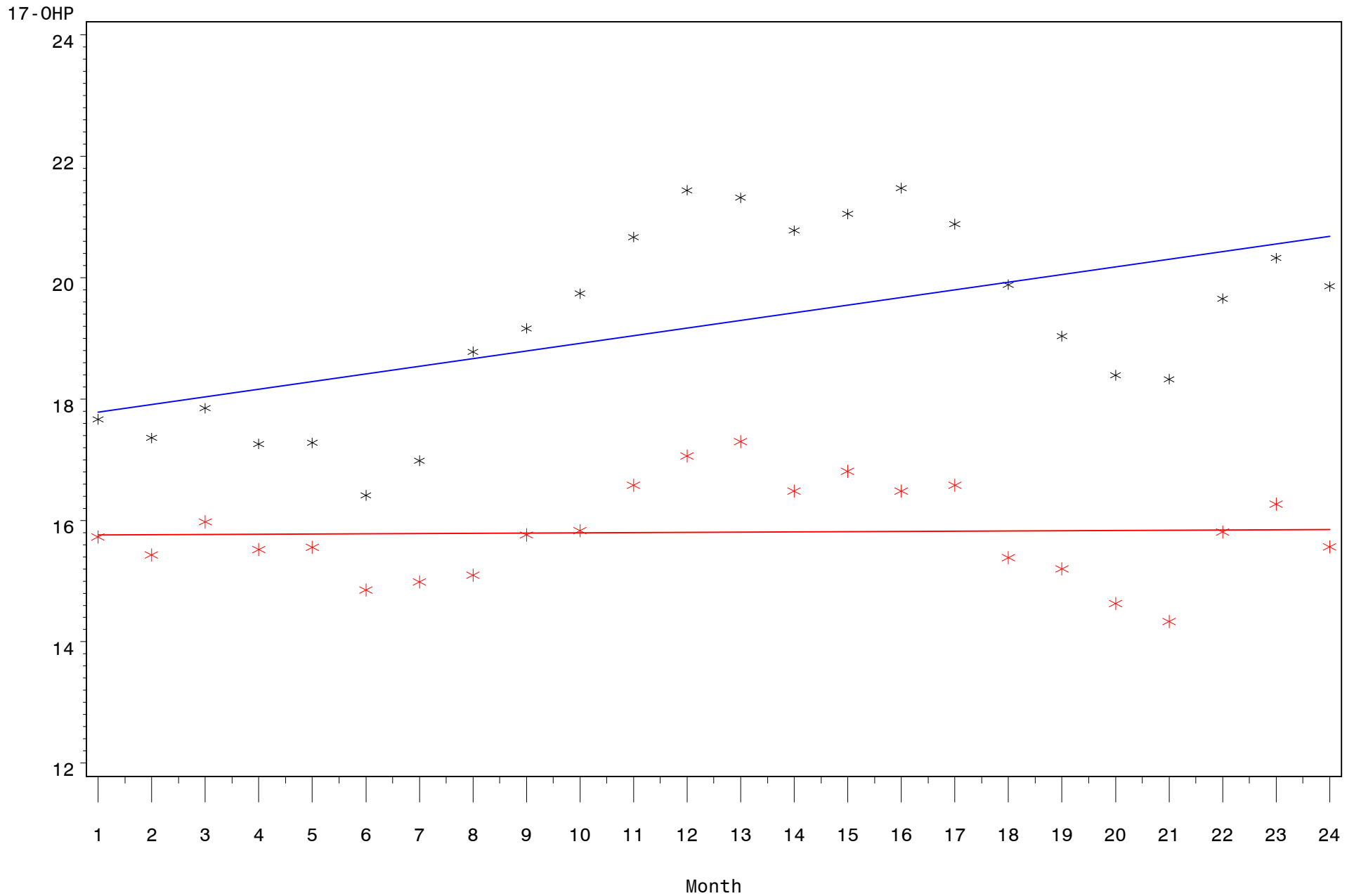
State "A" 17-OHP Values by Month

For the period Jan 2005 through Dec 2006



State "A" 17-OHP Values by Month

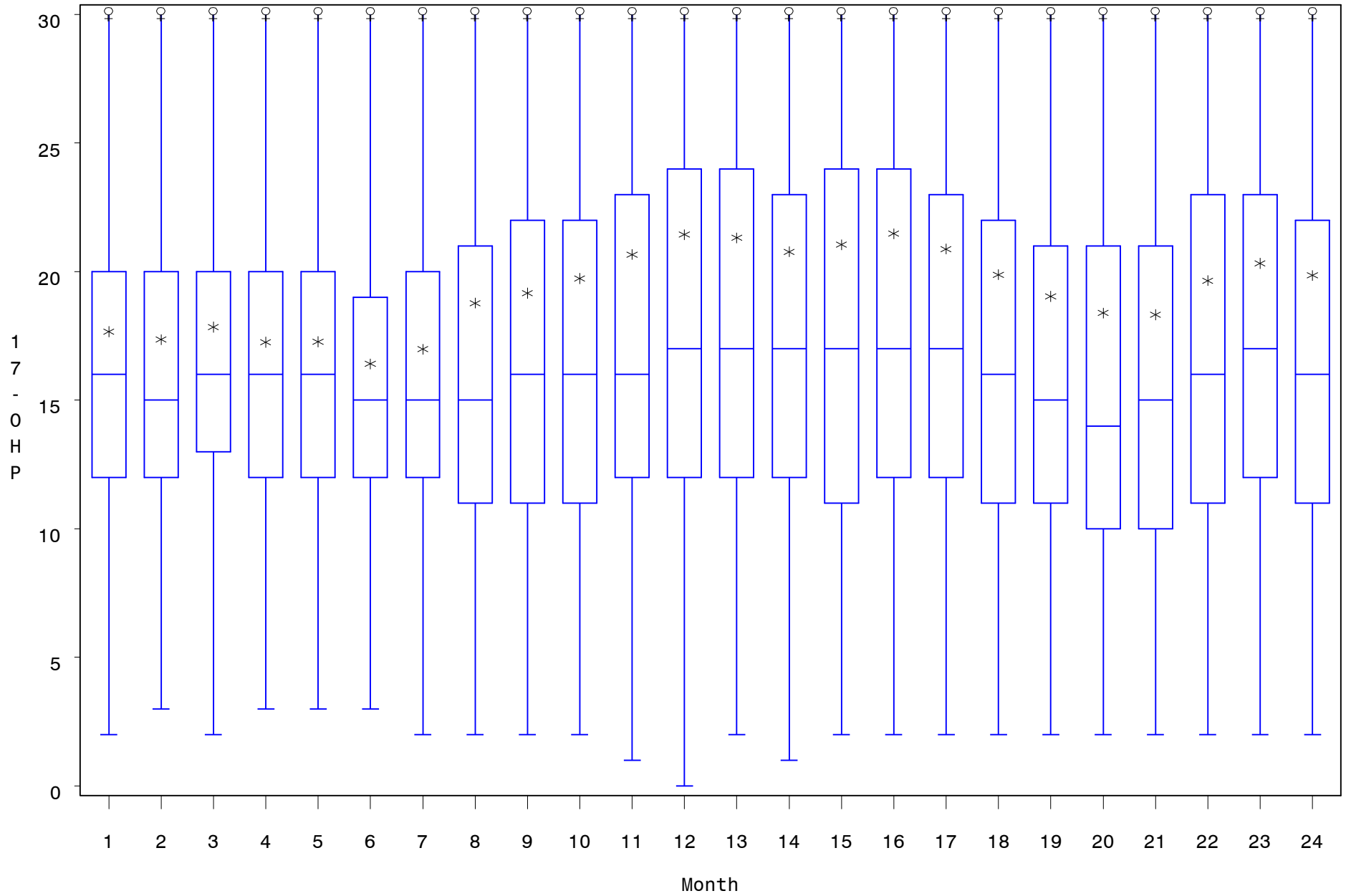
For the period Jan 2005 through Dec 2006



State "A" 17-OHP Values by Month

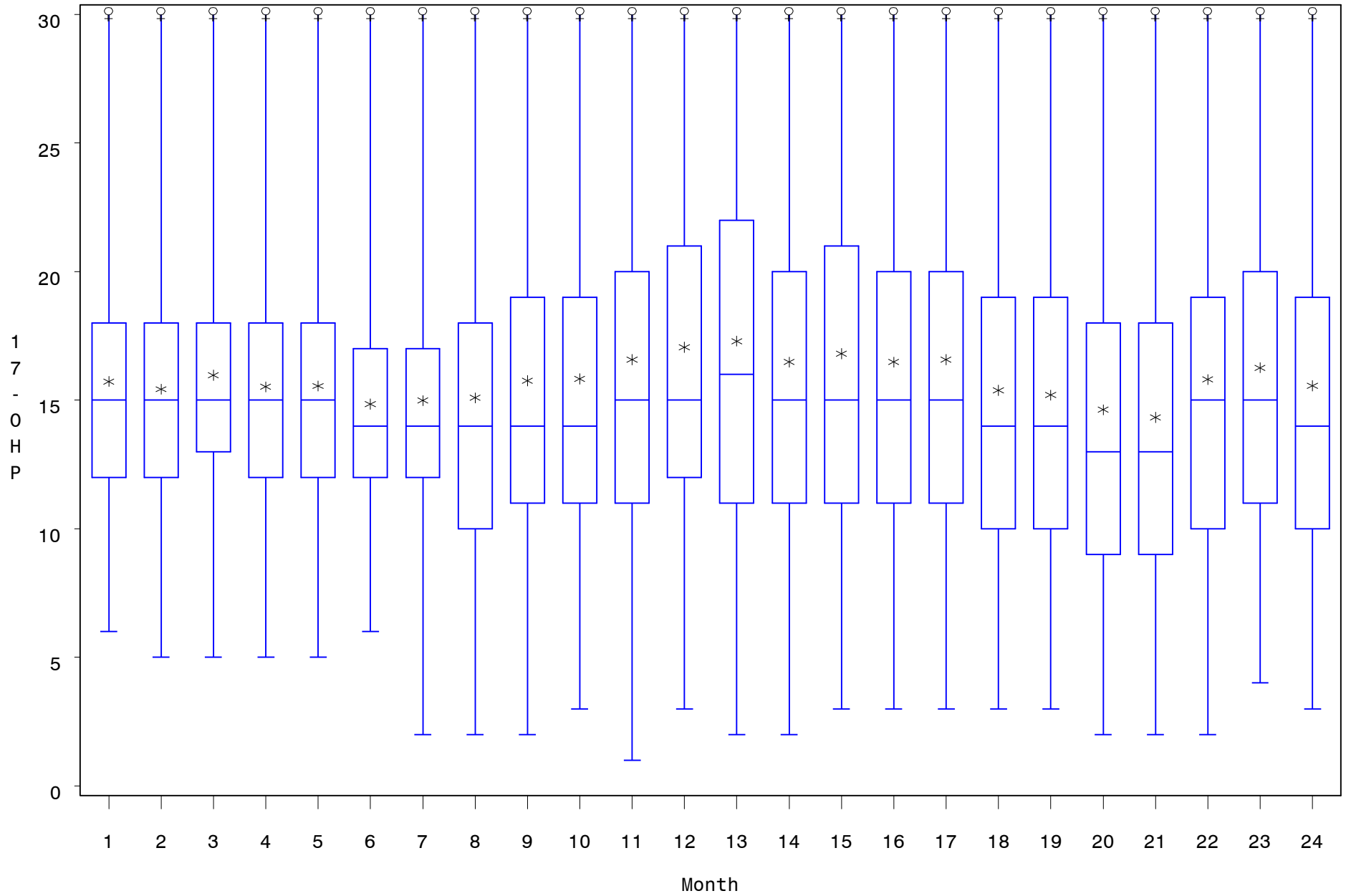
For the period Jan 2005 through Dec 2006

All cases collected within 14 days



State "A" 17-OHP Values by Month

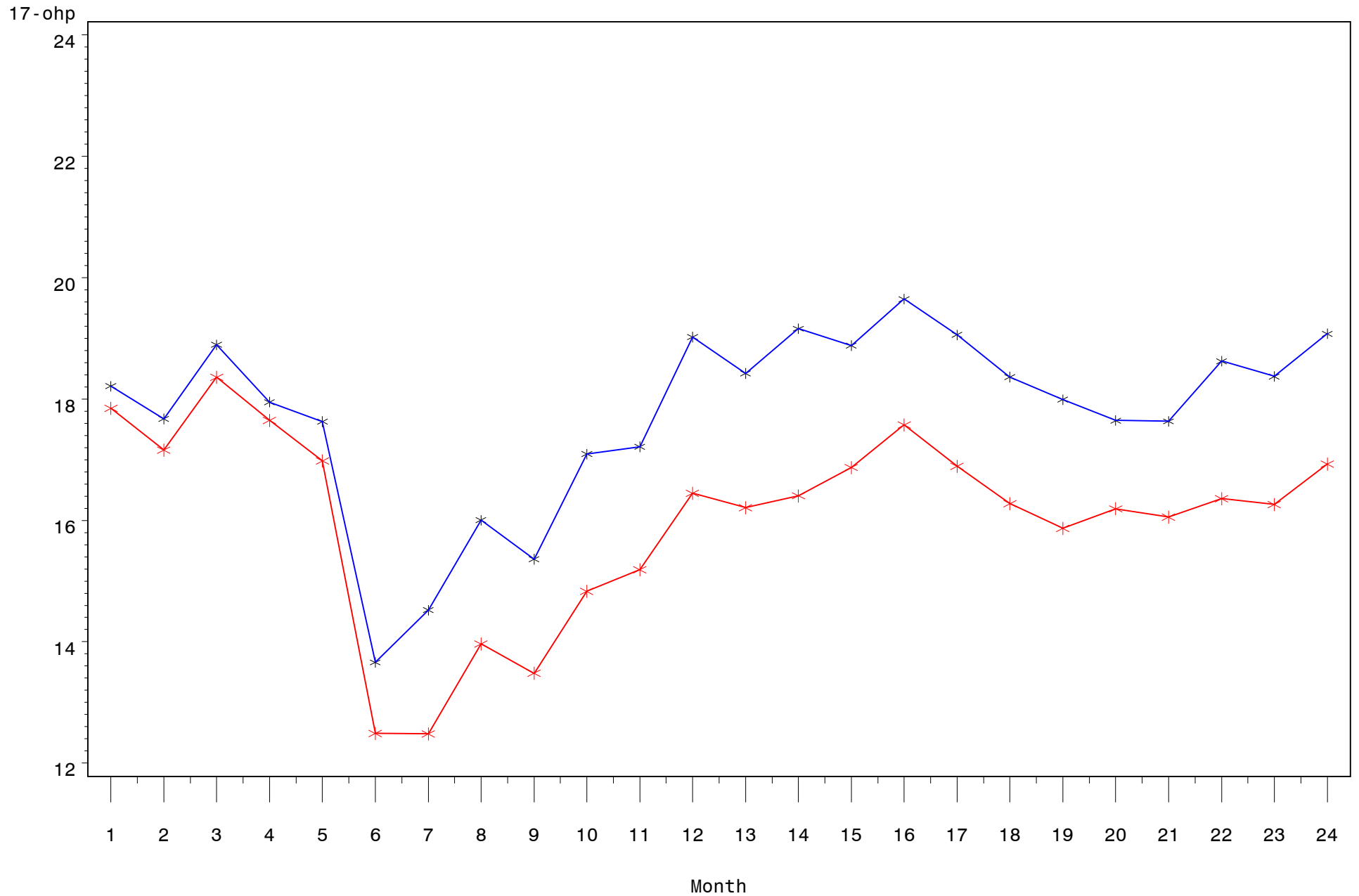
For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



State “B”

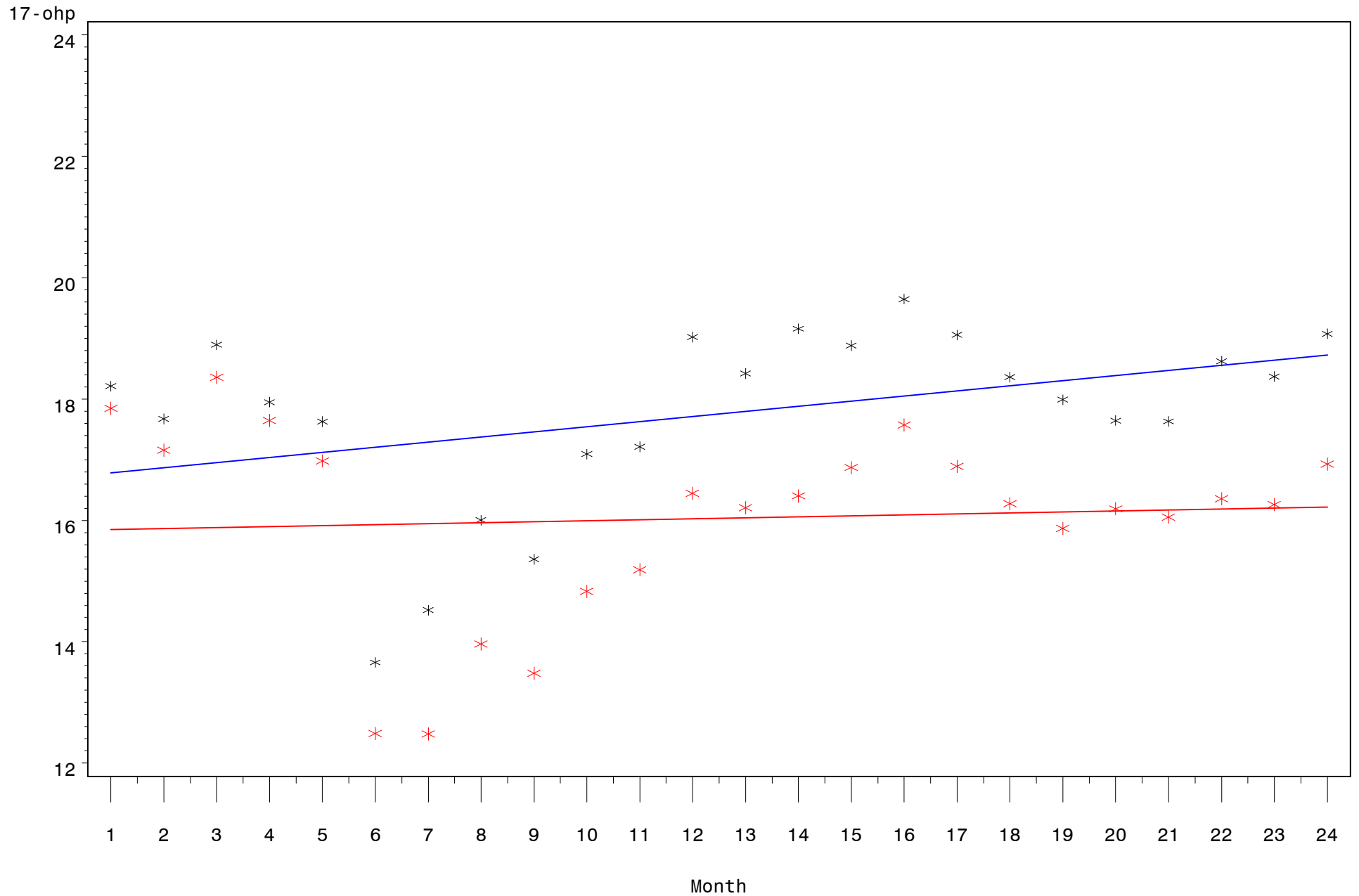
State "B" 17-OHP Values by Month

For the period Jan 2005 through Dec 2006



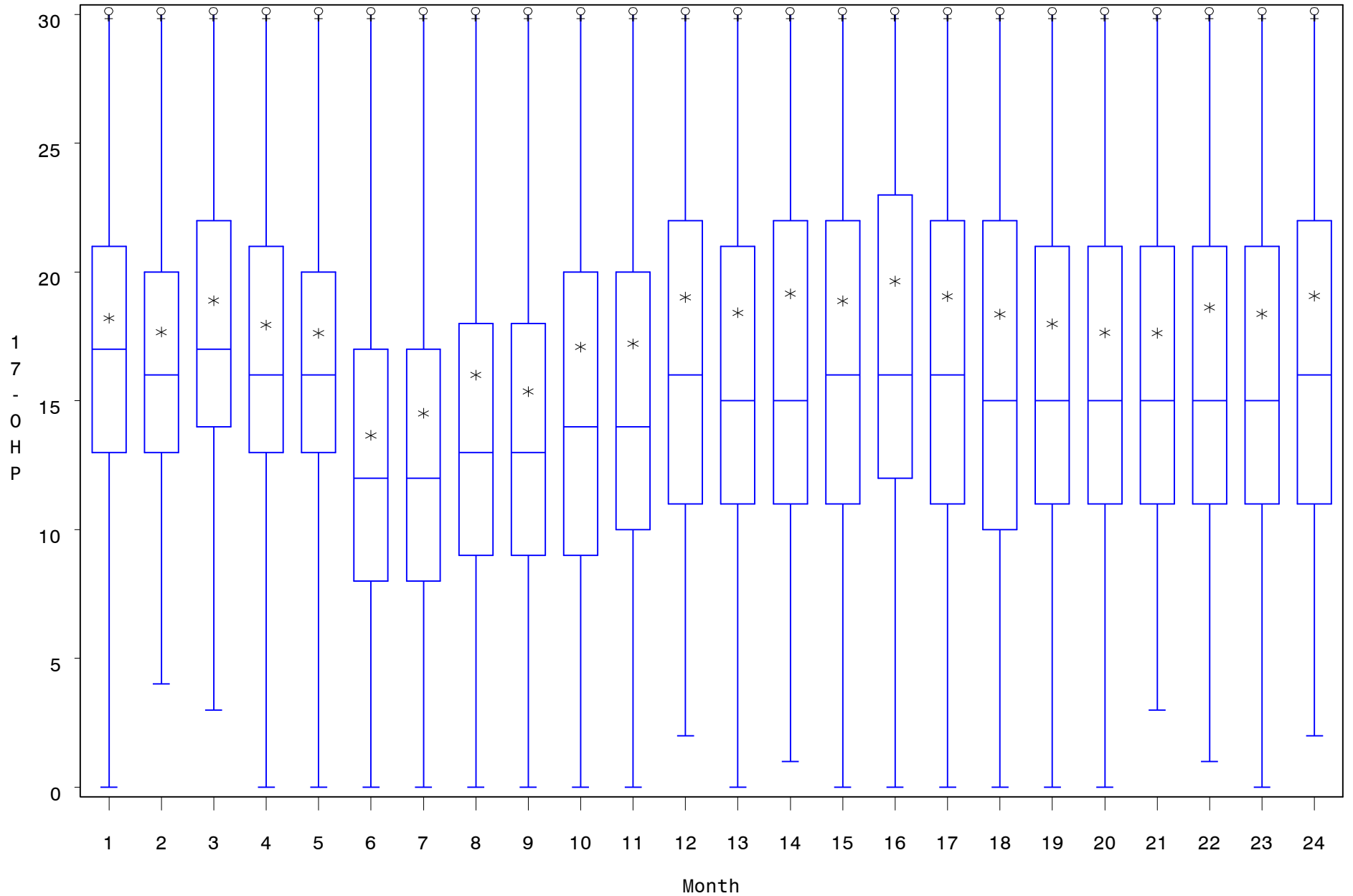
State "B" 17-OHP Values by Month

For the period Jan 2005 through Dec 2006



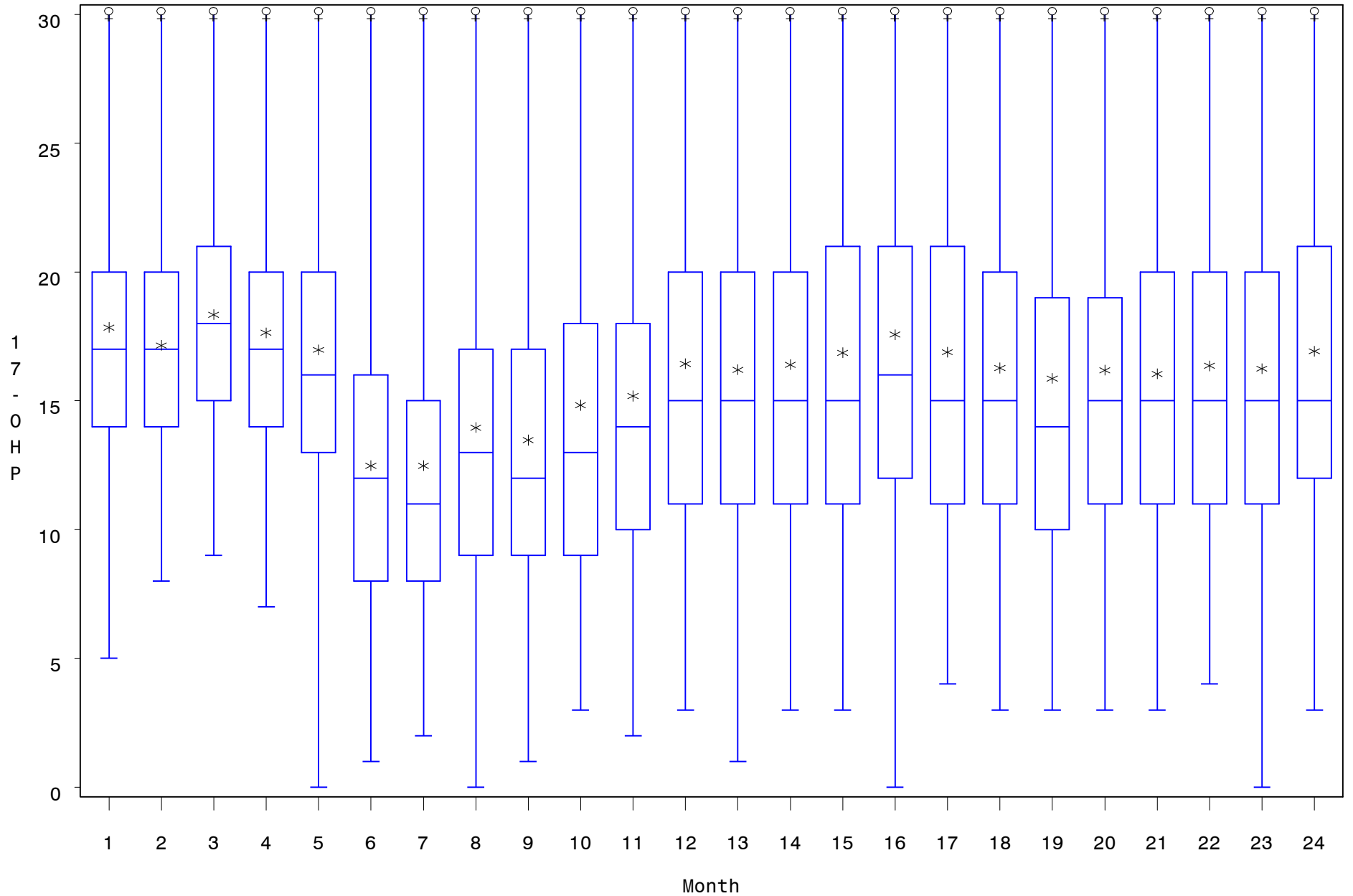
State "B" 17-OHP Values by Month

For the period Jan 2005 through Dec 2006
All cases collected within 14 days



State "B" 17-OHP Values by Month

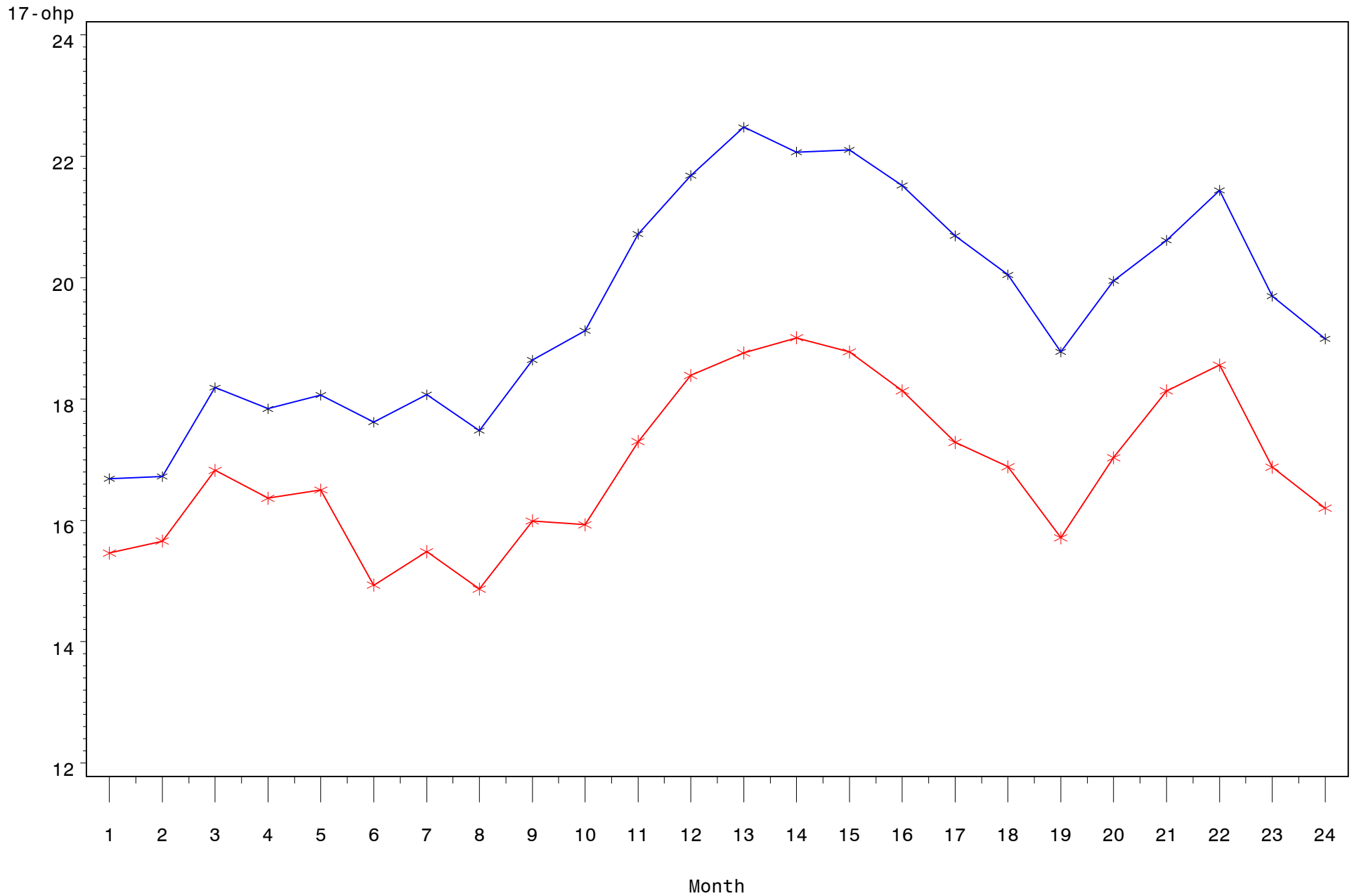
For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



State “C”

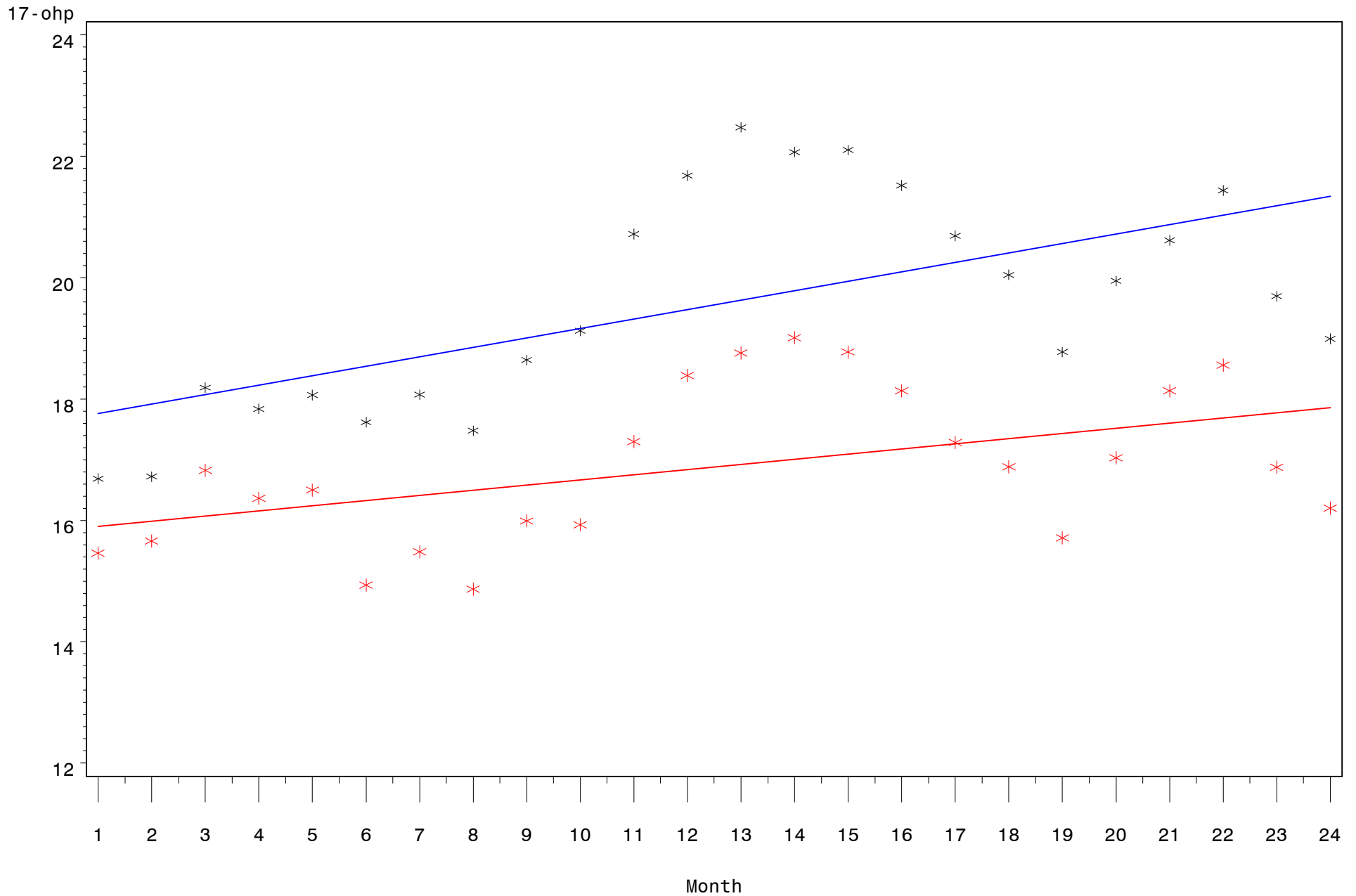
State "C" 17-OHP Values by Month

For the period Jan 2005 through Dec 2006



State "C" 17-OHP Values by Month

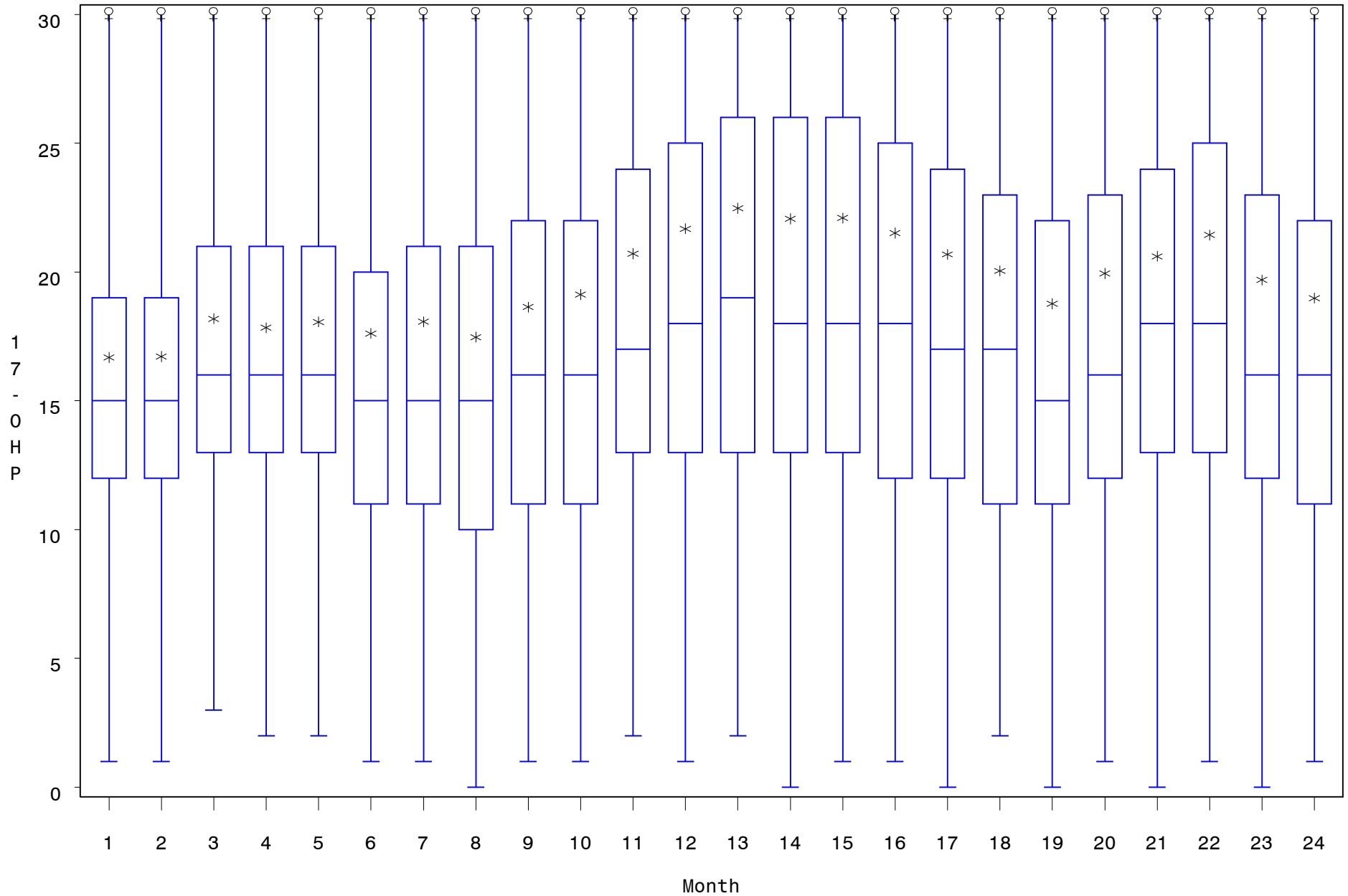
For the period Jan 2005 through Dec 2006



State "C" 17-OHP Values by Month

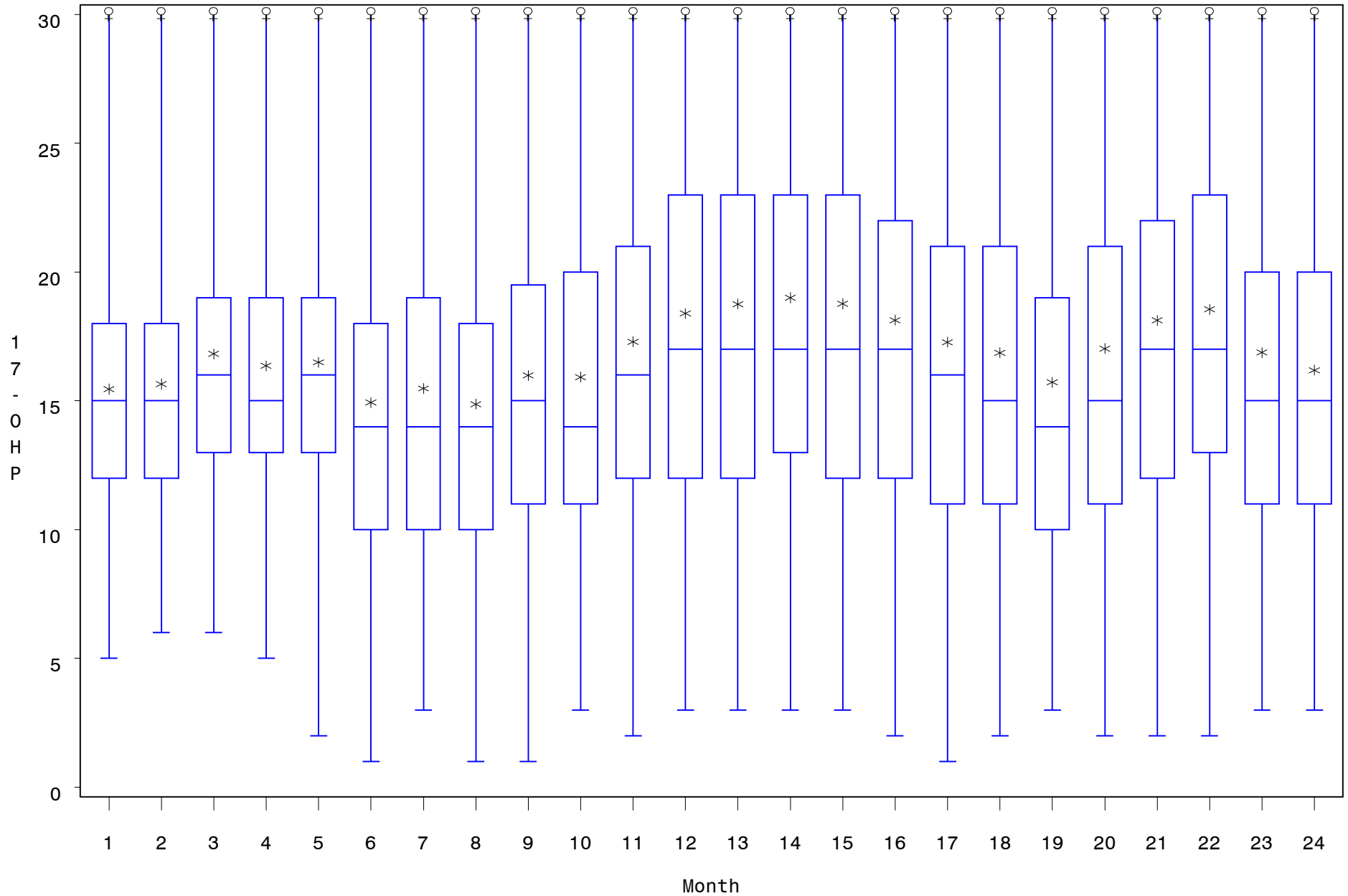
For the period Jan 2005 through Dec 2006

All cases collected within 14 days



State "C" 17-OHP Values by Month

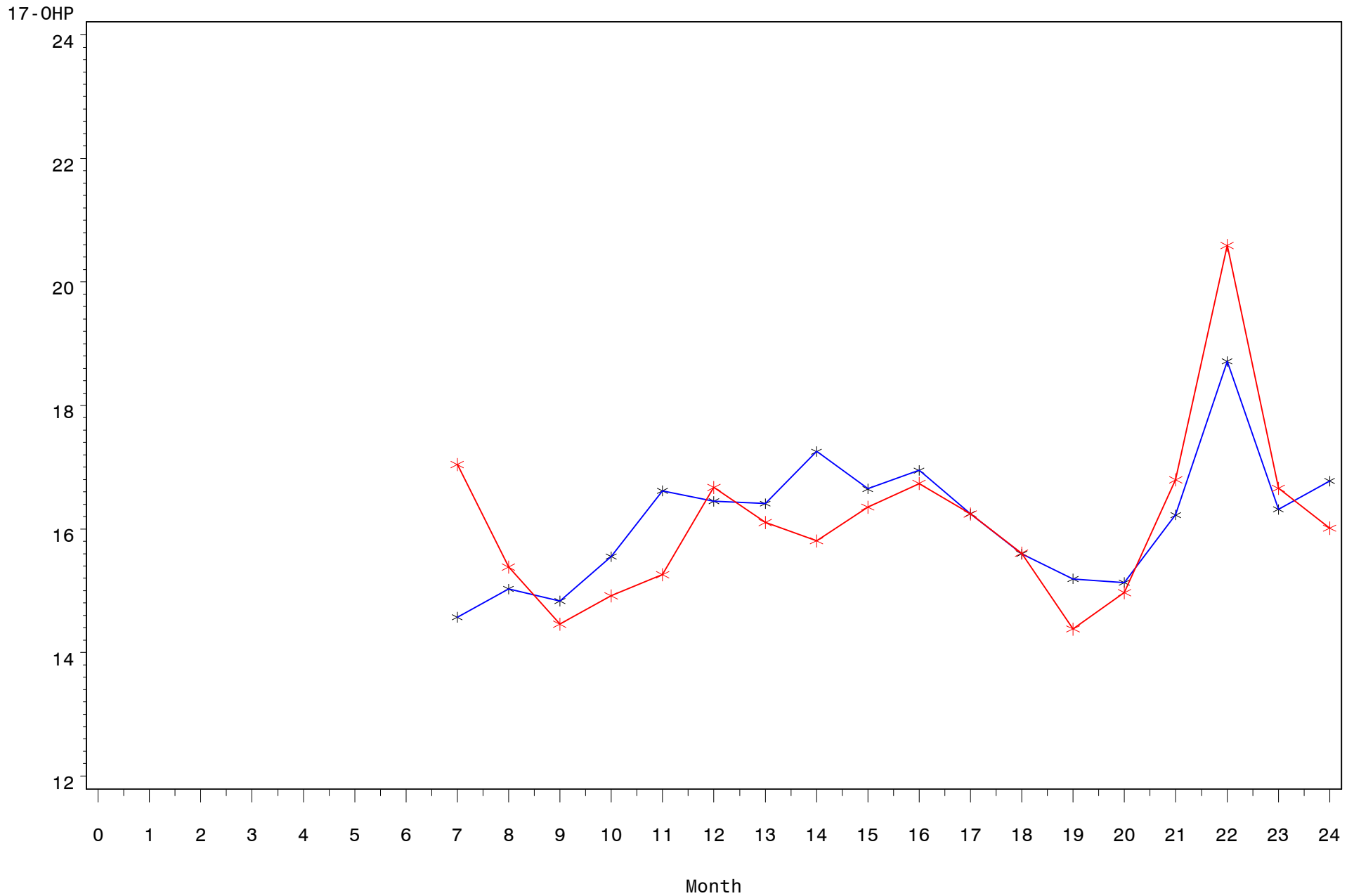
For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



State “D”

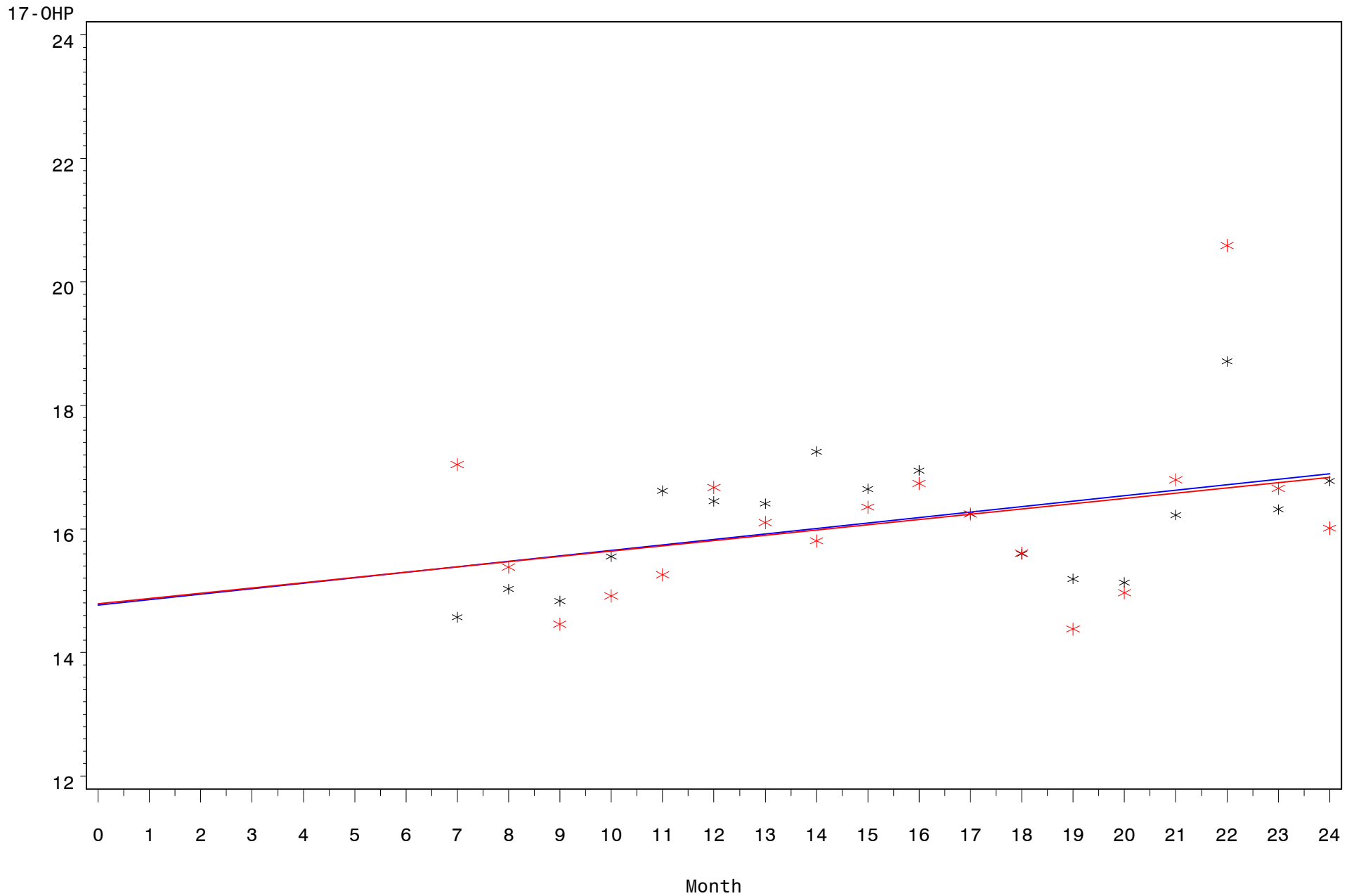
State "D" 17-OHP Means by Month

For the period Jan 2005 through Dec 2006



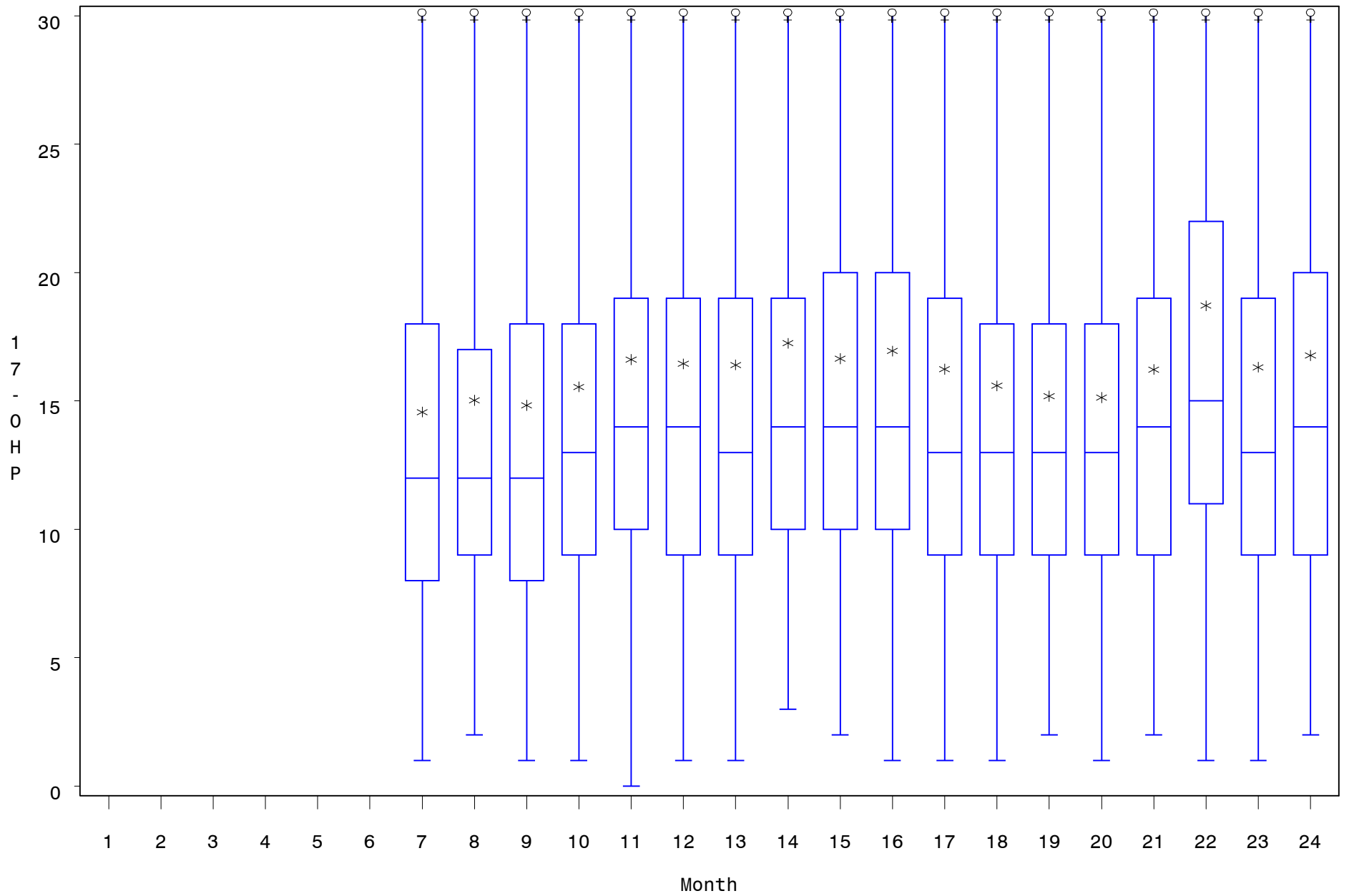
State "D" 17-OHP Means by Month

For the period Jan 2005 through Dec 2006



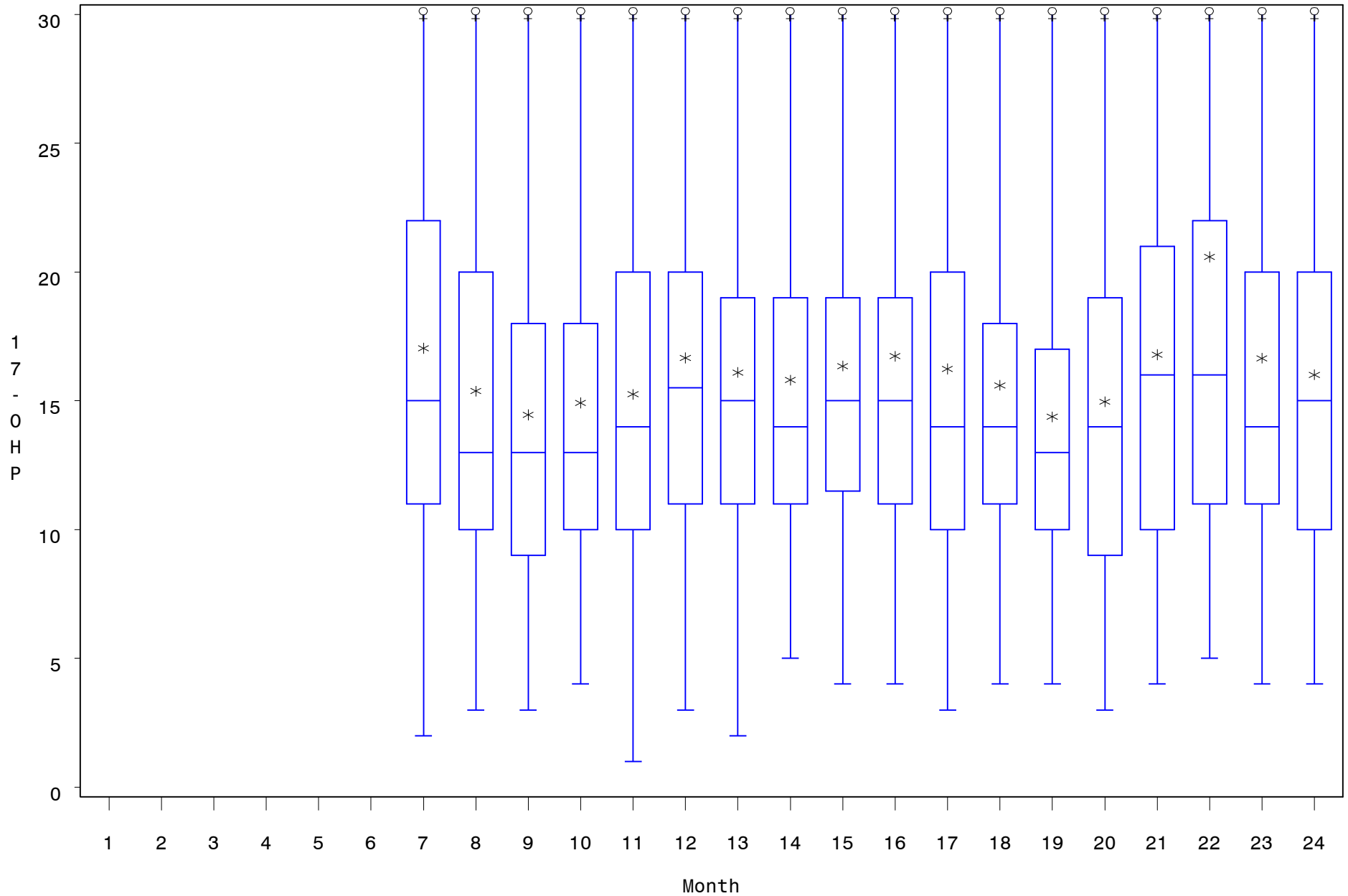
State "D" 17-OHP Values by Month

For the period Jan 2005 through Dec 2006
All cases collected within 14 days



State "D" 17-OHP Values by Month

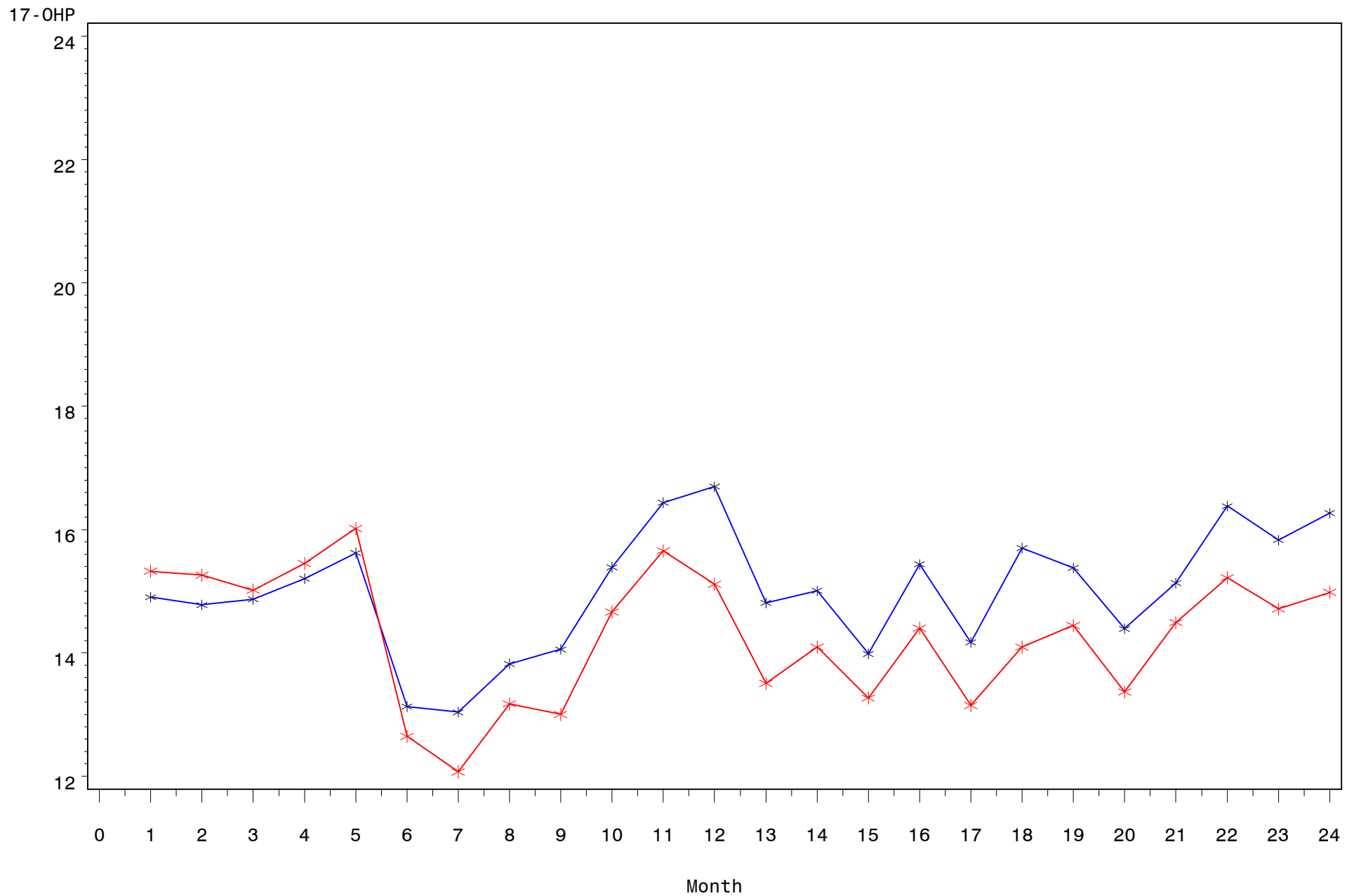
For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



State “E”

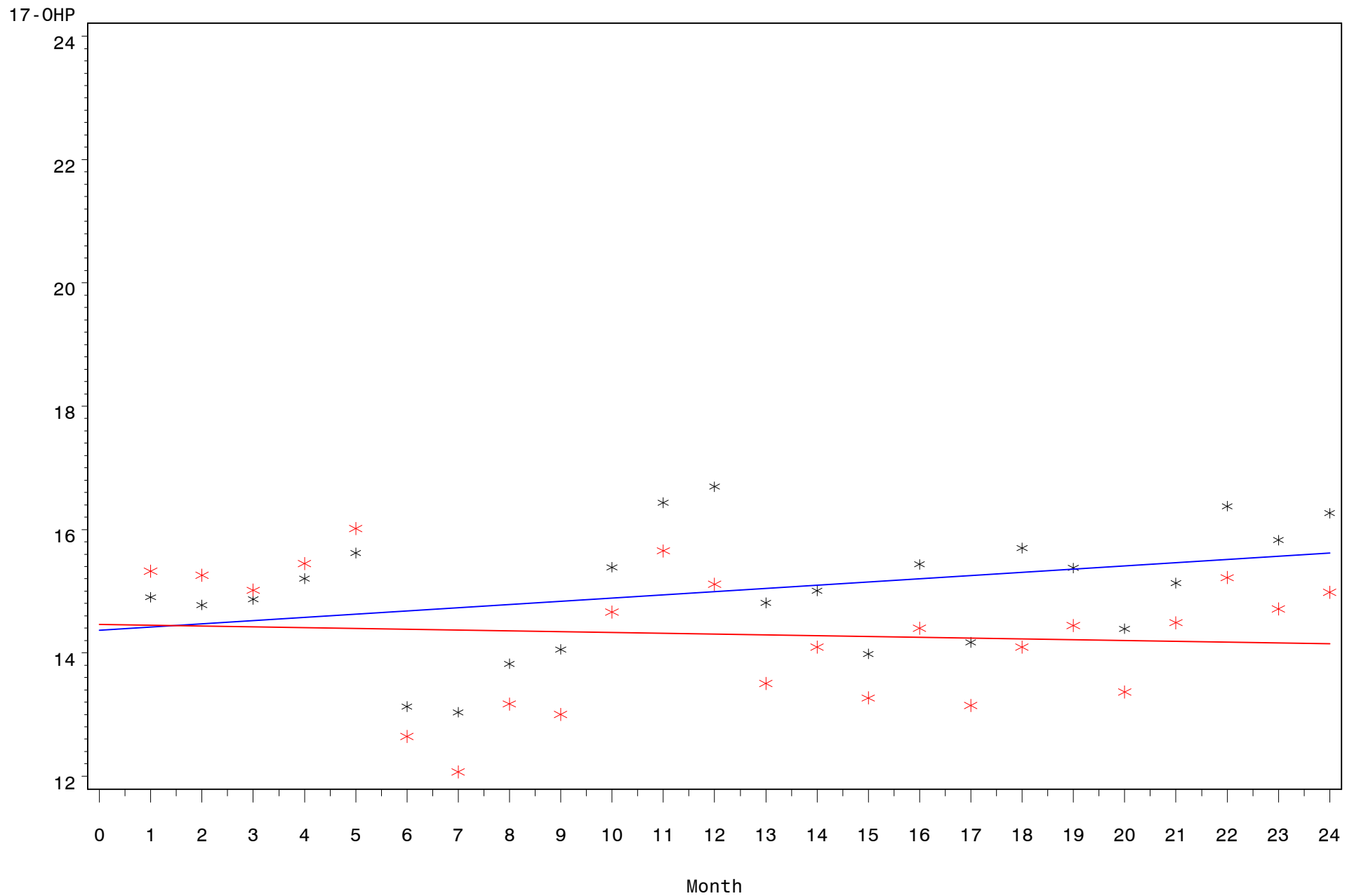
State "E" 17-OHP Means by Month

For the period Jan 2005 through Dec 2006



State "E" 17-OHP Means by Month

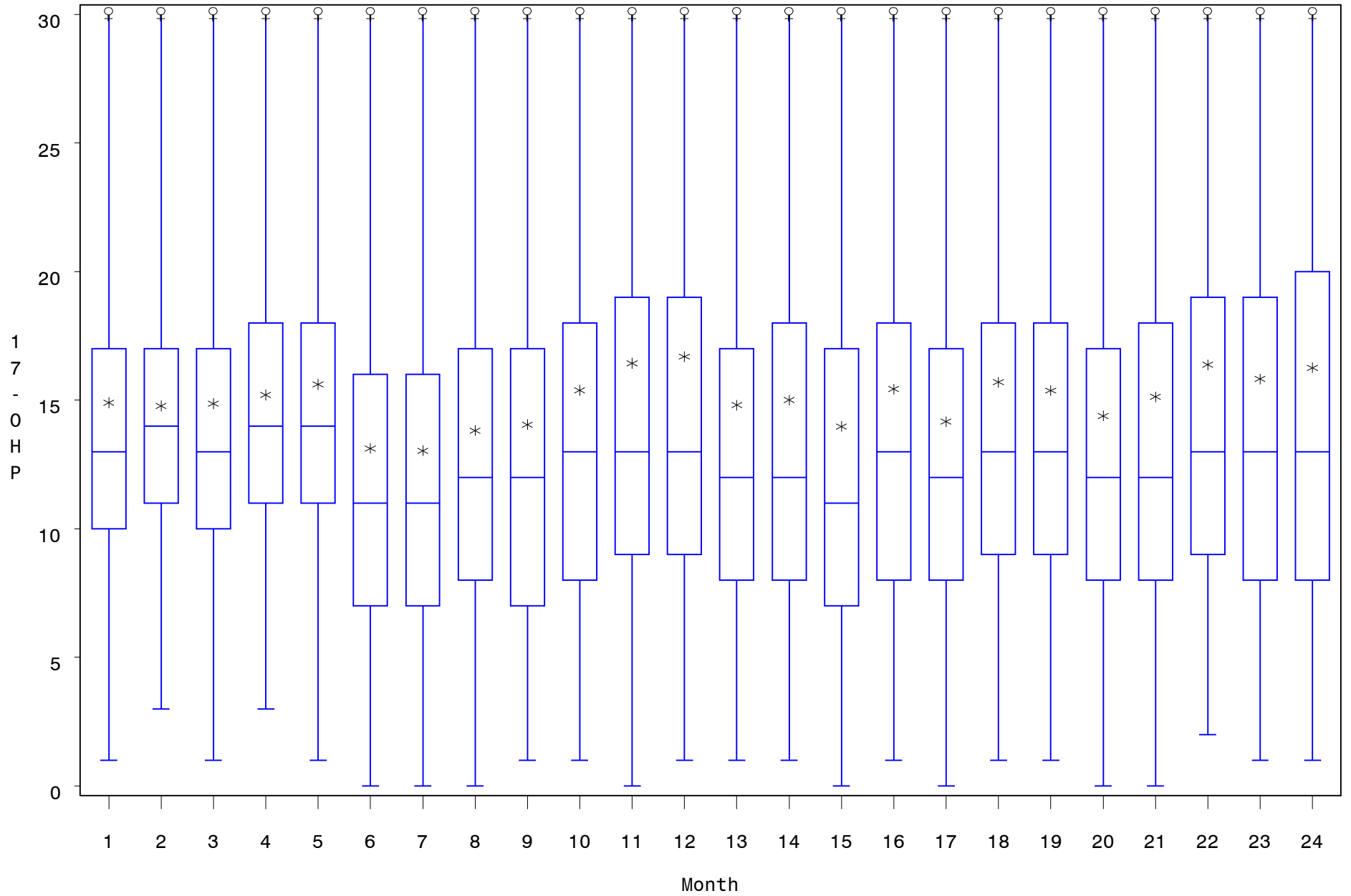
For the period Jan 2005 through Dec 2006



State "E" 17-OHP Values by Month

For the period Jan 2005 through Dec 2006

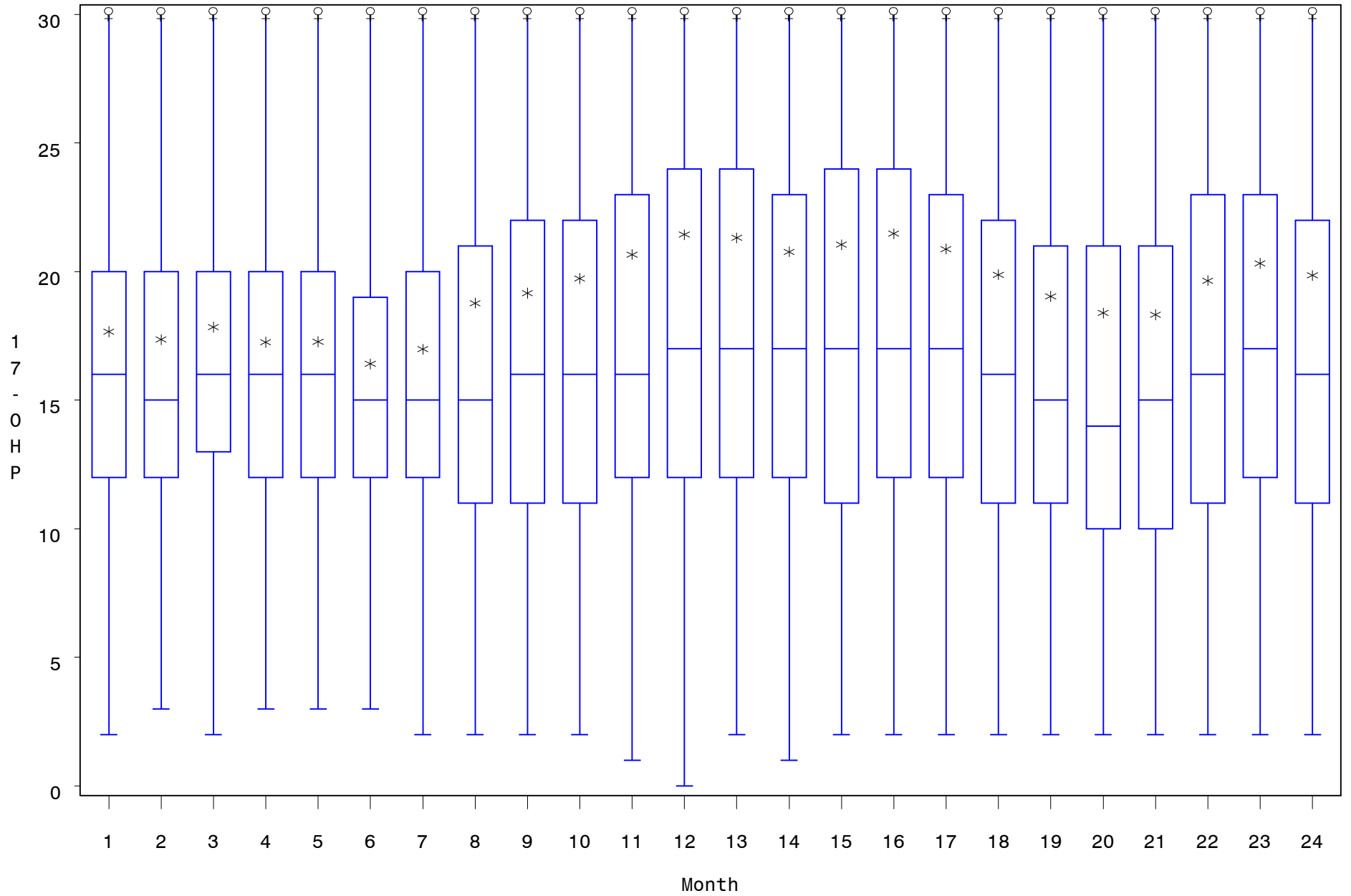
All cases collected within 14 days



State "A" 17-OHP Values by Month

For the period Jan 2005 through Dec 2006

All cases collected within 14 days

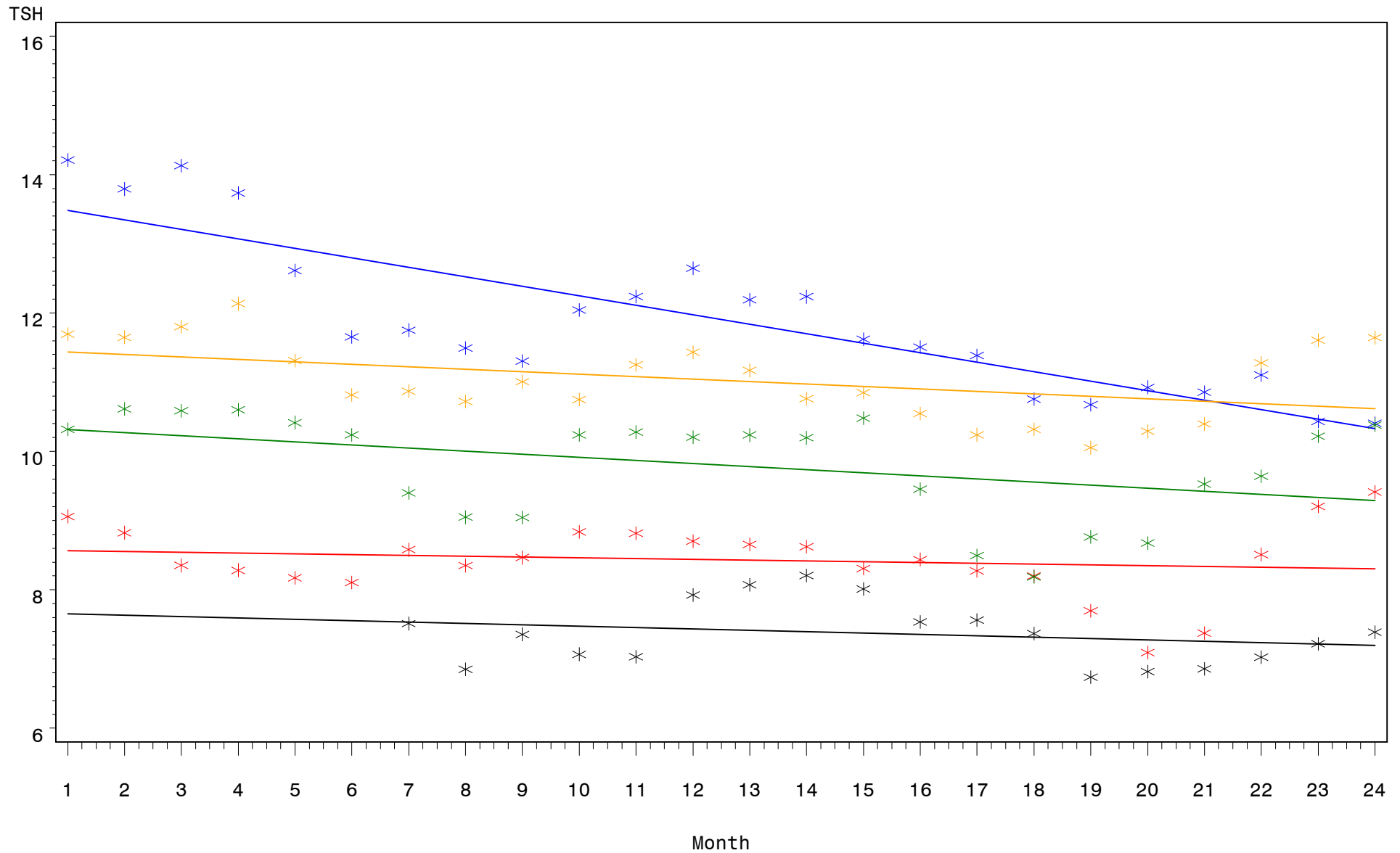


TSH''

Five States

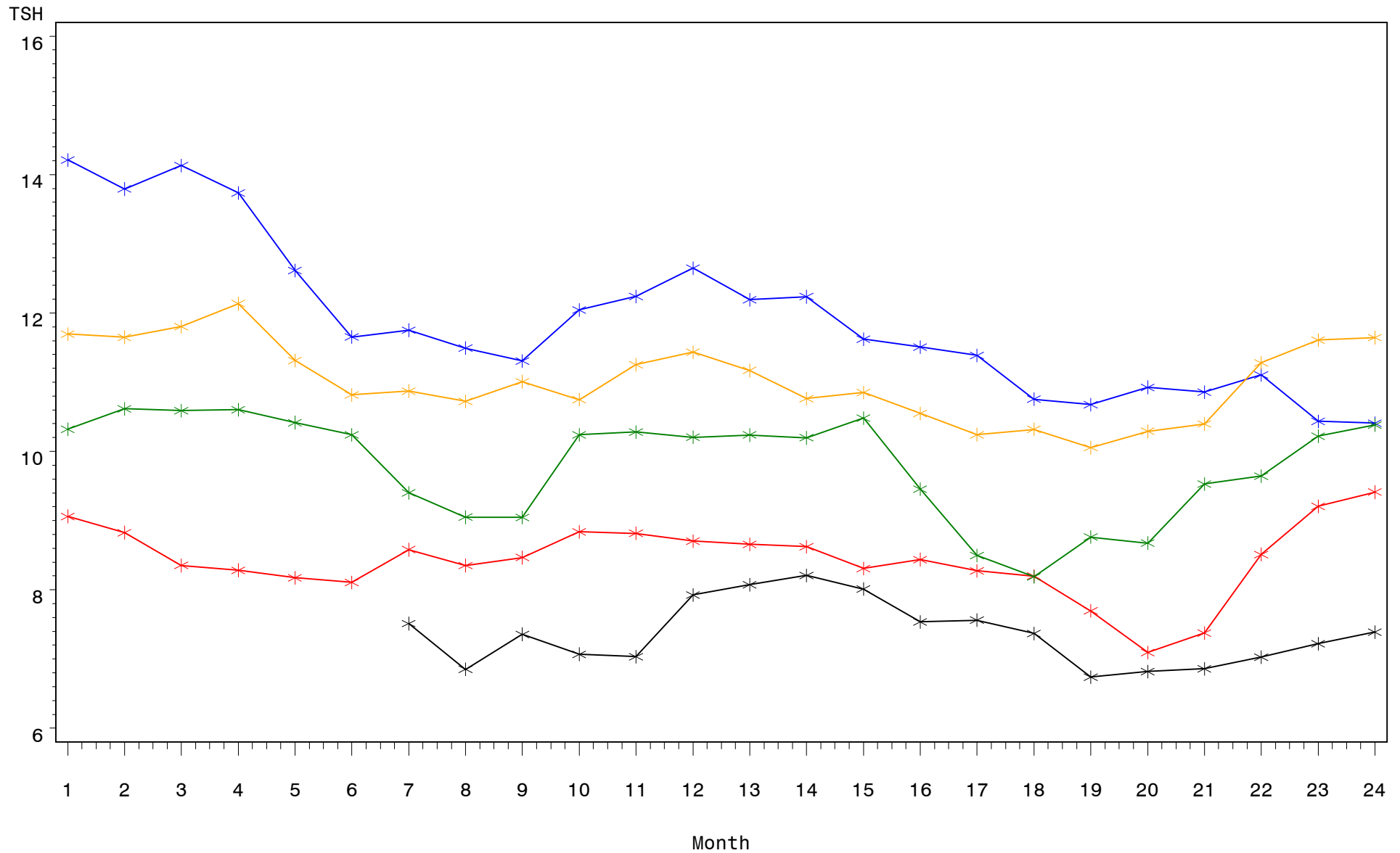
All States TSH Means by Month

For the period Jan 2005 through Dec 2006



All States TSH Means by Month

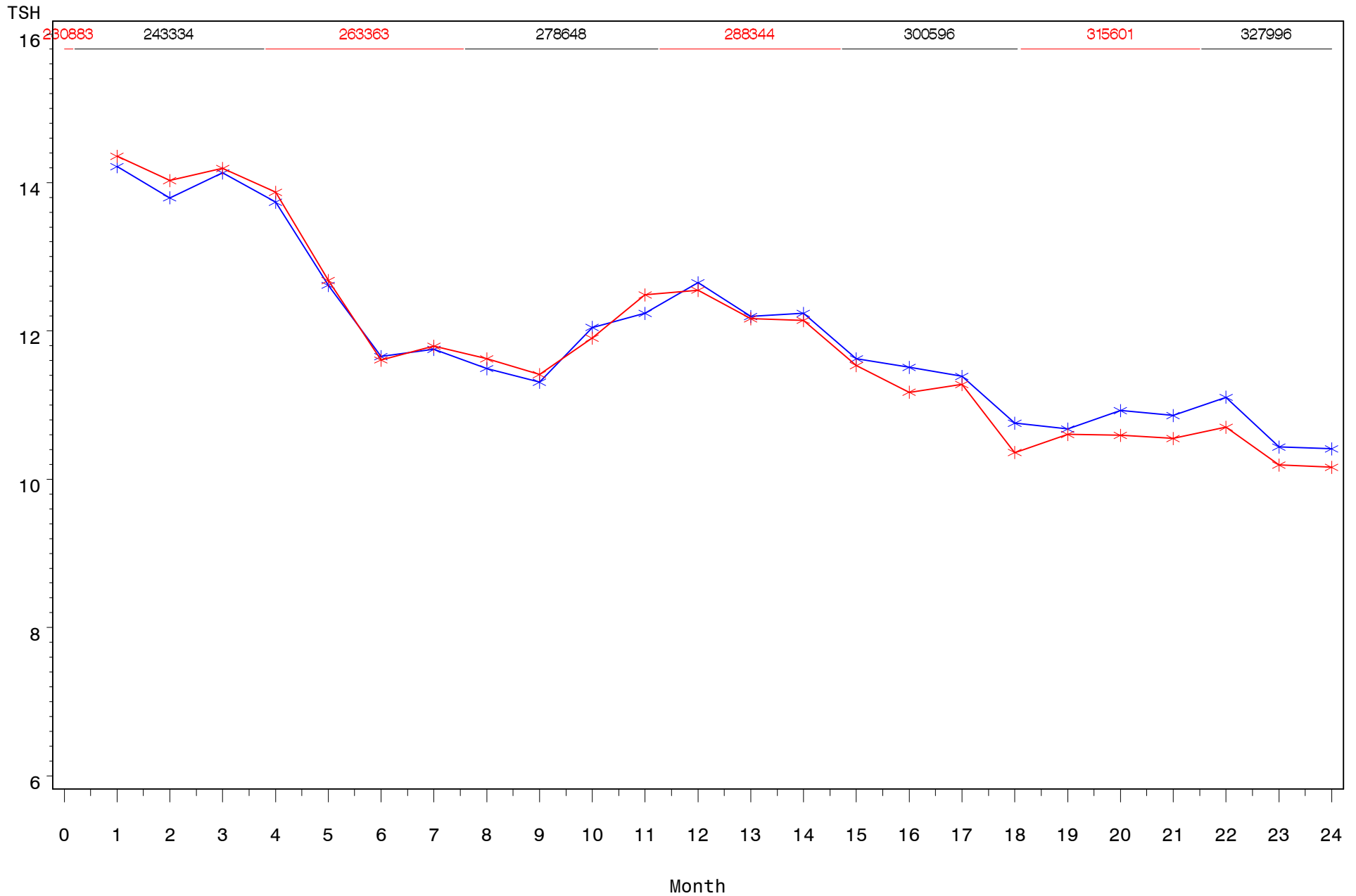
For the period Jan 2005 through Dec 2006



State “A”

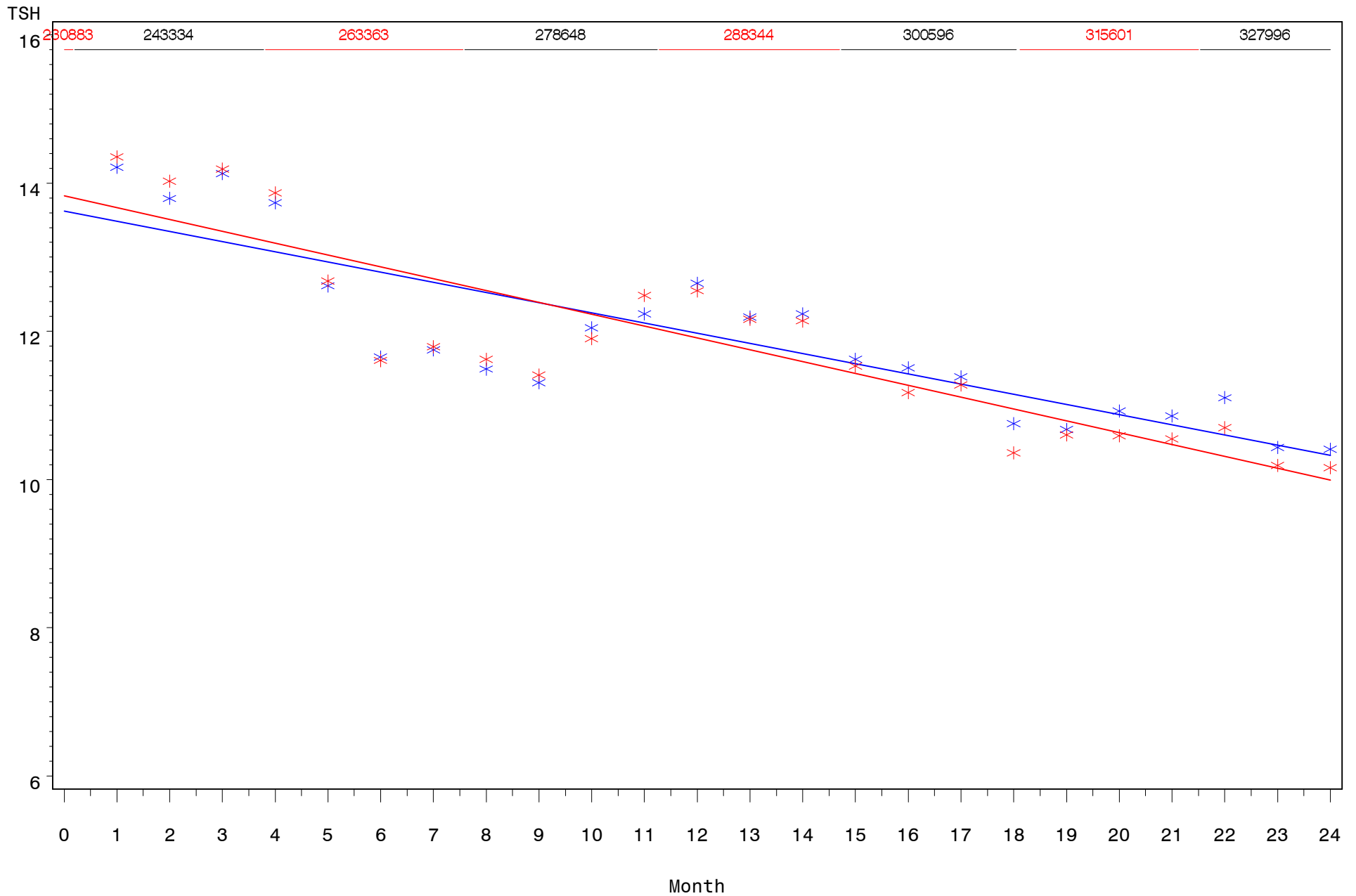
State "A" TSH Means by Month

For the period Jan 2005 through Dec 2006



State "A" TSH Means by Month

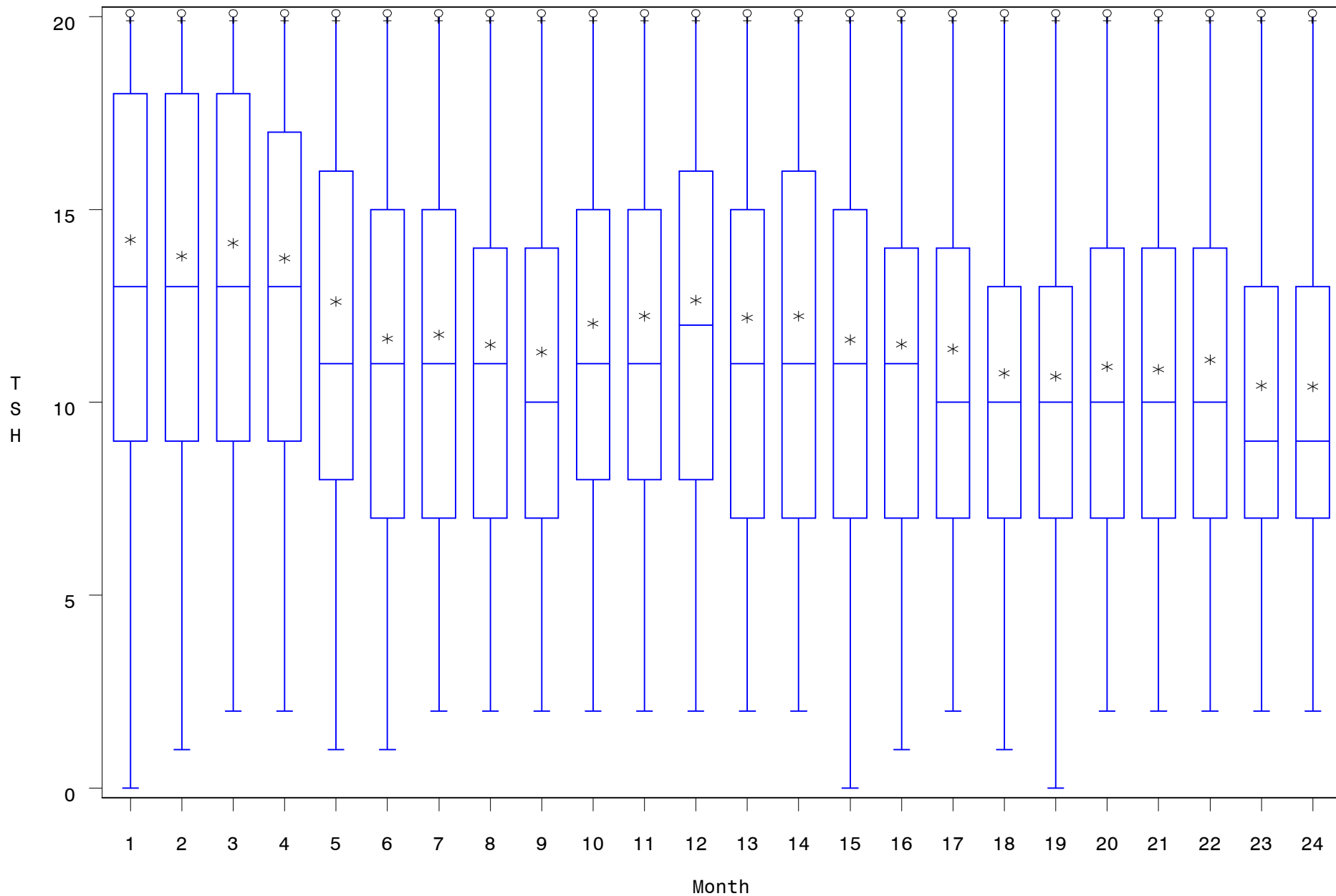
For the period Jan 2005 through Dec 2006



State "A" TSH Values by Month

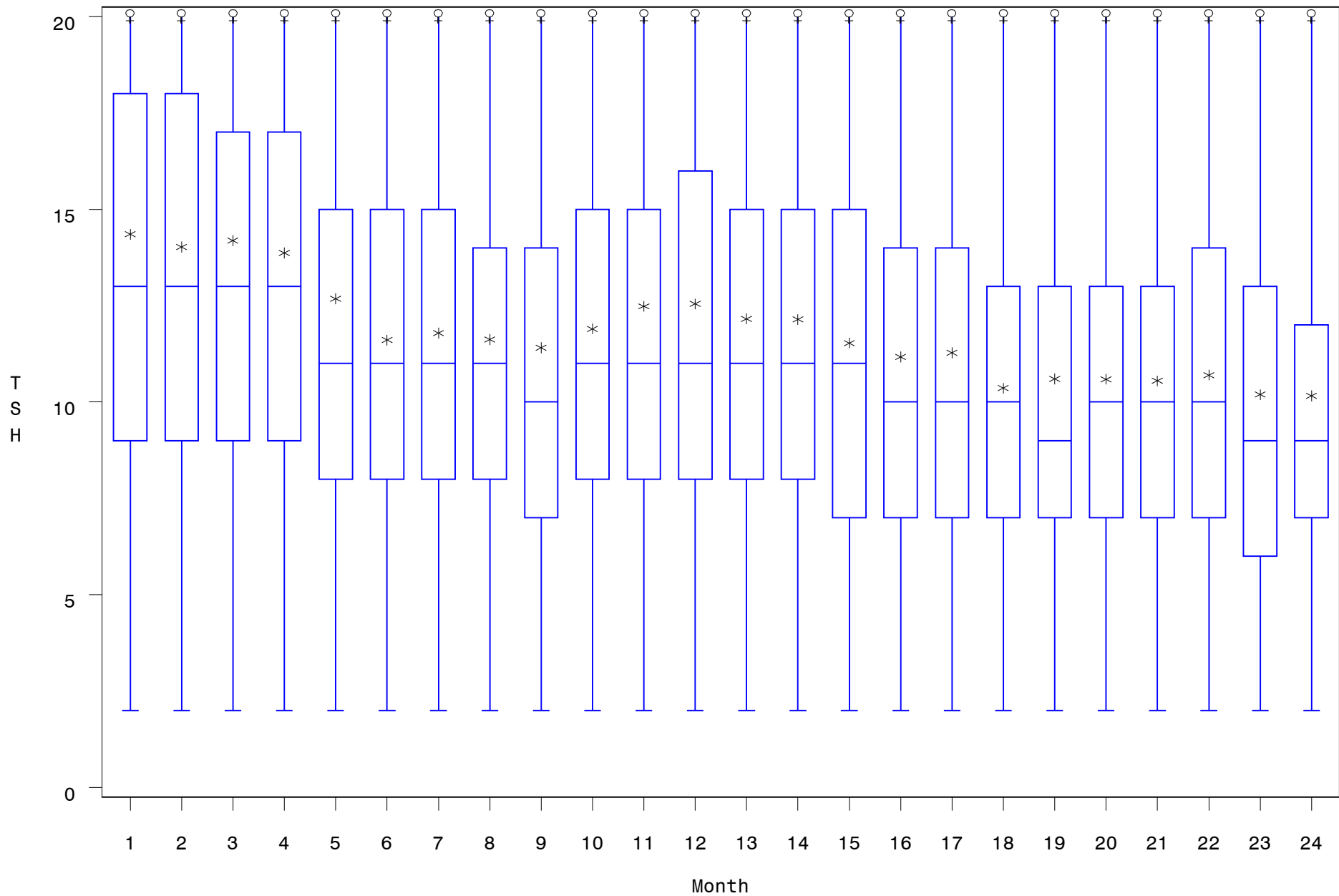
For the period Jan 2005 through Dec 2006

All cases collected within 14 days



State "A" TSH Values by Month

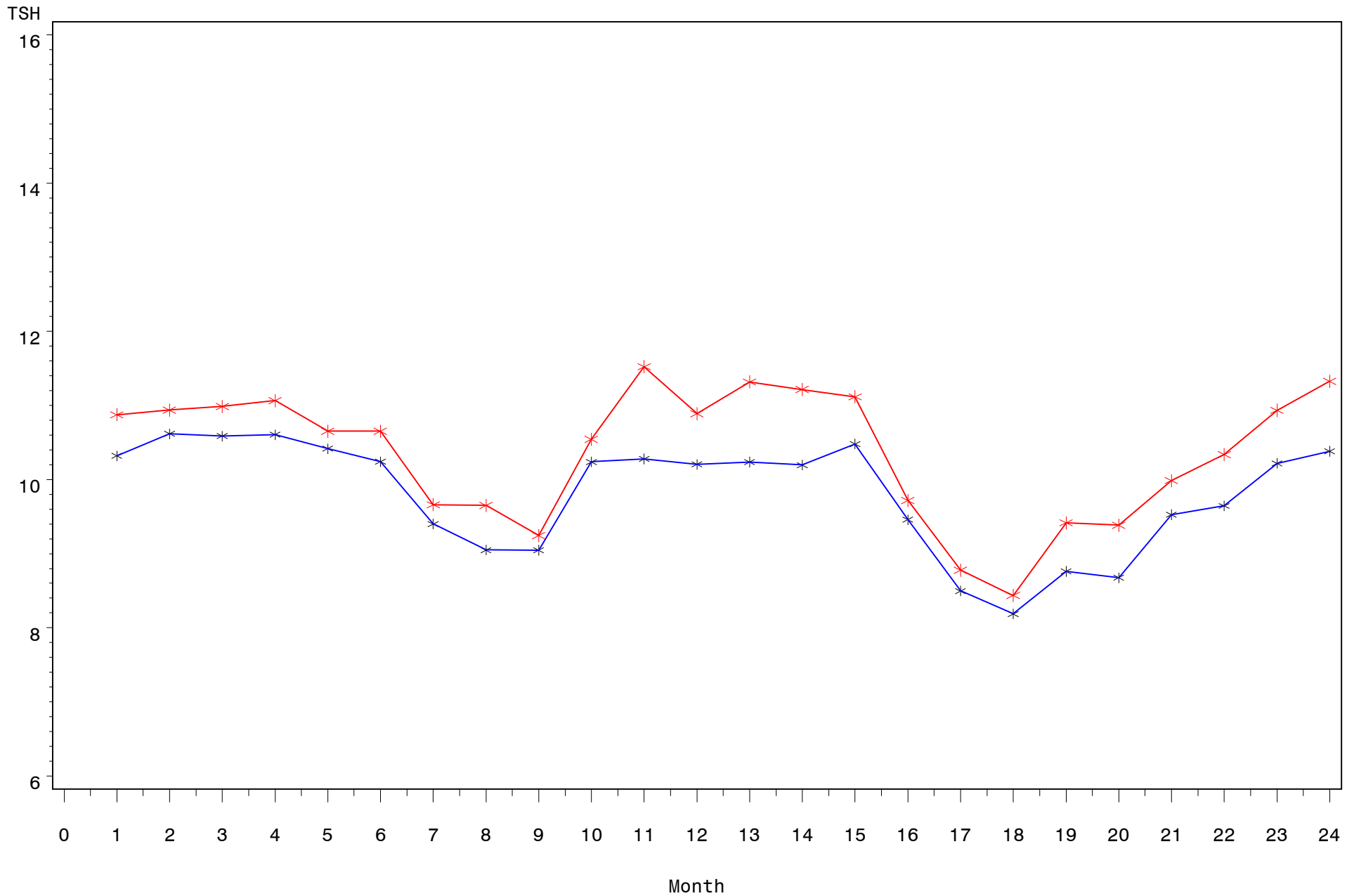
For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



State “B”

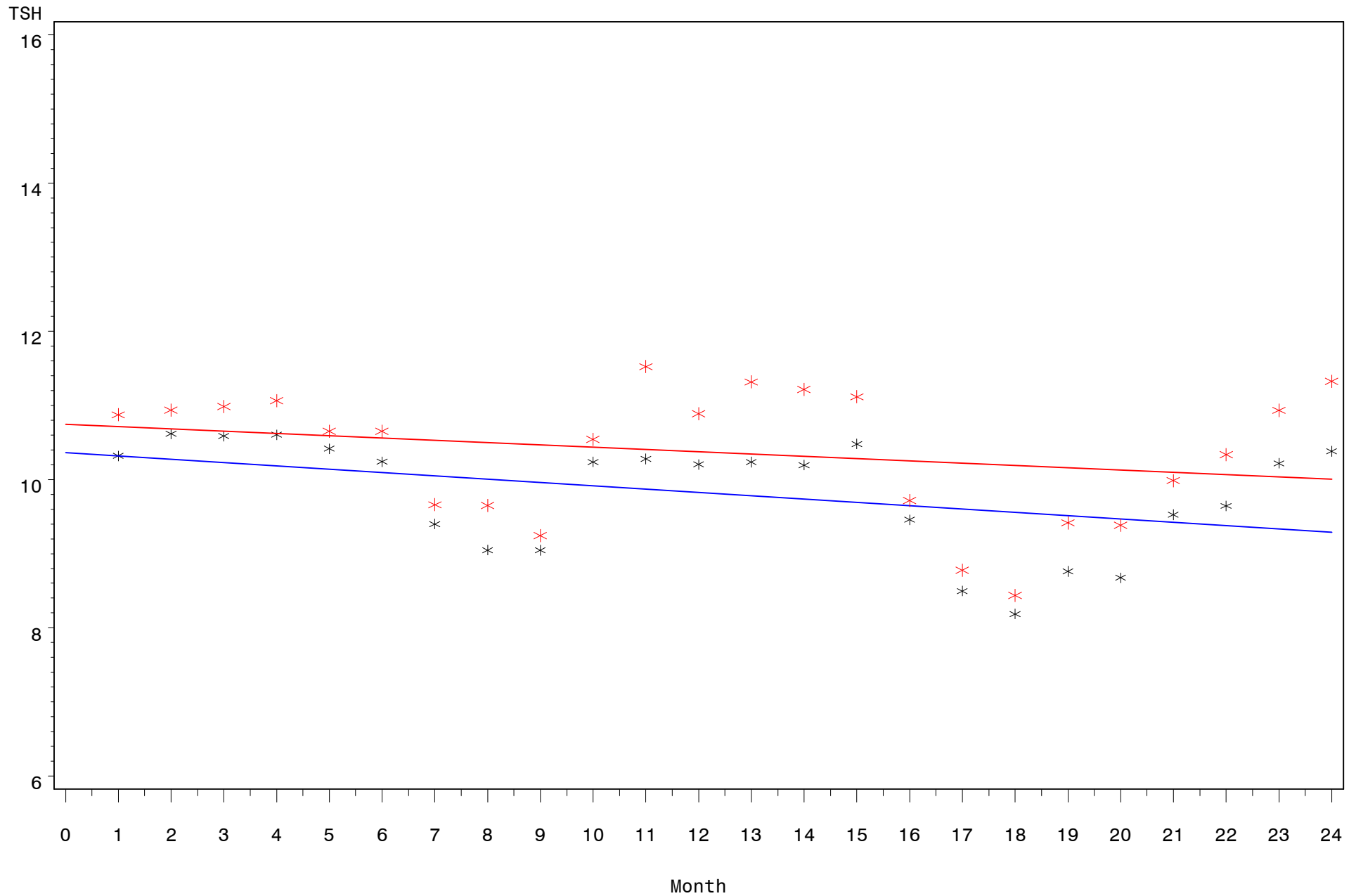
State "B" TSH Means by Month

For the period Jan 2005 through Dec 2006



State "B" TSH Means by Month

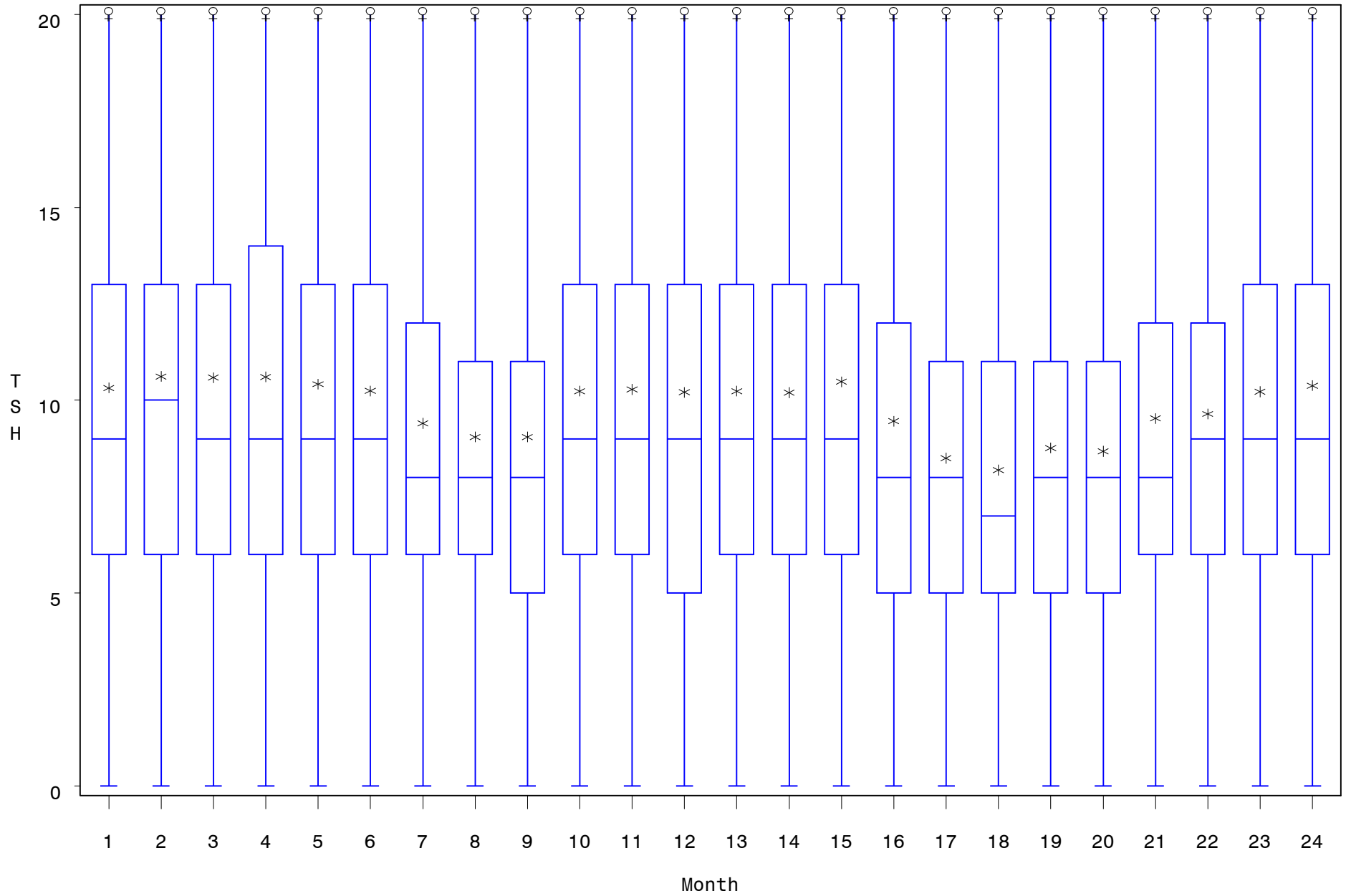
For the period Jan 2005 through Dec 2006



State "B" TSH Values by Month

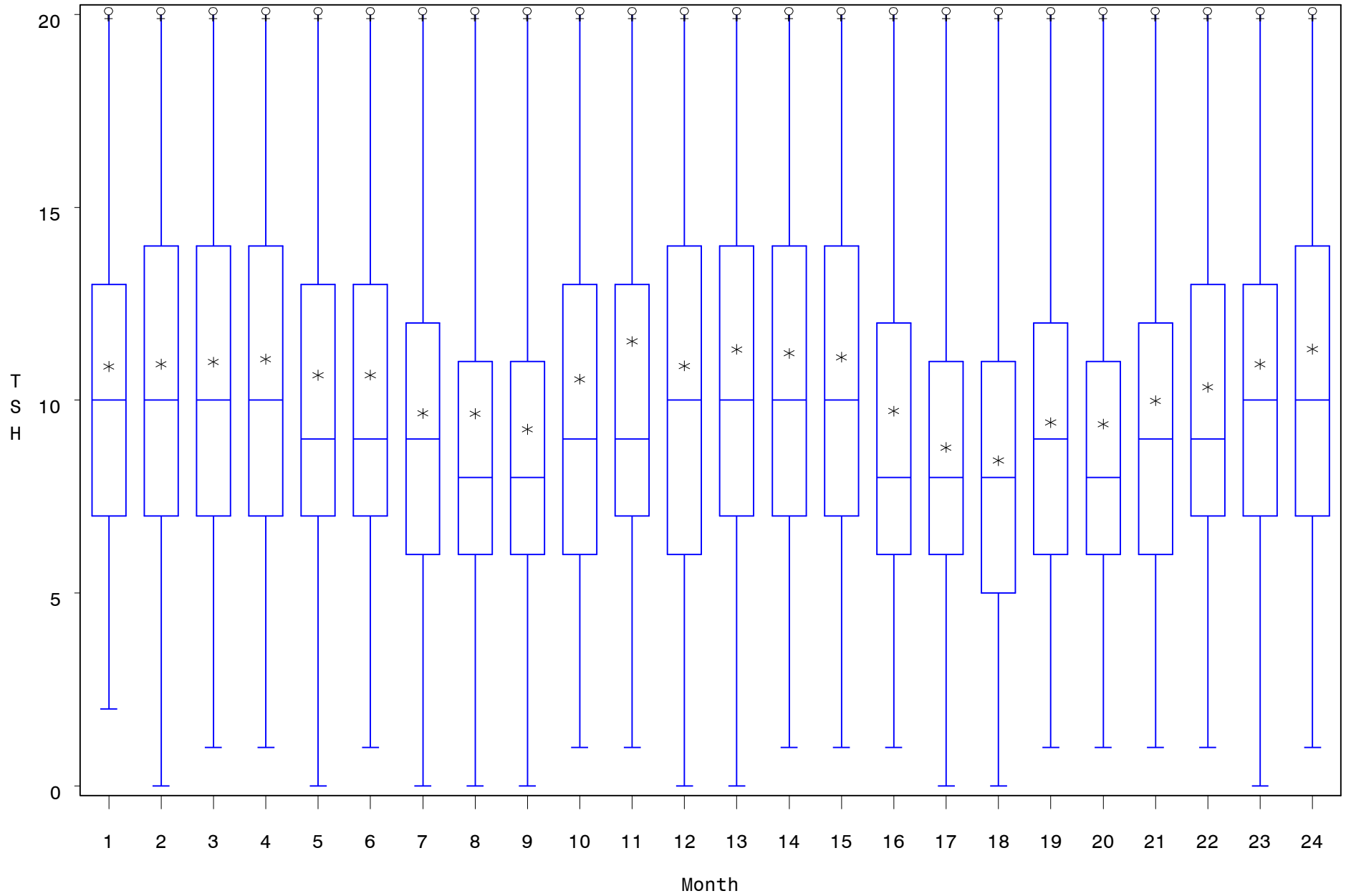
For the period Jan 2005 through Dec 2006

All cases collected within 14 days



State "B" TSH Values by Month

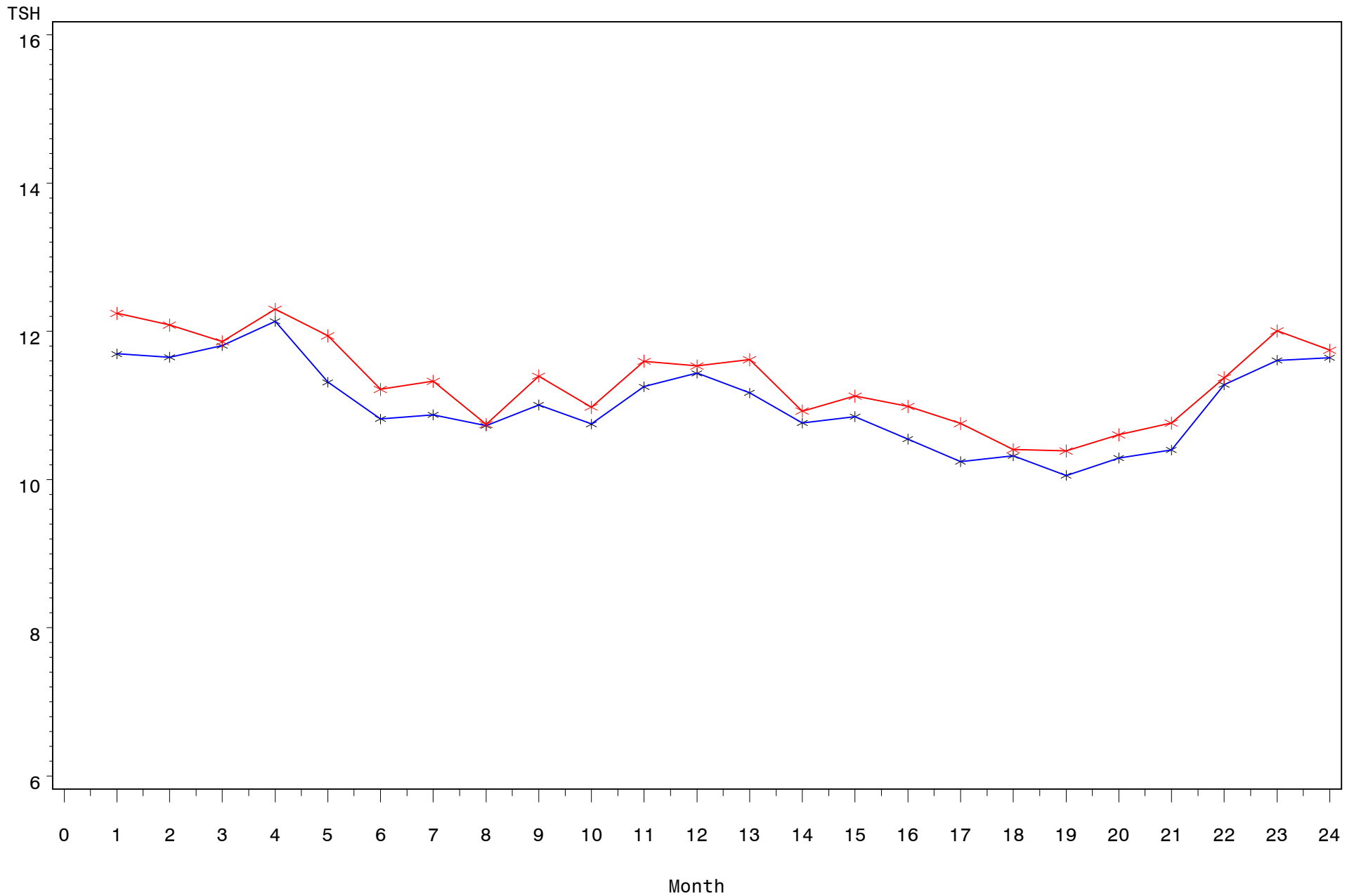
For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



State “C”

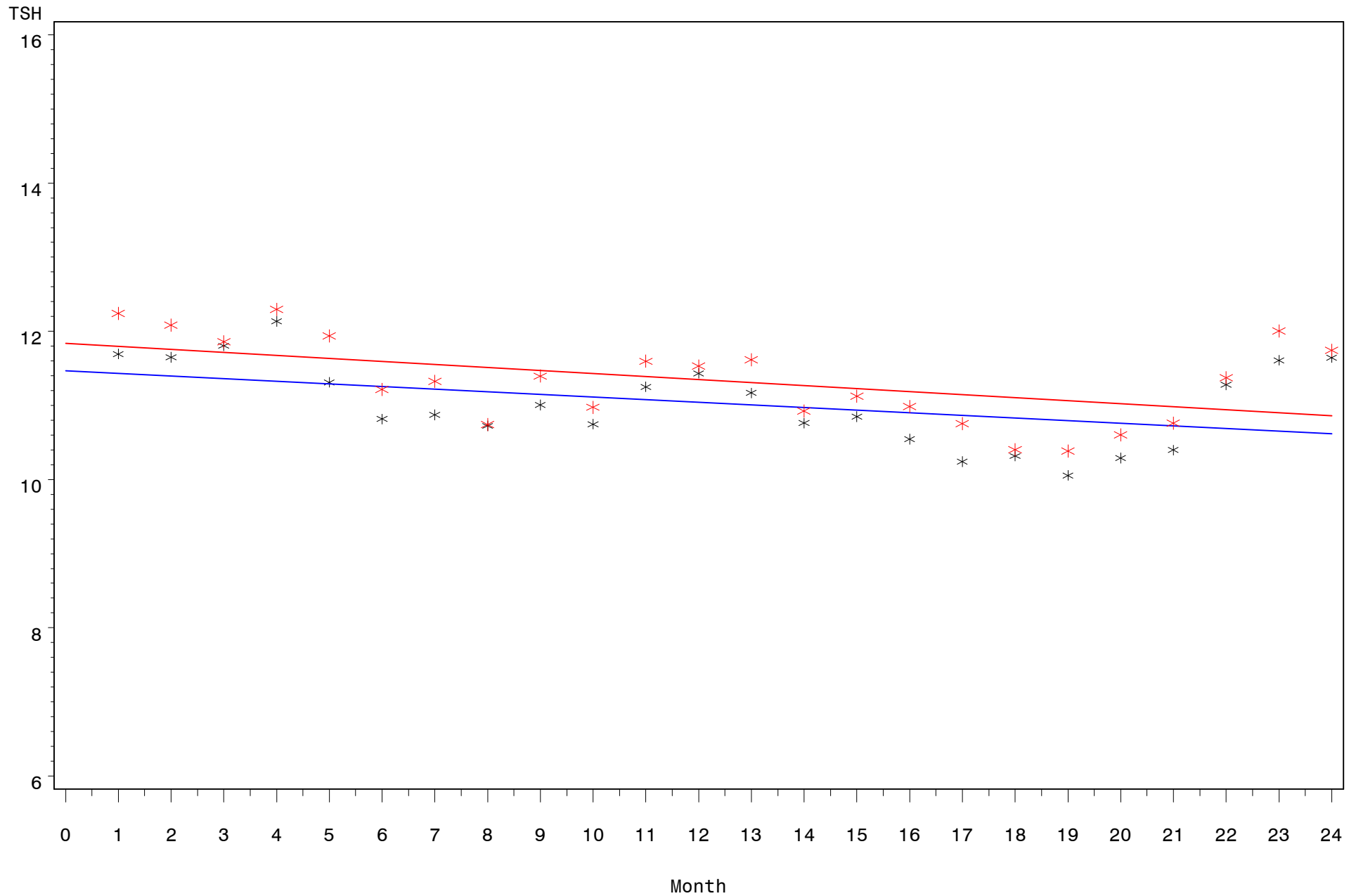
State "C" TSH Means by Month

For the period Jan 2005 through Dec 2006



State "C" TSH Means by Month

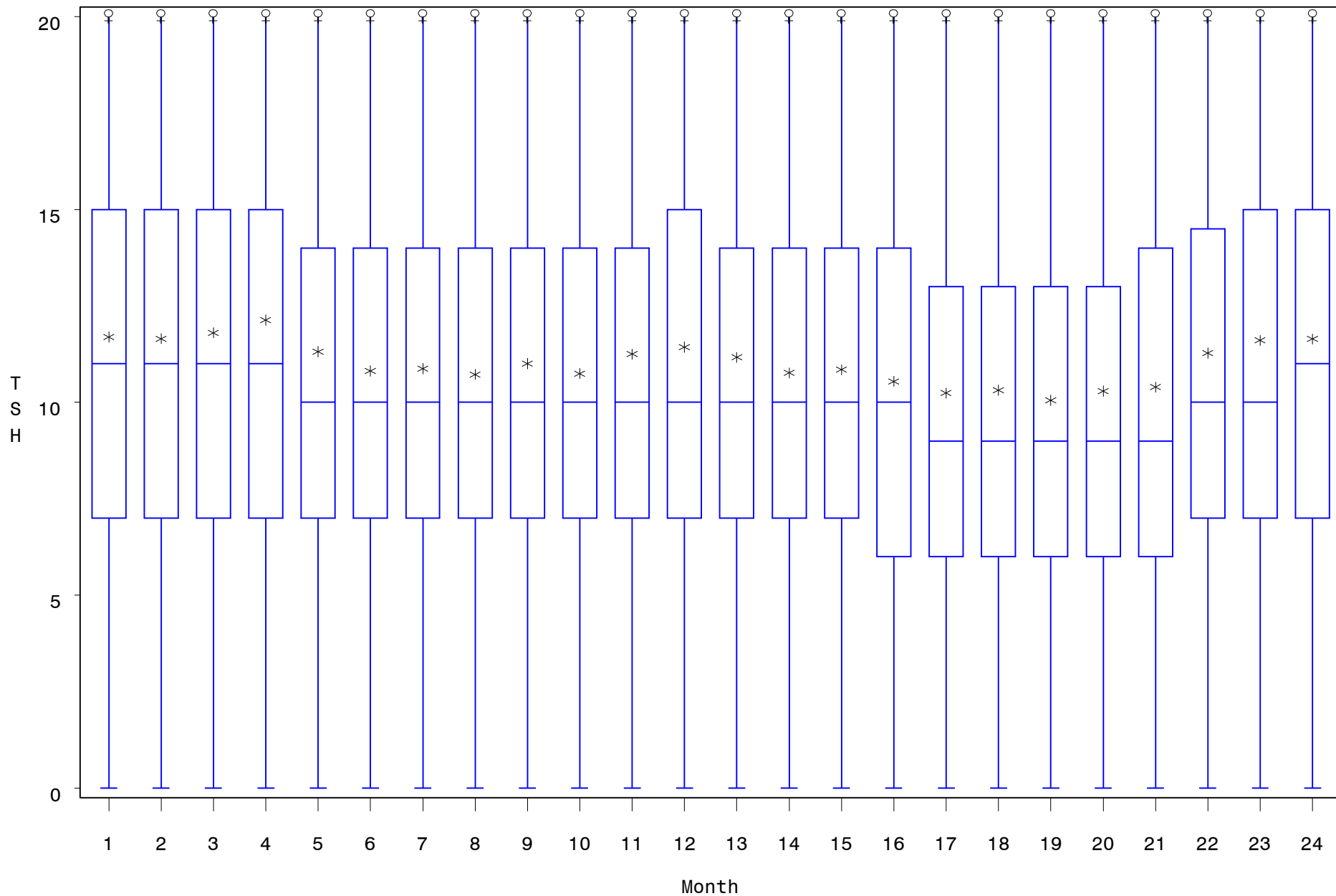
For the period Jan 2005 through Dec 2006



State "C" TSH Values by Month

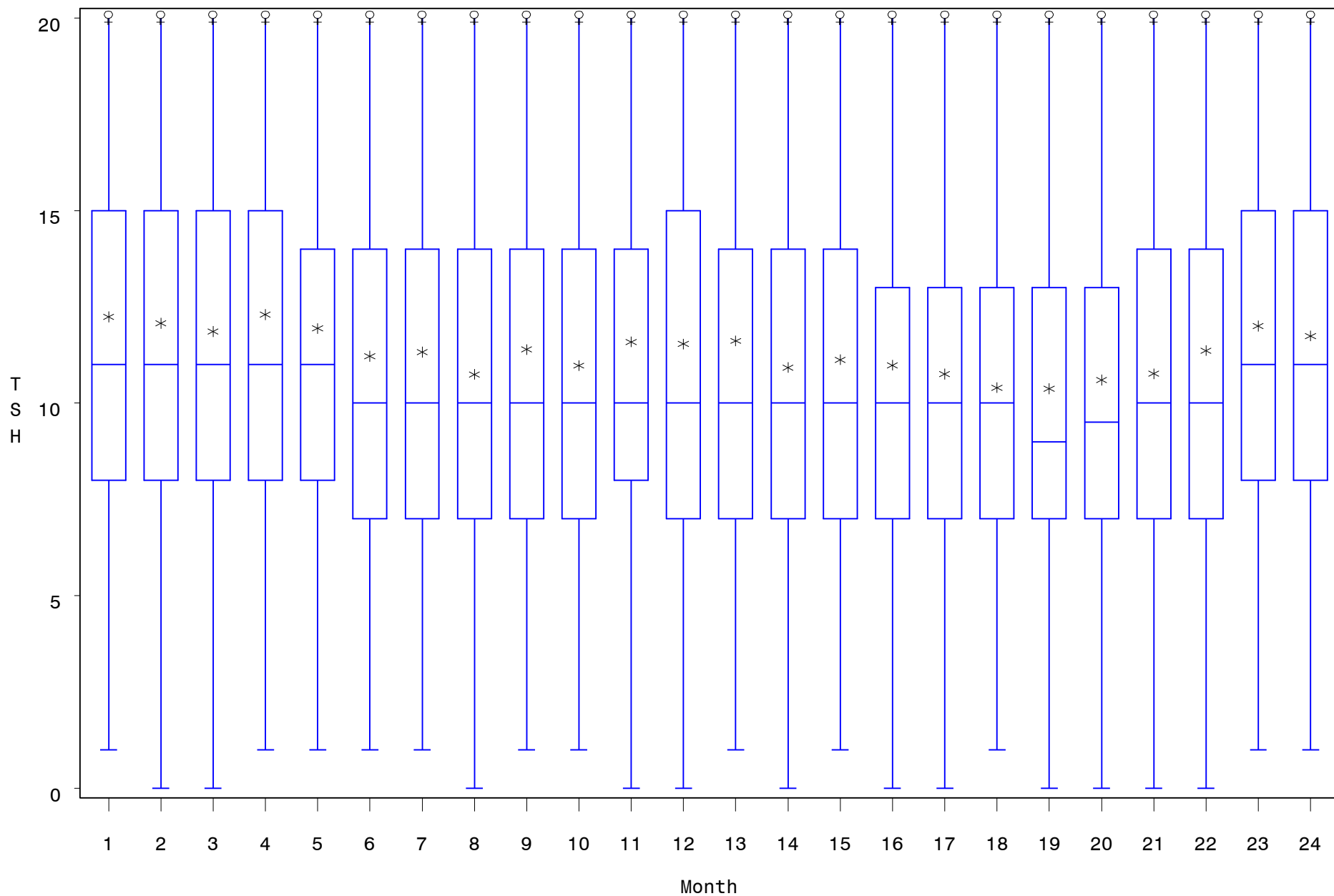
For the period Jan 2005 through Dec 2006

All cases collected within 14 days



State "C" TSH Values by Month

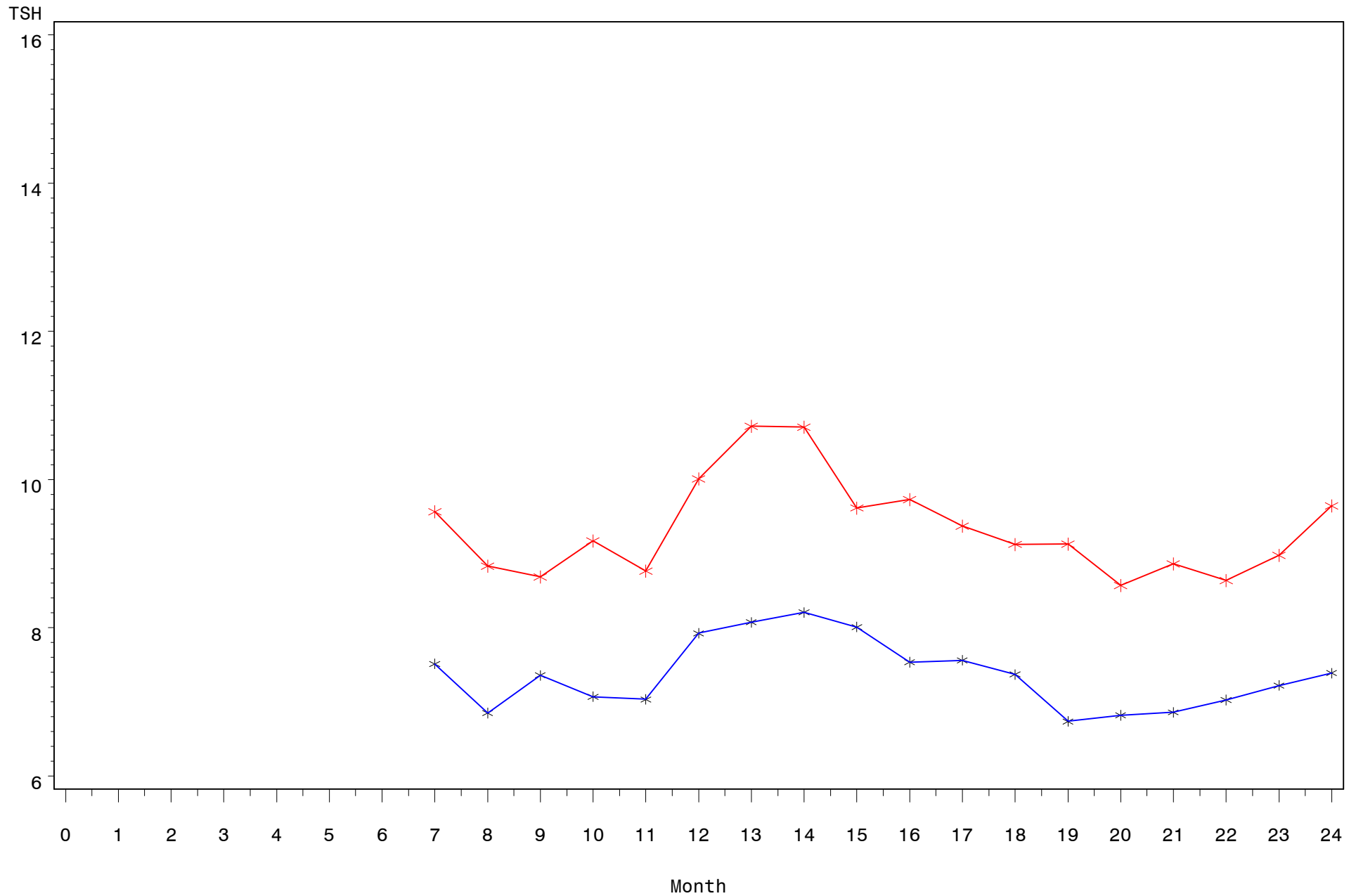
For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



State “D”

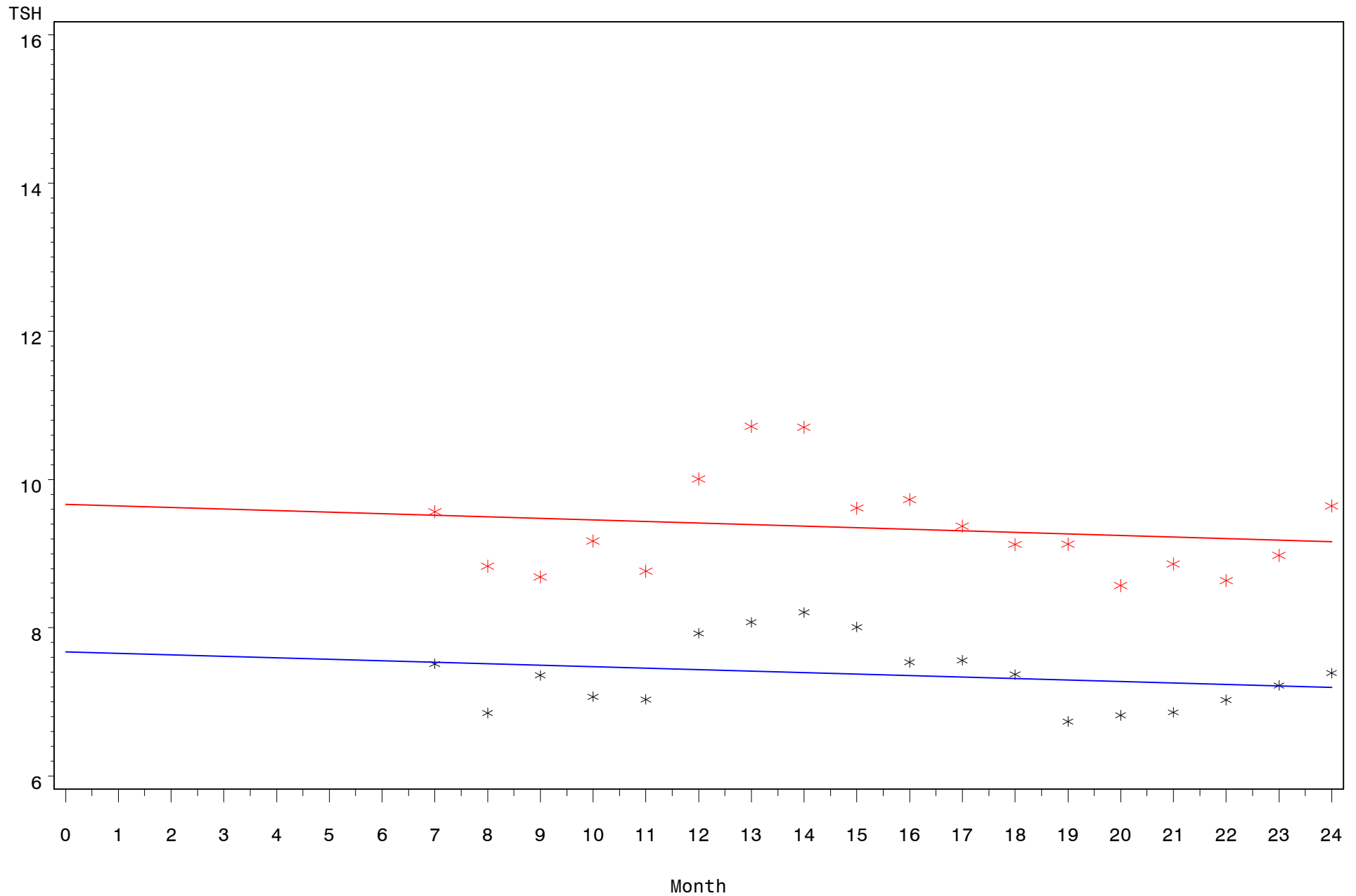
State "D" TSH Means by Month

For the period Jan 2005 through Dec 2006



State "D" TSH Means by Month

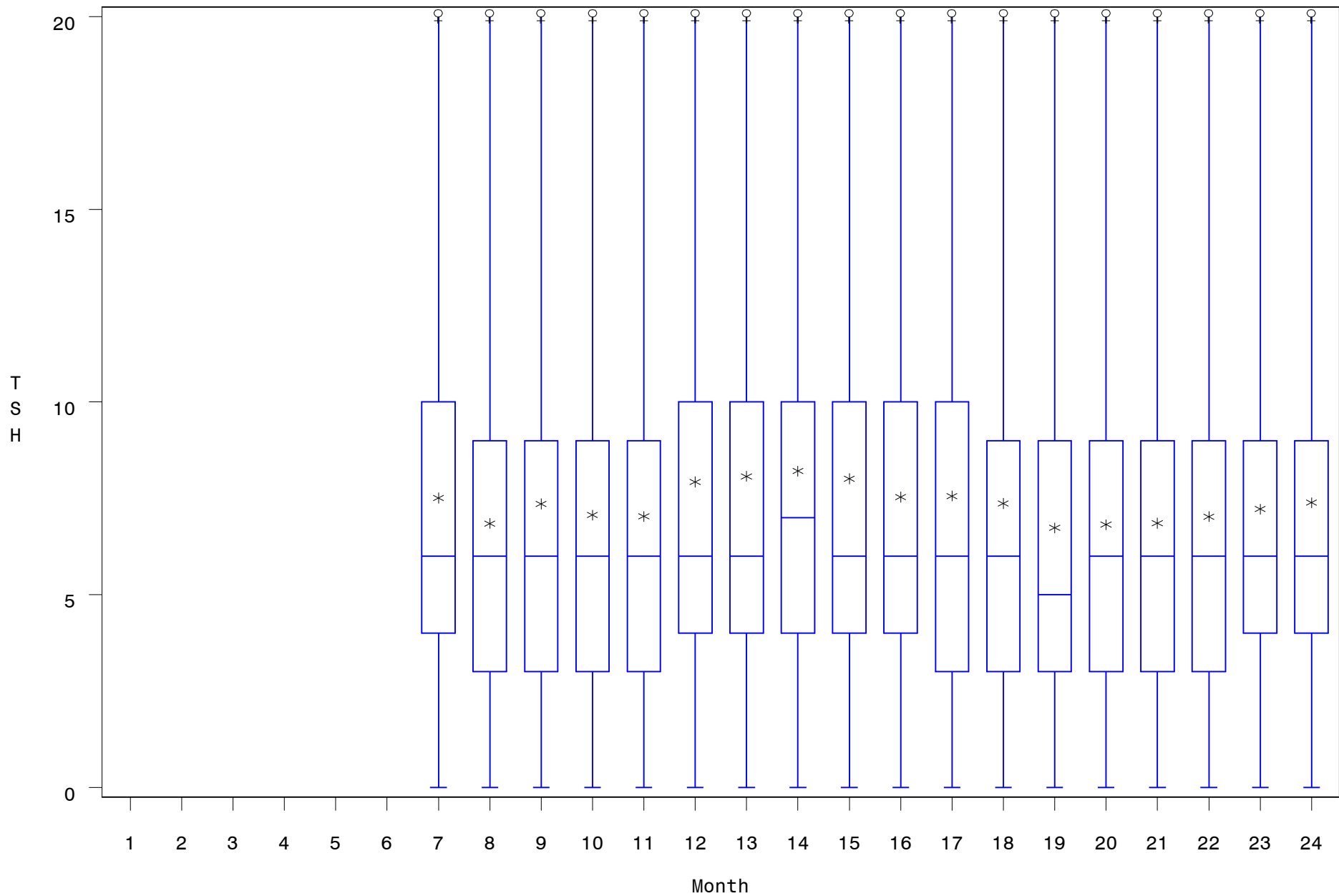
For the period Jan 2005 through Dec 2006



State "D" TSH Values by Month

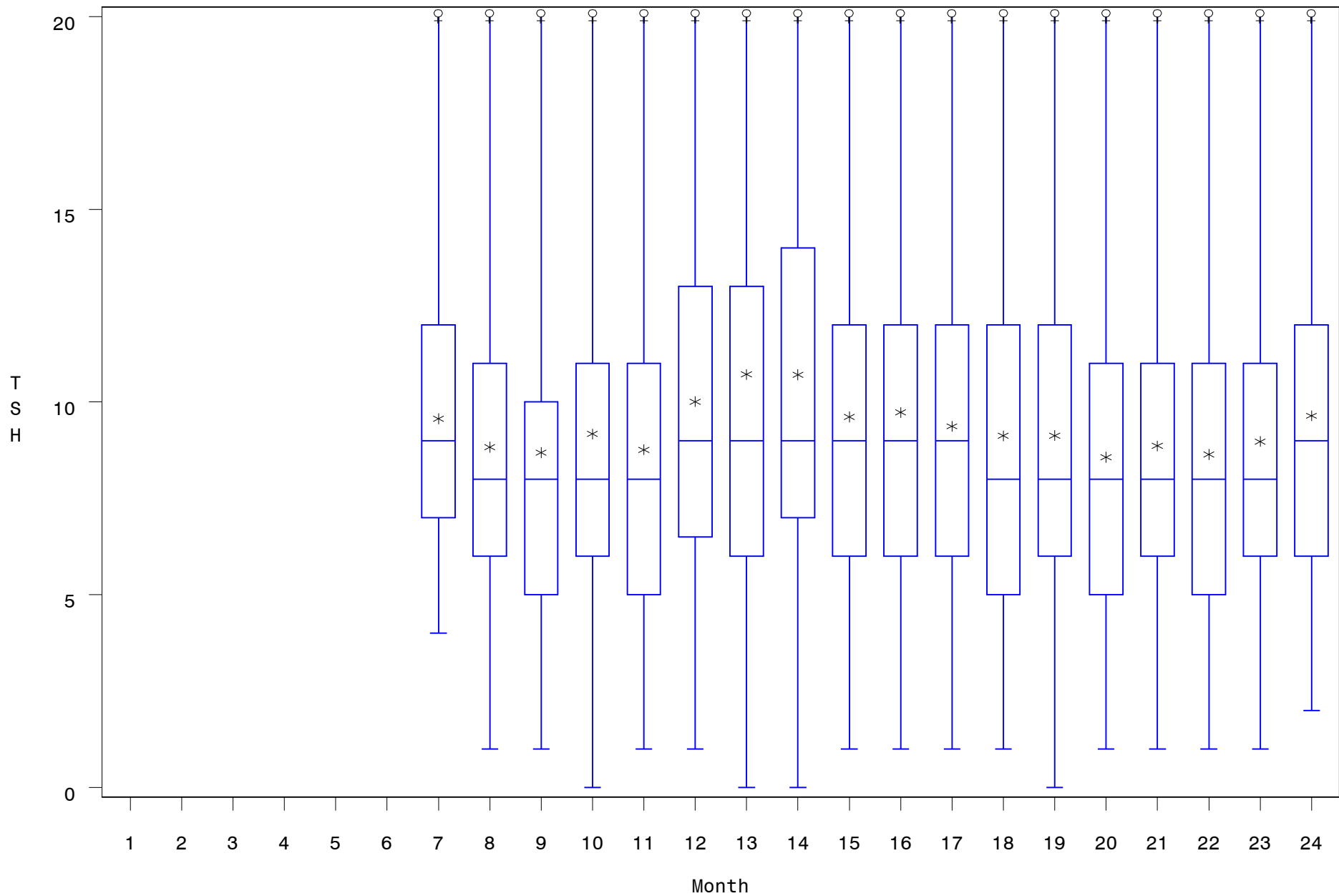
For the period Jan 2005 through Dec 2006

All cases collected within 14 days



State "D" TSH Values by Month

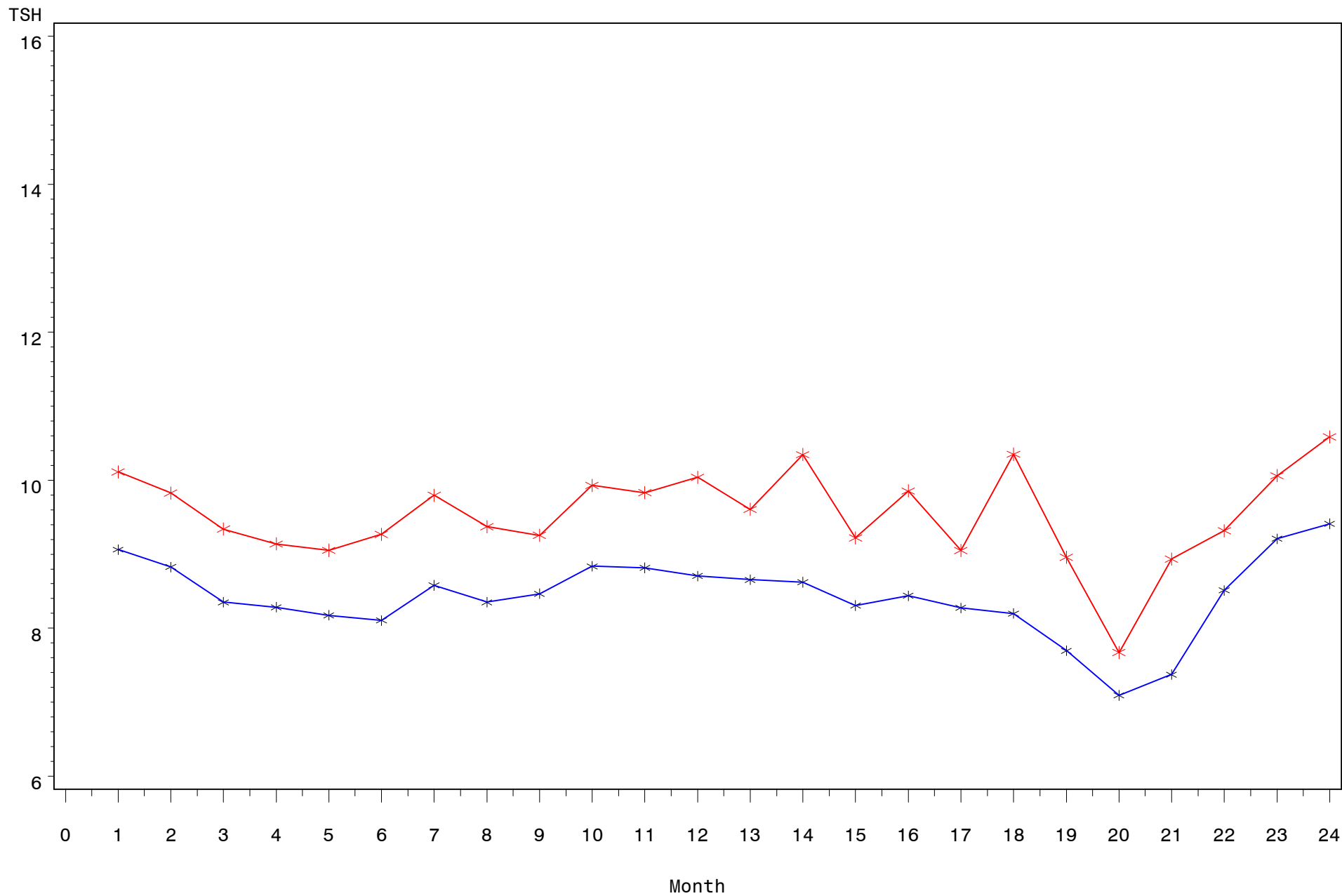
For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



State “E”

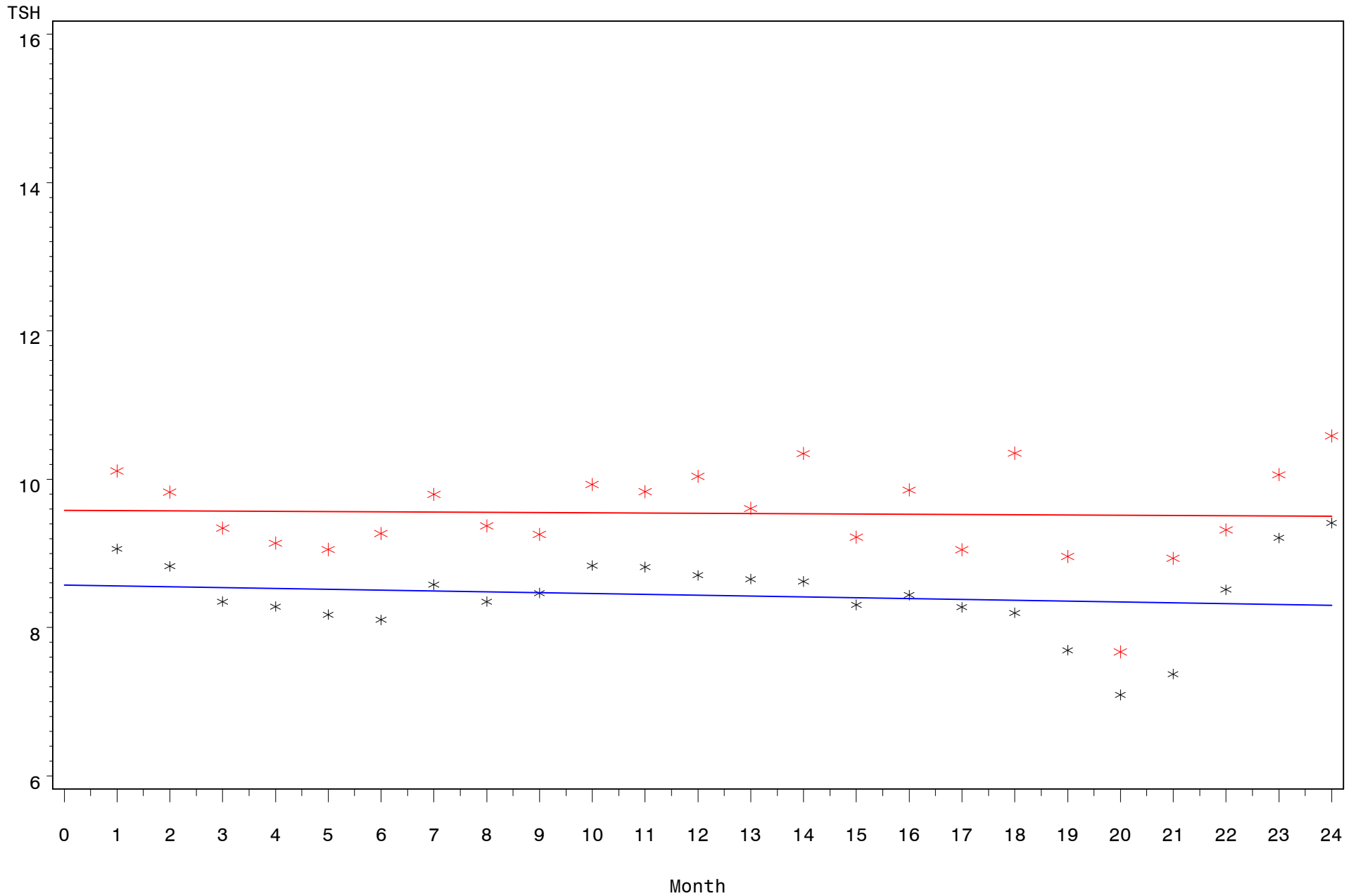
State "E" TSH Means by Month

For the period Jan 2005 through Dec 2006



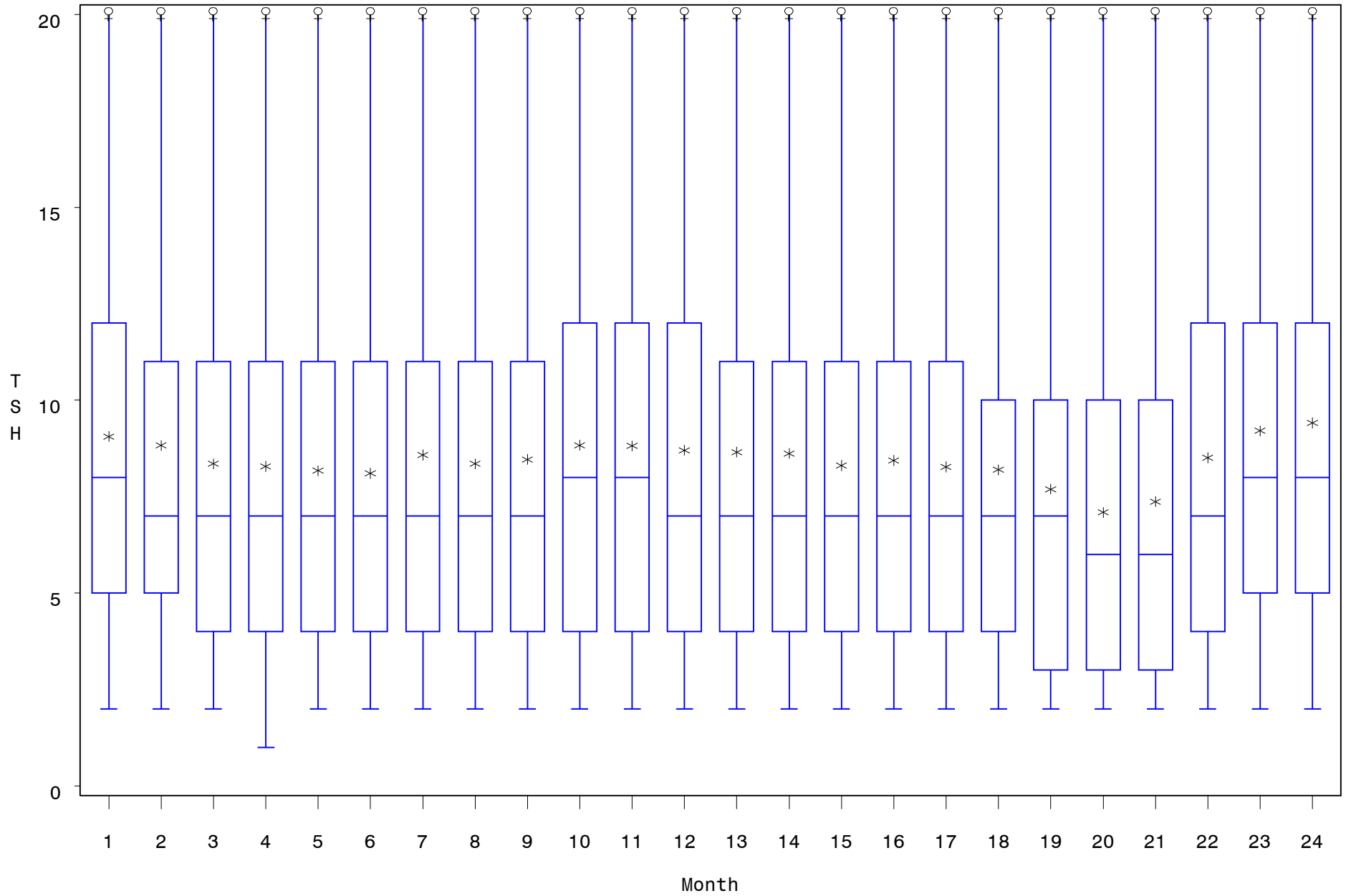
State "E" TSH Means by Month

For the period Jan 2005 through Dec 2006



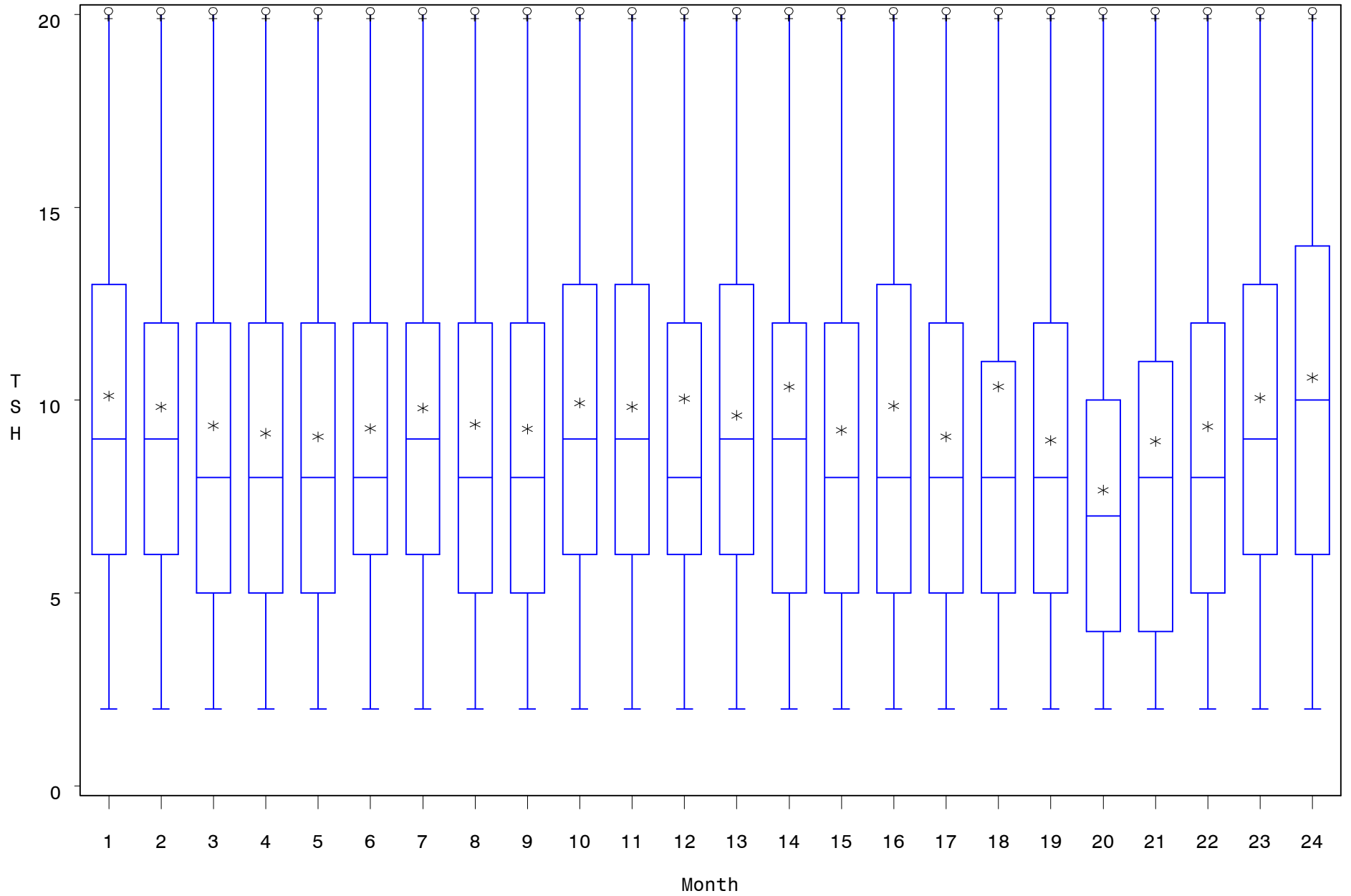
State "E" TSH Values by Month

For the period Jan 2005 through Dec 2006
All cases collected within 14 days



State "E" TSH Values by Month

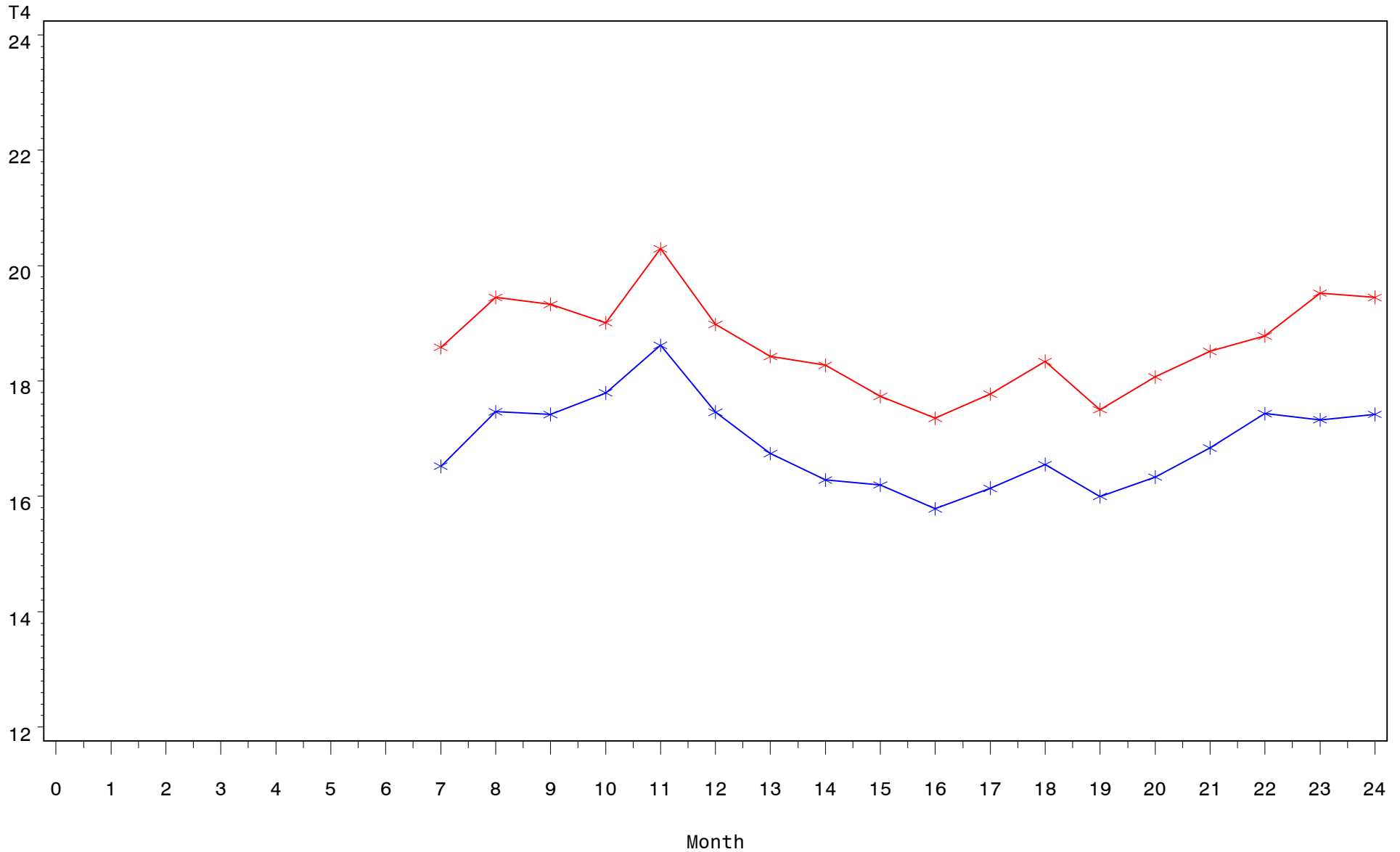
For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



T4

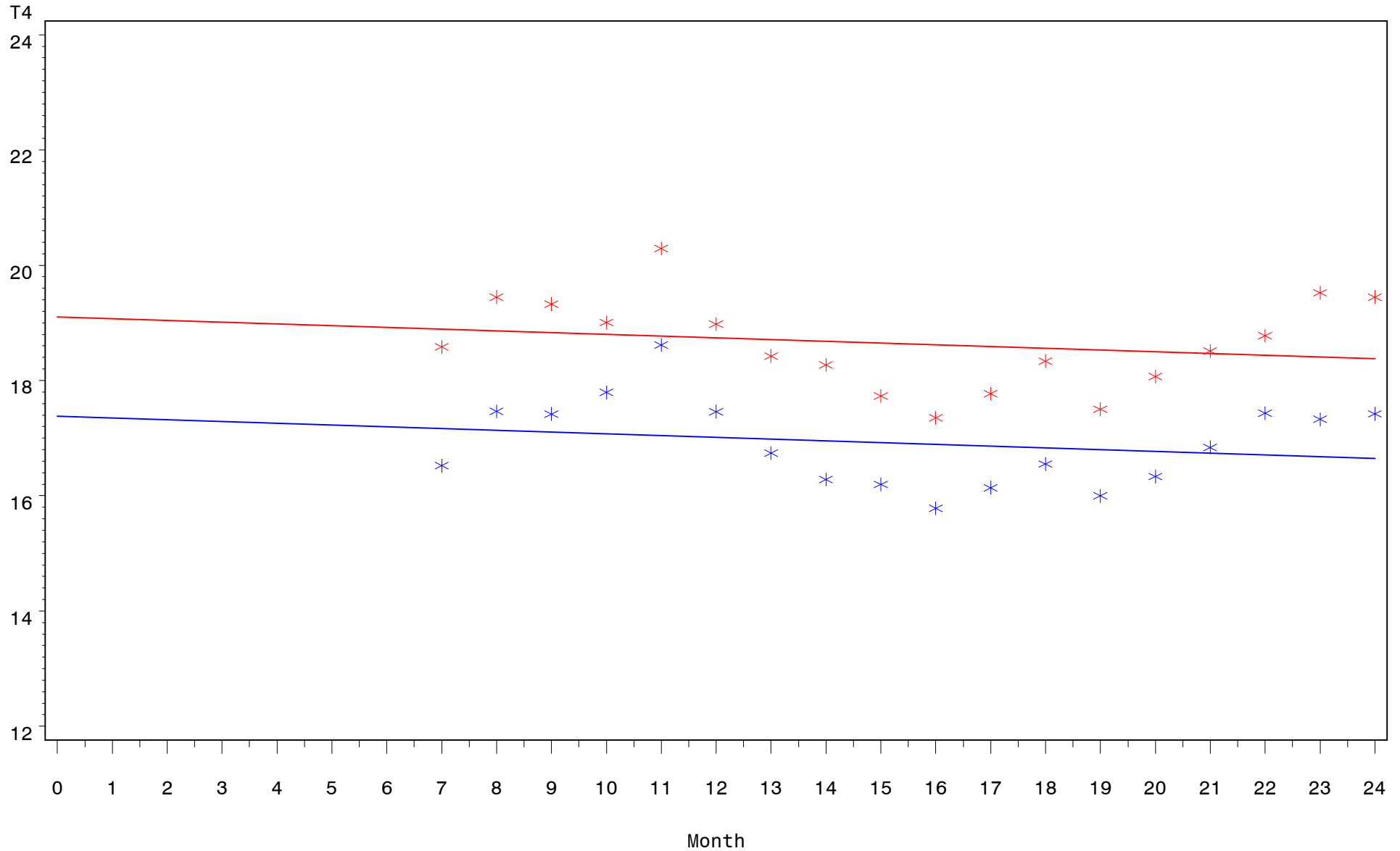
State "D" T4 Means by Month

For the period Jan 2005 through Dec 2006



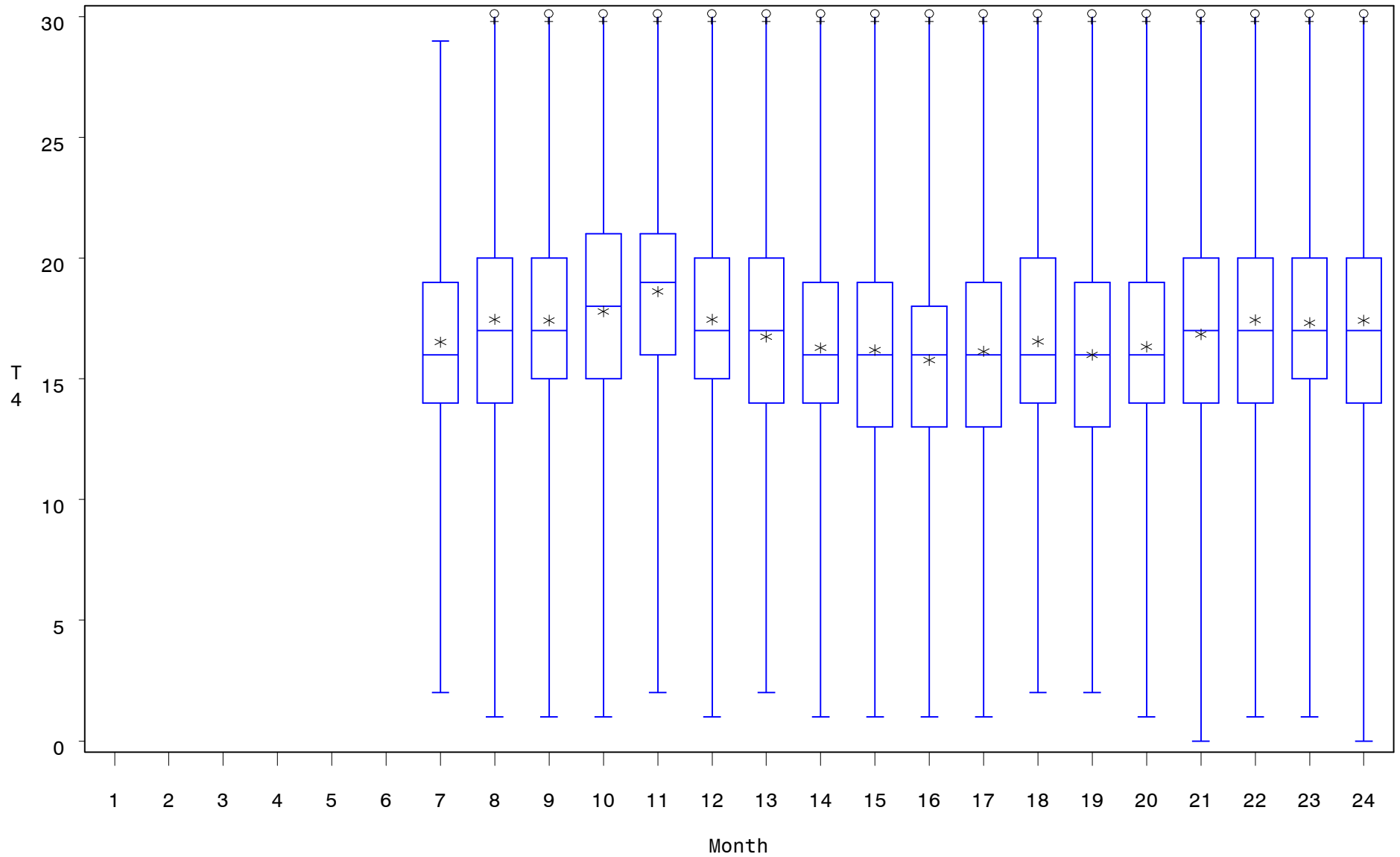
State "D" T4 Means by Month

For the period Jan 2005 through Dec 2006



State "D" T4 Values by Month

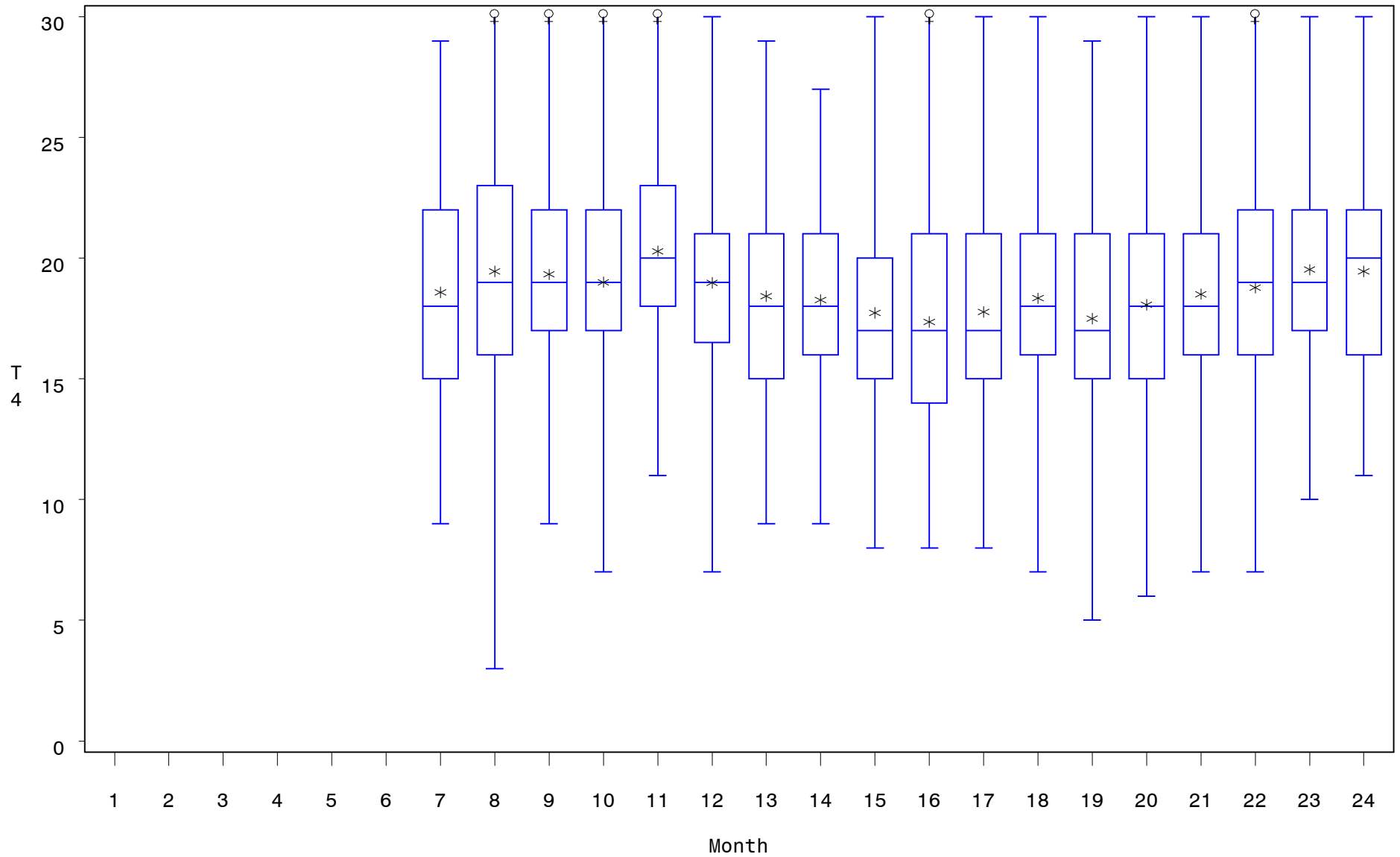
For the period Jan 2005 through Dec 2006
All cases collected within 14 days



♀ 17 boxes clipped

State "D" T4 Values by Month

For the period Jan 2005 through Dec 2006
Selected cases collected within 14 days



♀ 6 boxes clipped

C

For Discussion Purposes Only
Congenital Hypothyroidism and Congenital Adrenal Hyperplasia Algorithms and Screening Metrics
2002-2006

Endocrine Project Report
Region 4 Genetics Collaborative
May 1, 2008
Okemos, Michigan

William Young, Ph.D.
Charles J. Mundt, M.A.

Preliminary Results

Region 4 CH Algorithm and Screening Metrics

	Method	Positive Criteria Hrs	TSH	T4	Year	Births	Total +	+/1000	S +	B +	Cases	Det. Rate	PPV %	False + rate	
Michigan final	Auto Delfia TSH Only 2004-2006 2002-2006	24-36 37-167 168-743 >743	>33 >=50 S+ >24 >=50 S+ >13 >=50 S+ >9 >=50 S+		2002	128689	6260		-----	-----		108	1/1192	2	4.78
					2003	129889	4964		-----	-----		88	1/1476	2	3.75
					2004	126789	1407		178	1229	67	1/1892	5	1.06	
					2005	124942	1362		172	1190	72	1/1735	5	1.03	
					2006	123095	694		156	538	49	1/2512	7	0.52	
						633404	14687	23.2			384	1/1649	3	2.26	
Wisconsin final	AutoDelfia TSH Only 0-25 26-96 96-14days 14+days	>=37 >50 S+ >=30 >50 S+ >=17 >17 S+ >=15			2002	67408	333		85	248	32	1/2107	10	0.45	
					2003	68893	371		72	299	43	1/1602	12	0.48	
					2004	68472	410		85	325	58	1/1181	14	0.51	
					2005	68606	324		62	262	42	1/1632	16	0.32	
					2006	68739	348		80	268	45	1/1528	13	0.44	
						342118	1486	4.3			220	1/1555	15	0.37	
Minnesota final	AutoDelfia TSH Only 0-26 27-48 49-168 >168	>=37 >=30 >=23 >10			2002	68064	470		32	438	28	1/2431	6	0.65	
					2003	69999	291		41	250	32	1/2187	11	0.37	
					2004	70259	291		36	254	20	1/3513	7	0.39	
					2005	71058	246		38	208	34	1/2090	14	0.30	
					2006	73473	190		55	135	34	1/2161	18	0.21	
						352853	1488	4.2			148	1/2384	10	0.38	
Illinois final	AutoDelfia TSH Primary T4 Secondary	All	1. >53 2. Top 3% 3. Top 0.5% and<54 4. Not in top 0.5% but 36-54 5. Top 0.5%	<5 5-7.99	2003	179082	1382		184	1198	84	1/2132	6	0.72	
					2004	177417	1337		167	1170	89	1/1993	7	0.70	
					2005	176089	1337		165	1172	93	1/1893	7	0.71	
					2006	174975	1341		142	1199	96	1/1823	7	0.71	
						707563	5397	7.6			362	1/1955	7	0.71	
Indiana final	AutoDelfia TSH/T4 primary	All	>25.5	<5.0	2002	85506	2427		44	2383	32	1/2672	1	2.80	
					2003	87115	2459		42	2417	29	1/3004	1	2.79	
					2004	85923	2290		50	2240	29	1/2963	1	2.63	
					2005	85570	2164		55	2109	41	1/1990	2	2.48	
					2006	89786	1848		40	1808	32	1/2806	2	2.02	
						433900	11188	25.8			163	1/2662	1	2.54	
Ohio final	AutoDelfia <=48 >48 All	>28 >34 >50		<=8 <=8 Any value	2002	149247	1376		224	1152	83	1/1798	6	0.87	
					2003	149670	1539		244	1539	88	1/1701	6	0.97	
					2004	149269	1177		173	1006	72	1/2073	6	0.74	
					2005	148458	1039		185	859	75	1/1979	7	0.65	
					2006	150814	1178		209	976	74	1/2038	6	0.73	
						747458	6309	8.4			392	1/1907	6	0.79	
Kentucky	RIA	0-96 >96	>25 >20	<5	2002										
					2003										
					2004										
					2005										
					2006										
TOTALS						3,217,296	40,555	12.6			1,669	1/1928	4	1.21	

Region 4 CAH Algorithm and Screening Metrics

	Method	Wt/Age Criteria	Cut-off	Year	Births	Total +	Total + /1000	S+	B+	Cases	Det. Rate	PPV %	False + %
Michigan final	AutoDelfia TMS 2 nd Tier final	All weights <=12 hrs or <2500 >12 hrs & >2500	>=150 >=110	2004	126789	322		78	244	7	1/18713	2	0.25
				2005	124942	844		322	522	6	1/20284	1	0.67
				2006	123095	694		267	447	3	1/41032	0	0.56
					374826	1860	5.0			16	1/23427	1	0.49
Wisconsin final	AutoDelfia final	>=2200g 1700-2199 <1699	>=86 >=105 >=190	2002	64408	116		18	98	1	1/64408	1	0.18
				2003	68893	134		27	107	4	1/17223	3	0.19
				2004	68472	72		12	60	2	1/34236	2	0.50
				2005	68606	349		62	287	5	1/13721	1	0.50
				2006	68739	277		46	231	2	1/34370	2	0.40
	339118	948	2.8			14	1/24223	1	0.28				
Minnesota final	AutoDelfia TMS 2 nd tier final	>=2200g 1600-2199 1099-1599 >1099	>=65 >=112 >=146 >=175	2002	68064	419				18	1/3781	4	0.59
				2003	69999	340				1	1/69999	0	0.48
				2004	70259	162				3	1/23419	2	0.23
				2005	71058	48				3	1/23686	6	0.06
				2006	73473	47				4	1/18363	9	0.06
	352853	1016	2.9			29	1/12167	3	0.28				
Illinois final	AutoDelfia final	Term Upper 0.5% Outside 0.5% Premature: <2000g or <=36 wks.	>=48 >=60 >=100	2003	179082	1188		166	1022	6	1/29847	1	0.66
				2004	177417	933		164	769	7	1/25345	1	0.52
				2005	176089	1534		350	1184	10	1/17609	1	0.87
				2006	174975	2212		475	1737	5	1/34995	0	1.26
	707563	5867	8.3			28	1/25270	0	0.83				
Indiana final	AutoDelfia final	>2500g 1500-2499 <1500	>=50 >=90 >=135	2002	85506	530		8	525	3	1/28502	1	.062
				2003	87115	496		16	480	6	1/14519	1	0.56
				2004	85923	268		6	262	3	1/28641	1	0.31
				2005	85570	1044		23	1021	5	1/17114	0	1.21
				2006	89786	728		21	727	2	1/44893	0	0.81
	433900	3066	7.1			19	1/22837	1	0.70				
Ohio	AutoDelfia final	<1500g 1501-2000 2001-2500 >2500	>250 >130 >100 >90	2003	84973	238				4	1/21243	2	0.28
				2004	149269	201				6	1/24848	3	0.13
				2005	148458	812				10	1/14846	1	0.54
				2006	150814	1102				10	1/15081	1	0.72
	533514	2353	4.4			30	1/17784	1	0.44				
Kentucky	AutoDelfia TMS 2 nd tier	<1500g 1500-2500 >2500	<90 <70 <50										
TOTAL					2,741,774	15,110	5.5			146	1/18779	1	0.55

A Project Report of the Michigan Newborn Screening Program

A pilot project to explore additional data sources for identification of false-negative cases of CH and CAH

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The Endocrine project of the Region 4 Genetics Collaborative conducted a meeting of endocrinologists and state newborn screening laboratory and program personnel in May 2007. At the meeting, attendees discussed the difficulty of identifying false negatives for the newborn screening endocrine disorders, Congenital Hypothyroidism (CH) and Congenital Adrenal Hyperplasia (CAH). When Newborn Screening Programs (NBS) modify their screening algorithms to decrease the rate of false-positives and increase positive-predictive-value the program's ability to accurately determine the false-negative rate increases in importance.

Much of the current awareness of false-negative cases is a result of physician reports of late diagnosed cases of CH or CAH to the NBS program. Other attendees knew of national efforts to identify possible false-negative cases by surveying endocrinologists and asking for information regarding cases that were detected outside of the NBS process. Attendees felt that there might be other useful databases that would assist in identifying false-negative cases.

The Michigan Newborn Screening Program screens approximately 125,000 babies per year and for the endocrine tests uses:

1. For CAH, evaluates 17-OHP and incorporates as a second tier a steroid profile conducted at the Mayo's Biochemical Genetics Laboratory in Rochester, MN; and
2. For CH, uses a primary TSH screen but does not evaluate T4 as a component of the initial screen.

After the meeting, Michigan NBS program staff identified several possible useful data sources that might contain information that would identify false-negatives. One such source was Michigan's Children's Special Health Care Services Program (CSHCS). CSHCS provides funding and case management for approximately 35,000 children enrolled in the program.

The CSHCS linked files for 2005 and 2006 were searched and 8 CAH cases and 33 CH cases were identified. These cases were then matched to the newborn screening database.

All 8 CAH cases were previously screened and diagnosed by the newborn screening program.

Of the 33 CH cases found in the CSHCS linked files, 31 were in the NBS database and 2 were not. CSHCS case reviews found that the 2 cases not in the NBS database were born out-of-state.

Of the 31 CH cases in the NBS database, 22 had abnormal CH screens and were diagnosed with CH. The remaining 9 had normal initial CH screens. A review of the 9 cases found that 8 of the 9

were in the NICU and 1 was a home birth. Of the 8 NICU cases, 2 had evidence of Down Syndrome, 1 had neurosurgery shortly after birth, and one died at approximately 7 months of non-CH related conditions.

This review of a significant cross section of Michigan's children with disabilities, suggests that most cases of CH missed by NBS (false negatives) are associated with NICU births and two had Down Syndrome. This is not surprising in view of the known association between both prematurity and Down Syndrome and delayed TSH rise in cases of CH. It is significant that, with the exception of the home birth, none of the missed cases were non-NICU newborns. These observations also confirm the need for Michigan's recently implemented program of repeat screening of newborns in the NICU at 14 and 30 days. Since the start of NICU re-screening in March 2007, 5 cases of CH have been diagnosed in the NICU based on an abnormal re-screen following an initial normal screen.

A rough estimate of the resources required to conduct this activity is as follows:

Newborn quality assurance coordinator	4 hours
CSHCS epidemiologist	4 hours
Medically trained epidemiologist	4 hours
Newborn screening program manager	1 hour

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