Supplement to Criteria to Reevaluate Cutpt

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When assessing previously determined cut points using in-study baseline samples or for a new population, it is a good practice not to change too hastily when the sample size is small. Tan et al. (2020) provided distribution-free criteria on when the inherent sampling variability cannot be ruled out for the apparent deviation from the target rate. Here, I seek to document the calculations performed for Tan et al. (2020), and provide the detailed criteria for different sample sizes in a data listing to assist the use of the paper in practice.

Calculations behind Table 1

```
source("Funs.R")
tab1t1 <- CalcLmt(size=c(50,100,150,200,250,300,400,500), pct=0.95)
tab1t1 <- data.frame(tab1t1, tablow=tab1t1$size-tab1t1$upper,
                     tabupp=tab1t1$size-tab1t1$lower)
tab1t1 <- data.frame(tab1t1, tabPlow=tab1t1$tablow/tab1t1$size*100,
                     tabPupp=tab1t1$tabupp/tab1t1$size*100)
tab1t1
```

```
  size lower upper outlow outupp tablow tabupp tabPlow tabPupp
1   50    45    50 0.0000 0.1000      0      5    0.00   10.00
2  100    91    98 0.0200 0.0900      2      9    2.00    9.00
3  150   138   147 0.0200 0.0800      3     12    2.00    8.00
4  200   185   195 0.0250 0.0750      5     15    2.50    7.50
5  250   232   243 0.0280 0.0720      7     18    2.80    7.20
6  300   279   291 0.0300 0.0700      9     21    3.00    7.00
7  400   373   387 0.0325 0.0675     13     27    3.25    6.75
8  500   467   483 0.0340 0.0660     17     33    3.40    6.60
```

The above and the below are the calculations for tier 1 and 2 cut points, respectively. The first column **size** and the last four columns appeared in Table 1 of Tan et al. (2020). These are

Acceptable Ranges. In other words, if the numbers of "positives" are within these ranges, the inherent sampling variability cannot be ruled out.

```
tab1t2 <- CalcLmt(size=c(50,100,150,200,250,300,400,500), pct=0.99)
tab1t2 <- data.frame(tab1t2, tablow=tab1t2$size-tab1t2$upper,
                     tabupp=tab1t2$size-tab1t2$lower)
tab1t2 <- data.frame(tab1t2, tabPlow=tab1t2$tablow/tab1t2$size*100,
                     tabPupp=tab1t2$tabupp/tab1t2$size*100)
tab1t2
```

```
  size lower upper      outlow     outupp tablow tabupp   tabPlow  tabPupp
1   50    48    50 0.000000000 0.04000000      0      2 0.0000000 4.000000
2  100    97   100 0.000000000 0.03000000      0      3 0.0000000 3.000000
3  150   146   150 0.000000000 0.02666667      0      4 0.0000000 2.666667
4  200   195   200 0.000000000 0.02500000      0      5 0.0000000 2.500000
5  250   245   250 0.000000000 0.02000000      0      5 0.0000000 2.000000
6  300   294   299 0.003333333 0.02000000      1      6 0.3333333 2.000000
7  400   392   399 0.002500000 0.02000000      1      8 0.2500000 2.000000
8  500   491   498 0.004000000 0.01800000      2      9 0.4000000 1.800000
```

Data behind Figs 1 & 2

Figs 1 & 2 plot the same calculations on more refined grid: from sample size 20 to 500 for tier 1 cut point, and 100 to 500 for tier 2 cut point.

```
T1crit <- CalcLmt(size=20:500, pct=0.95)
T1crit <- data.frame(T1crit, tablow=T1crit$size-T1crit$upper,
                     tabupp=T1crit$size-T1crit$lower)
T1crit <- data.frame(T1crit, tabPlow=T1crit$tablow/T1crit$size*100,
                     tabPupp=T1crit$tabupp/T1crit$size*100)
T2crit <- CalcLmt(size=100:500, pct=0.99)
T2crit <- data.frame(T2crit, tablow=T2crit$size-T2crit$upper,
                     tabupp=T2crit$size-T2crit$lower)
T2crit <- data.frame(T2crit, tabPlow=T2crit$tablow/T2crit$size*100,
                     tabPupp=T2crit$tabupp/T2crit$size*100)
```

Below are the detailed ***Acceptable Ranges*** for tier 1 cut point (the last four columns):

```
T1crit
```

```
    size lower upper      outlow     outupp tablow tabupp   tabPlow   tabPupp
```

1	20	17	20	0.00000000	0.15000000	0	3	0.000000	15.000000
2	21	18	21	0.00000000	0.14285714	0	3	0.000000	14.285714
3	22	19	22	0.00000000	0.13636364	0	3	0.000000	13.636364
4	23	20	23	0.00000000	0.13043478	0	3	0.000000	13.043478
5	24	21	24	0.00000000	0.12500000	0	3	0.000000	12.500000
6	25	22	25	0.00000000	0.12000000	0	3	0.000000	12.000000
7	26	23	26	0.00000000	0.11538462	0	3	0.000000	11.538462
8	27	24	27	0.00000000	0.11111111	0	3	0.000000	11.111111
9	28	25	28	0.00000000	0.10714286	0	3	0.000000	10.714286
10	29	25	29	0.00000000	0.13793103	0	4	0.000000	13.793103
11	30	26	30	0.00000000	0.13333333	0	4	0.000000	13.333333
12	31	27	31	0.00000000	0.12903226	0	4	0.000000	12.903226
13	32	28	32	0.00000000	0.12500000	0	4	0.000000	12.500000
14	33	29	33	0.00000000	0.12121212	0	4	0.000000	12.121212
15	34	30	34	0.00000000	0.11764706	0	4	0.000000	11.764706
16	35	31	35	0.00000000	0.11428571	0	4	0.000000	11.428571
17	36	32	36	0.00000000	0.11111111	0	4	0.000000	11.111111
18	37	33	37	0.00000000	0.10810811	0	4	0.000000	10.810811
19	38	34	38	0.00000000	0.10526316	0	4	0.000000	10.526316
20	39	35	39	0.00000000	0.10256410	0	4	0.000000	10.256410
21	40	36	40	0.00000000	0.10000000	0	4	0.000000	10.000000
22	41	36	41	0.00000000	0.12195122	0	5	0.000000	12.195122
23	42	37	42	0.00000000	0.11904762	0	5	0.000000	11.904762
24	43	38	43	0.00000000	0.11627907	0	5	0.000000	11.627907
25	44	39	44	0.00000000	0.11363636	0	5	0.000000	11.363636
26	45	40	45	0.00000000	0.11111111	0	5	0.000000	11.111111
27	46	41	46	0.00000000	0.10869565	0	5	0.000000	10.869565
28	47	42	47	0.00000000	0.10638298	0	5	0.000000	10.638298
29	48	43	48	0.00000000	0.10416667	0	5	0.000000	10.416667
30	49	44	49	0.00000000	0.10204082	0	5	0.000000	10.204082
31	50	45	50	0.00000000	0.10000000	0	5	0.000000	10.000000
32	51	46	51	0.00000000	0.09803922	0	5	0.000000	9.803922
33	52	47	52	0.00000000	0.09615385	0	5	0.000000	9.615385
34	53	48	53	0.00000000	0.09433962	0	5	0.000000	9.433962
35	54	48	54	0.00000000	0.11111111	0	6	0.000000	11.111111
36	55	49	55	0.00000000	0.10909091	0	6	0.000000	10.909091
37	56	50	56	0.00000000	0.10714286	0	6	0.000000	10.714286
38	57	51	57	0.00000000	0.10526316	0	6	0.000000	10.526316
39	58	52	58	0.00000000	0.10344828	0	6	0.000000	10.344828
40	59	53	58	0.01694915	0.10169492	1	6	1.694915	10.169492
41	60	54	59	0.01666667	0.10000000	1	6	1.666667	10.000000
42	61	55	60	0.01639344	0.09836066	1	6	1.639344	9.836066
43	62	56	61	0.01612903	0.09677419	1	6	1.612903	9.677419

44	63	57	62	0.01587302	0.09523810	1	6	1.587302	9.523810
45	64	58	63	0.01562500	0.09375000	1	6	1.562500	9.375000
46	65	59	64	0.01538462	0.09230769	1	6	1.538462	9.230769
47	66	60	65	0.01515152	0.09090909	1	6	1.515152	9.090909
48	67	61	66	0.01492537	0.08955224	1	6	1.492537	8.955224
49	68	61	67	0.01470588	0.10294118	1	7	1.470588	10.294118
50	69	62	68	0.01449275	0.10144928	1	7	1.449275	10.144928
51	70	63	69	0.01428571	0.10000000	1	7	1.428571	10.000000
52	71	64	70	0.01408451	0.09859155	1	7	1.408451	9.859155
53	72	65	71	0.01388889	0.09722222	1	7	1.388889	9.722222
54	73	66	72	0.01369863	0.09589041	1	7	1.369863	9.589041
55	74	67	73	0.01351351	0.09459459	1	7	1.351351	9.459459
56	75	68	74	0.01333333	0.09333333	1	7	1.333333	9.333333
57	76	69	75	0.01315789	0.09210526	1	7	1.315789	9.210526
58	77	70	76	0.01298701	0.09090909	1	7	1.298701	9.090909
59	78	71	77	0.01282051	0.08974359	1	7	1.282051	8.974359
60	79	72	78	0.01265823	0.08860759	1	7	1.265823	8.860759
61	80	73	79	0.01250000	0.08750000	1	7	1.250000	8.750000
62	81	74	80	0.01234568	0.08641975	1	7	1.234568	8.641975
63	82	74	81	0.01219512	0.09756098	1	8	1.219512	9.756098
64	83	75	82	0.01204819	0.09638554	1	8	1.204819	9.638554
65	84	76	83	0.01190476	0.09523810	1	8	1.190476	9.523810
66	85	77	84	0.01176471	0.09411765	1	8	1.176471	9.411765
67	86	78	85	0.01162791	0.09302326	1	8	1.162791	9.302326
68	87	79	86	0.01149425	0.09195402	1	8	1.149425	9.195402
69	88	80	87	0.01136364	0.09090909	1	8	1.136364	9.090909
70	89	81	88	0.01123596	0.08988764	1	8	1.123596	8.988764
71	90	82	89	0.01111111	0.08888889	1	8	1.111111	8.888889
72	91	83	90	0.01098901	0.08791209	1	8	1.098901	8.791209
73	92	84	91	0.01086957	0.08695652	1	8	1.086957	8.695652
74	93	85	91	0.02150538	0.08602151	2	8	2.150538	8.602151
75	94	86	92	0.02127660	0.08510638	2	8	2.127660	8.510638
76	95	87	93	0.02105263	0.08421053	2	8	2.105263	8.421053
77	96	87	94	0.02083333	0.09375000	2	9	2.083333	9.375000
78	97	88	95	0.02061856	0.09278351	2	9	2.061856	9.278351
79	98	89	96	0.02040816	0.09183673	2	9	2.040816	9.183673
80	99	90	97	0.02020202	0.09090909	2	9	2.020202	9.090909
81	100	91	98	0.02000000	0.09000000	2	9	2.000000	9.000000
82	101	92	99	0.01980198	0.08910891	2	9	1.980198	8.910891
83	102	93	100	0.01960784	0.08823529	2	9	1.960784	8.823529
84	103	94	101	0.01941748	0.08737864	2	9	1.941748	8.737864
85	104	95	102	0.01923077	0.08653846	2	9	1.923077	8.653846
86	105	96	103	0.01904762	0.08571429	2	9	1.904762	8.571429

87	106	97	104	0.01886792	0.08490566	2	9	1.886792	8.490566
88	107	98	105	0.01869159	0.08411215	2	9	1.869159	8.411215
89	108	99	106	0.01851852	0.08333333	2	9	1.851852	8.333333
90	109	100	107	0.01834862	0.08256881	2	9	1.834862	8.256881
91	110	101	108	0.01818182	0.08181818	2	9	1.818182	8.181818
92	111	101	109	0.01801802	0.09009009	2	10	1.801802	9.009009
93	112	102	110	0.01785714	0.08928571	2	10	1.785714	8.928571
94	113	103	111	0.01769912	0.08849558	2	10	1.769912	8.849558
95	114	104	112	0.01754386	0.08771930	2	10	1.754386	8.771930
96	115	105	113	0.01739130	0.08695652	2	10	1.739130	8.695652
97	116	106	114	0.01724138	0.08620690	2	10	1.724138	8.620690
98	117	107	115	0.01709402	0.08547009	2	10	1.709402	8.547009
99	118	108	116	0.01694915	0.08474576	2	10	1.694915	8.474576
100	119	109	117	0.01680672	0.08403361	2	10	1.680672	8.403361
101	120	110	118	0.01666667	0.08333333	2	10	1.666667	8.333333
102	121	111	119	0.01652893	0.08264463	2	10	1.652893	8.264463
103	122	112	120	0.01639344	0.08196721	2	10	1.639344	8.196721
104	123	113	121	0.01626016	0.08130081	2	10	1.626016	8.130081
105	124	114	121	0.02419355	0.08064516	3	10	2.419355	8.064516
106	125	115	122	0.02400000	0.08000000	3	10	2.400000	8.000000
107	126	115	123	0.02380952	0.08730159	3	11	2.380952	8.730159
108	127	116	124	0.02362205	0.08661417	3	11	2.362205	8.661417
109	128	117	125	0.02343750	0.08593750	3	11	2.343750	8.593750
110	129	118	126	0.02325581	0.08527132	3	11	2.325581	8.527132
111	130	119	127	0.02307692	0.08461538	3	11	2.307692	8.461538
112	131	120	128	0.02290076	0.08396947	3	11	2.290076	8.396947
113	132	121	129	0.02272727	0.08333333	3	11	2.272727	8.333333
114	133	122	130	0.02255639	0.08270677	3	11	2.255639	8.270677
115	134	123	131	0.02238806	0.08208955	3	11	2.238806	8.208955
116	135	124	132	0.02222222	0.08148148	3	11	2.222222	8.148148
117	136	125	133	0.02205882	0.08088235	3	11	2.205882	8.088235
118	137	126	134	0.02189781	0.08029197	3	11	2.189781	8.029197
119	138	127	135	0.02173913	0.07971014	3	11	2.173913	7.971014
120	139	128	136	0.02158273	0.07913669	3	11	2.158273	7.913669
121	140	129	137	0.02142857	0.07857143	3	11	2.142857	7.857143
122	141	129	138	0.02127660	0.08510638	3	12	2.127660	8.510638
123	142	130	139	0.02112676	0.08450704	3	12	2.112676	8.450704
124	143	131	140	0.02097902	0.08391608	3	12	2.097902	8.391608
125	144	132	141	0.02083333	0.08333333	3	12	2.083333	8.333333
126	145	133	142	0.02068966	0.08275862	3	12	2.068966	8.275862
127	146	134	143	0.02054795	0.08219178	3	12	2.054795	8.219178
128	147	135	144	0.02040816	0.08163265	3	12	2.040816	8.163265
129	148	136	145	0.02027027	0.08108108	3	12	2.027027	8.108108

130	149	137	146	0.02013423	0.08053691	3	12	2.013423	8.053691
131	150	138	147	0.02000000	0.08000000	3	12	2.000000	8.000000
132	151	139	148	0.01986755	0.07947020	3	12	1.986755	7.947020
133	152	140	149	0.01973684	0.07894737	3	12	1.973684	7.894737
134	153	141	149	0.02614379	0.07843137	4	12	2.614379	7.843137
135	154	142	150	0.02597403	0.07792208	4	12	2.597403	7.792208
136	155	143	151	0.02580645	0.07741935	4	12	2.580645	7.741935
137	156	143	152	0.02564103	0.08333333	4	13	2.564103	8.333333
138	157	144	153	0.02547771	0.08280255	4	13	2.547771	8.280255
139	158	145	154	0.02531646	0.08227848	4	13	2.531646	8.227848
140	159	146	155	0.02515723	0.08176101	4	13	2.515723	8.176101
141	160	147	156	0.02500000	0.08125000	4	13	2.500000	8.125000
142	161	148	157	0.02484472	0.08074534	4	13	2.484472	8.074534
143	162	149	158	0.02469136	0.08024691	4	13	2.469136	8.024691
144	163	150	159	0.02453988	0.07975460	4	13	2.453988	7.975460
145	164	151	160	0.02439024	0.07926829	4	13	2.439024	7.926829
146	165	152	161	0.02424242	0.07878788	4	13	2.424242	7.878788
147	166	153	162	0.02409639	0.07831325	4	13	2.409639	7.831325
148	167	154	163	0.02395210	0.07784431	4	13	2.395210	7.784431
149	168	155	164	0.02380952	0.07738095	4	13	2.380952	7.738095
150	169	156	165	0.02366864	0.07692308	4	13	2.366864	7.692308
151	170	157	166	0.02352941	0.07647059	4	13	2.352941	7.647059
152	171	158	167	0.02339181	0.07602339	4	13	2.339181	7.602339
153	172	158	168	0.02325581	0.08139535	4	14	2.325581	8.139535
154	173	159	169	0.02312139	0.08092486	4	14	2.312139	8.092486
155	174	160	170	0.02298851	0.08045977	4	14	2.298851	8.045977
156	175	161	171	0.02285714	0.08000000	4	14	2.285714	8.000000
157	176	162	172	0.02272727	0.07954545	4	14	2.272727	7.954545
158	177	163	173	0.02259887	0.07909605	4	14	2.259887	7.909605
159	178	164	174	0.02247191	0.07865169	4	14	2.247191	7.865169
160	179	165	175	0.02234637	0.07821229	4	14	2.234637	7.821229
161	180	166	176	0.02222222	0.07777778	4	14	2.222222	7.777778
162	181	167	176	0.02762431	0.07734807	5	14	2.762431	7.734807
163	182	168	177	0.02747253	0.07692308	5	14	2.747253	7.692308
164	183	169	178	0.02732240	0.07650273	5	14	2.732240	7.650273
165	184	170	179	0.02717391	0.07608696	5	14	2.717391	7.608696
166	185	171	180	0.02702703	0.07567568	5	14	2.702703	7.567568
167	186	172	181	0.02688172	0.07526882	5	14	2.688172	7.526882
168	187	173	182	0.02673797	0.07486631	5	14	2.673797	7.486631
169	188	173	183	0.02659574	0.07978723	5	15	2.659574	7.978723
170	189	174	184	0.02645503	0.07936508	5	15	2.645503	7.936508
171	190	175	185	0.02631579	0.07894737	5	15	2.631579	7.894737
172	191	176	186	0.02617801	0.07853403	5	15	2.617801	7.853403

173	192	177	187	0.02604167	0.07812500	5	15	2.604167	7.812500
174	193	178	188	0.02590674	0.07772021	5	15	2.590674	7.772021
175	194	179	189	0.02577320	0.07731959	5	15	2.577320	7.731959
176	195	180	190	0.02564103	0.07692308	5	15	2.564103	7.692308
177	196	181	191	0.02551020	0.07653061	5	15	2.551020	7.653061
178	197	182	192	0.02538071	0.07614213	5	15	2.538071	7.614213
179	198	183	193	0.02525253	0.07575758	5	15	2.525253	7.575758
180	199	184	194	0.02512563	0.07537688	5	15	2.512563	7.537688
181	200	185	195	0.02500000	0.07500000	5	15	2.500000	7.500000
182	201	186	196	0.02487562	0.07462687	5	15	2.487562	7.462687
183	202	187	197	0.02475248	0.07425743	5	15	2.475248	7.425743
184	203	188	198	0.02463054	0.07389163	5	15	2.463054	7.389163
185	204	188	199	0.02450980	0.07843137	5	16	2.450980	7.843137
186	205	189	200	0.02439024	0.07804878	5	16	2.439024	7.804878
187	206	190	201	0.02427184	0.07766990	5	16	2.427184	7.766990
188	207	191	202	0.02415459	0.07729469	5	16	2.415459	7.729469
189	208	192	202	0.02884615	0.07692308	6	16	2.884615	7.692308
190	209	193	203	0.02870813	0.07655502	6	16	2.870813	7.655502
191	210	194	204	0.02857143	0.07619048	6	16	2.857143	7.619048
192	211	195	205	0.02843602	0.07582938	6	16	2.843602	7.582938
193	212	196	206	0.02830189	0.07547170	6	16	2.830189	7.547170
194	213	197	207	0.02816901	0.07511737	6	16	2.816901	7.511737
195	214	198	208	0.02803738	0.07476636	6	16	2.803738	7.476636
196	215	199	209	0.02790698	0.07441860	6	16	2.790698	7.441860
197	216	200	210	0.02777778	0.07407407	6	16	2.777778	7.407407
198	217	201	211	0.02764977	0.07373272	6	16	2.764977	7.373272
199	218	202	212	0.02752294	0.07339450	6	16	2.752294	7.339450
200	219	203	213	0.02739726	0.07305936	6	16	2.739726	7.305936
201	220	203	214	0.02727273	0.07727273	6	17	2.727273	7.727273
202	221	204	215	0.02714932	0.07692308	6	17	2.714932	7.692308
203	222	205	216	0.02702703	0.07657658	6	17	2.702703	7.657658
204	223	206	217	0.02690583	0.07623318	6	17	2.690583	7.623318
205	224	207	218	0.02678571	0.07589286	6	17	2.678571	7.589286
206	225	208	219	0.02666667	0.07555556	6	17	2.666667	7.555556
207	226	209	220	0.02654867	0.07522124	6	17	2.654867	7.522124
208	227	210	221	0.02643172	0.07488987	6	17	2.643172	7.488987
209	228	211	222	0.02631579	0.07456140	6	17	2.631579	7.456140
210	229	212	223	0.02620087	0.07423581	6	17	2.620087	7.423581
211	230	213	224	0.02608696	0.07391304	6	17	2.608696	7.391304
212	231	214	225	0.02597403	0.07359307	6	17	2.597403	7.359307
213	232	215	226	0.02586207	0.07327586	6	17	2.586207	7.327586
214	233	216	227	0.02575107	0.07296137	6	17	2.575107	7.296137
215	234	217	227	0.02991453	0.07264957	7	17	2.991453	7.264957

216	235	218	228	0.02978723	0.07234043	7	17	2.978723	7.234043
217	236	218	229	0.02966102	0.07627119	7	18	2.966102	7.627119
218	237	219	230	0.02953586	0.07594937	7	18	2.953586	7.594937
219	238	220	231	0.02941176	0.07563025	7	18	2.941176	7.563025
220	239	221	232	0.02928870	0.07531381	7	18	2.928870	7.531381
221	240	222	233	0.02916667	0.07500000	7	18	2.916667	7.500000
222	241	223	234	0.02904564	0.07468880	7	18	2.904564	7.468880
223	242	224	235	0.02892562	0.07438017	7	18	2.892562	7.438017
224	243	225	236	0.02880658	0.07407407	7	18	2.880658	7.407407
225	244	226	237	0.02868852	0.07377049	7	18	2.868852	7.377049
226	245	227	238	0.02857143	0.07346939	7	18	2.857143	7.346939
227	246	228	239	0.02845528	0.07317073	7	18	2.845528	7.317073
228	247	229	240	0.02834008	0.07287449	7	18	2.834008	7.287449
229	248	230	241	0.02822581	0.07258065	7	18	2.822581	7.258065
230	249	231	242	0.02811245	0.07228916	7	18	2.811245	7.228916
231	250	232	243	0.02800000	0.07200000	7	18	2.800000	7.200000
232	251	233	244	0.02788845	0.07171315	7	18	2.788845	7.171315
233	252	233	245	0.02777778	0.07539683	7	19	2.777778	7.539683
234	253	234	246	0.02766798	0.07509881	7	19	2.766798	7.509881
235	254	235	247	0.02755906	0.07480315	7	19	2.755906	7.480315
236	255	236	248	0.02745098	0.07450980	7	19	2.745098	7.450980
237	256	237	249	0.02734375	0.07421875	7	19	2.734375	7.421875
238	257	238	250	0.02723735	0.07392996	7	19	2.723735	7.392996
239	258	239	251	0.02713178	0.07364341	7	19	2.713178	7.364341
240	259	240	252	0.02702703	0.07335907	7	19	2.702703	7.335907
241	260	241	252	0.03076923	0.07307692	8	19	3.076923	7.307692
242	261	242	253	0.03065134	0.07279693	8	19	3.065134	7.279693
243	262	243	254	0.03053435	0.07251908	8	19	3.053435	7.251908
244	263	244	255	0.03041825	0.07224335	8	19	3.041825	7.224335
245	264	245	256	0.03030303	0.07196970	8	19	3.030303	7.196970
246	265	246	257	0.03018868	0.07169811	8	19	3.018868	7.169811
247	266	247	258	0.03007519	0.07142857	8	19	3.007519	7.142857
248	267	248	259	0.02996255	0.07116105	8	19	2.996255	7.116105
249	268	249	260	0.02985075	0.07089552	8	19	2.985075	7.089552
250	269	249	261	0.02973978	0.07434944	8	20	2.973978	7.434944
251	270	250	262	0.02962963	0.07407407	8	20	2.962963	7.407407
252	271	251	263	0.02952030	0.07380074	8	20	2.952030	7.380074
253	272	252	264	0.02941176	0.07352941	8	20	2.941176	7.352941
254	273	253	265	0.02930403	0.07326007	8	20	2.930403	7.326007
255	274	254	266	0.02919708	0.07299270	8	20	2.919708	7.299270
256	275	255	267	0.02909091	0.07272727	8	20	2.909091	7.272727
257	276	256	268	0.02898551	0.07246377	8	20	2.898551	7.246377
258	277	257	269	0.02888087	0.07220217	8	20	2.888087	7.220217

259	278	258	270	0.02877698	0.07194245	8	20	2.877698	7.194245
260	279	259	271	0.02867384	0.07168459	8	20	2.867384	7.168459
261	280	260	272	0.02857143	0.07142857	8	20	2.857143	7.142857
262	281	261	273	0.02846975	0.07117438	8	20	2.846975	7.117438
263	282	262	274	0.02836879	0.07092199	8	20	2.836879	7.092199
264	283	263	275	0.02826855	0.07067138	8	20	2.826855	7.067138
265	284	264	276	0.02816901	0.07042254	8	20	2.816901	7.042254
266	285	264	277	0.02807018	0.07368421	8	21	2.807018	7.368421
267	286	265	277	0.03146853	0.07342657	9	21	3.146853	7.342657
268	287	266	278	0.03135889	0.07317073	9	21	3.135889	7.317073
269	288	267	279	0.03125000	0.07291667	9	21	3.125000	7.291667
270	289	268	280	0.03114187	0.07266436	9	21	3.114187	7.266436
271	290	269	281	0.03103448	0.07241379	9	21	3.103448	7.241379
272	291	270	282	0.03092784	0.07216495	9	21	3.092784	7.216495
273	292	271	283	0.03082192	0.07191781	9	21	3.082192	7.191781
274	293	272	284	0.03071672	0.07167235	9	21	3.071672	7.167235
275	294	273	285	0.03061224	0.07142857	9	21	3.061224	7.142857
276	295	274	286	0.03050847	0.07118644	9	21	3.050847	7.118644
277	296	275	287	0.03040541	0.07094595	9	21	3.040541	7.094595
278	297	276	288	0.03030303	0.07070707	9	21	3.030303	7.070707
279	298	277	289	0.03020134	0.07046980	9	21	3.020134	7.046980
280	299	278	290	0.03010033	0.07023411	9	21	3.010033	7.023411
281	300	279	291	0.03000000	0.07000000	9	21	3.000000	7.000000
282	301	279	292	0.02990033	0.07308970	9	22	2.990033	7.308970
283	302	280	293	0.02980132	0.07284768	9	22	2.980132	7.284768
284	303	281	294	0.02970297	0.07260726	9	22	2.970297	7.260726
285	304	282	295	0.02960526	0.07236842	9	22	2.960526	7.236842
286	305	283	296	0.02950820	0.07213115	9	22	2.950820	7.213115
287	306	284	297	0.02941176	0.07189542	9	22	2.941176	7.189542
288	307	285	298	0.02931596	0.07166124	9	22	2.931596	7.166124
289	308	286	299	0.02922078	0.07142857	9	22	2.922078	7.142857
290	309	287	300	0.02912621	0.07119741	9	22	2.912621	7.119741
291	310	288	301	0.02903226	0.07096774	9	22	2.903226	7.096774
292	311	289	301	0.03215434	0.07073955	10	22	3.215434	7.073955
293	312	290	302	0.03205128	0.07051282	10	22	3.205128	7.051282
294	313	291	303	0.03194888	0.07028754	10	22	3.194888	7.028754
295	314	292	304	0.03184713	0.07006369	10	22	3.184713	7.006369
296	315	293	305	0.03174603	0.06984127	10	22	3.174603	6.984127
297	316	294	306	0.03164557	0.06962025	10	22	3.164557	6.962025
298	317	295	307	0.03154574	0.06940063	10	22	3.154574	6.940063
299	318	295	308	0.03144654	0.07232704	10	23	3.144654	7.232704
300	319	296	309	0.03134796	0.07210031	10	23	3.134796	7.210031
301	320	297	310	0.03125000	0.07187500	10	23	3.125000	7.187500

302	321	298	311	0.03115265	0.07165109	10	23	3.115265	7.165109
303	322	299	312	0.03105590	0.07142857	10	23	3.105590	7.142857
304	323	300	313	0.03095975	0.07120743	10	23	3.095975	7.120743
305	324	301	314	0.03086420	0.07098765	10	23	3.086420	7.098765
306	325	302	315	0.03076923	0.07076923	10	23	3.076923	7.076923
307	326	303	316	0.03067485	0.07055215	10	23	3.067485	7.055215
308	327	304	317	0.03058104	0.07033639	10	23	3.058104	7.033639
309	328	305	318	0.03048780	0.07012195	10	23	3.048780	7.012195
310	329	306	319	0.03039514	0.06990881	10	23	3.039514	6.990881
311	330	307	320	0.03030303	0.06969697	10	23	3.030303	6.969697
312	331	308	321	0.03021148	0.06948640	10	23	3.021148	6.948640
313	332	309	322	0.03012048	0.06927711	10	23	3.012048	6.927711
314	333	310	323	0.03003003	0.06906907	10	23	3.003003	6.906907
315	334	311	324	0.02994012	0.06886228	10	23	2.994012	6.886228
316	335	311	325	0.02985075	0.07164179	10	24	2.985075	7.164179
317	336	312	325	0.03273810	0.07142857	11	24	3.273810	7.142857
318	337	313	326	0.03264095	0.07121662	11	24	3.264095	7.121662
319	338	314	327	0.03254438	0.07100592	11	24	3.254438	7.100592
320	339	315	328	0.03244838	0.07079646	11	24	3.244838	7.079646
321	340	316	329	0.03235294	0.07058824	11	24	3.235294	7.058824
322	341	317	330	0.03225806	0.07038123	11	24	3.225806	7.038123
323	342	318	331	0.03216374	0.07017544	11	24	3.216374	7.017544
324	343	319	332	0.03206997	0.06997085	11	24	3.206997	6.997085
325	344	320	333	0.03197674	0.06976744	11	24	3.197674	6.976744
326	345	321	334	0.03188406	0.06956522	11	24	3.188406	6.956522
327	346	322	335	0.03179191	0.06936416	11	24	3.179191	6.936416
328	347	323	336	0.03170029	0.06916427	11	24	3.170029	6.916427
329	348	324	337	0.03160920	0.06896552	11	24	3.160920	6.896552
330	349	325	338	0.03151862	0.06876791	11	24	3.151862	6.876791
331	350	326	339	0.03142857	0.06857143	11	24	3.142857	6.857143
332	351	327	340	0.03133903	0.06837607	11	24	3.133903	6.837607
333	352	327	341	0.03125000	0.07102273	11	25	3.125000	7.102273
334	353	328	342	0.03116147	0.07082153	11	25	3.116147	7.082153
335	354	329	343	0.03107345	0.07062147	11	25	3.107345	7.062147
336	355	330	344	0.03098592	0.07042254	11	25	3.098592	7.042254
337	356	331	345	0.03089888	0.07022472	11	25	3.089888	7.022472
338	357	332	346	0.03081232	0.07002801	11	25	3.081232	7.002801
339	358	333	347	0.03072626	0.06983240	11	25	3.072626	6.983240
340	359	334	348	0.03064067	0.06963788	11	25	3.064067	6.963788
341	360	335	349	0.03055556	0.06944444	11	25	3.055556	6.944444
342	361	336	349	0.03324100	0.06925208	12	25	3.324100	6.925208
343	362	337	350	0.03314917	0.06906077	12	25	3.314917	6.906077
344	363	338	351	0.03305785	0.06887052	12	25	3.305785	6.887052

345	364	339	352	0.03296703	0.06868132	12	25	3.296703	6.868132
346	365	340	353	0.03287671	0.06849315	12	25	3.287671	6.849315
347	366	341	354	0.03278689	0.06830601	12	25	3.278689	6.830601
348	367	342	355	0.03269755	0.06811989	12	25	3.269755	6.811989
349	368	342	356	0.03260870	0.07065217	12	26	3.260870	7.065217
350	369	343	357	0.03252033	0.07046070	12	26	3.252033	7.046070
351	370	344	358	0.03243243	0.07027027	12	26	3.243243	7.027027
352	371	345	359	0.03234501	0.07008086	12	26	3.234501	7.008086
353	372	346	360	0.03225806	0.06989247	12	26	3.225806	6.989247
354	373	347	361	0.03217158	0.06970509	12	26	3.217158	6.970509
355	374	348	362	0.03208556	0.06951872	12	26	3.208556	6.951872
356	375	349	363	0.03200000	0.06933333	12	26	3.200000	6.933333
357	376	350	364	0.03191489	0.06914894	12	26	3.191489	6.914894
358	377	351	365	0.03183024	0.06896552	12	26	3.183024	6.896552
359	378	352	366	0.03174603	0.06878307	12	26	3.174603	6.878307
360	379	353	367	0.03166227	0.06860158	12	26	3.166227	6.860158
361	380	354	368	0.03157895	0.06842105	12	26	3.157895	6.842105
362	381	355	369	0.03149606	0.06824147	12	26	3.149606	6.824147
363	382	356	370	0.03141361	0.06806283	12	26	3.141361	6.806283
364	383	357	371	0.03133159	0.06788512	12	26	3.133159	6.788512
365	384	358	372	0.03125000	0.06770833	12	26	3.125000	6.770833
366	385	358	373	0.03116883	0.07012987	12	27	3.116883	7.012987
367	386	359	373	0.03367876	0.06994819	13	27	3.367876	6.994819
368	387	360	374	0.03359173	0.06976744	13	27	3.359173	6.976744
369	388	361	375	0.03350515	0.06958763	13	27	3.350515	6.958763
370	389	362	376	0.03341902	0.06940874	13	27	3.341902	6.940874
371	390	363	377	0.03333333	0.06923077	13	27	3.333333	6.923077
372	391	364	378	0.03324808	0.06905371	13	27	3.324808	6.905371
373	392	365	379	0.03316327	0.06887755	13	27	3.316327	6.887755
374	393	366	380	0.03307888	0.06870229	13	27	3.307888	6.870229
375	394	367	381	0.03299492	0.06852792	13	27	3.299492	6.852792
376	395	368	382	0.03291139	0.06835443	13	27	3.291139	6.835443
377	396	369	383	0.03282828	0.06818182	13	27	3.282828	6.818182
378	397	370	384	0.03274559	0.06801008	13	27	3.274559	6.801008
379	398	371	385	0.03266332	0.06783920	13	27	3.266332	6.783920
380	399	372	386	0.03258145	0.06766917	13	27	3.258145	6.766917
381	400	373	387	0.03250000	0.06750000	13	27	3.250000	6.750000
382	401	374	388	0.03241895	0.06733167	13	27	3.241895	6.733167
383	402	374	389	0.03233831	0.06965174	13	28	3.233831	6.965174
384	403	375	390	0.03225806	0.06947891	13	28	3.225806	6.947891
385	404	376	391	0.03217822	0.06930693	13	28	3.217822	6.930693
386	405	377	392	0.03209877	0.06913580	13	28	3.209877	6.913580
387	406	378	393	0.03201970	0.06896552	13	28	3.201970	6.896552

388	407	379	394	0.03194103	0.06879607	13	28	3.194103	6.879607
389	408	380	395	0.03186275	0.06862745	13	28	3.186275	6.862745
390	409	381	396	0.03178484	0.06845966	13	28	3.178484	6.845966
391	410	382	396	0.03414634	0.06829268	14	28	3.414634	6.829268
392	411	383	397	0.03406326	0.06812652	14	28	3.406326	6.812652
393	412	384	398	0.03398058	0.06796117	14	28	3.398058	6.796117
394	413	385	399	0.03389831	0.06779661	14	28	3.389831	6.779661
395	414	386	400	0.03381643	0.06763285	14	28	3.381643	6.763285
396	415	387	401	0.03373494	0.06746988	14	28	3.373494	6.746988
397	416	388	402	0.03365385	0.06730769	14	28	3.365385	6.730769
398	417	389	403	0.03357314	0.06714628	14	28	3.357314	6.714628
399	418	390	404	0.03349282	0.06698565	14	28	3.349282	6.698565
400	419	390	405	0.03341289	0.06921241	14	29	3.341289	6.921241
401	420	391	406	0.03333333	0.06904762	14	29	3.333333	6.904762
402	421	392	407	0.03325416	0.06888361	14	29	3.325416	6.888361
403	422	393	408	0.03317536	0.06872038	14	29	3.317536	6.872038
404	423	394	409	0.03309693	0.06855792	14	29	3.309693	6.855792
405	424	395	410	0.03301887	0.06839623	14	29	3.301887	6.839623
406	425	396	411	0.03294118	0.06823529	14	29	3.294118	6.823529
407	426	397	412	0.03286385	0.06807512	14	29	3.286385	6.807512
408	427	398	413	0.03278689	0.06791569	14	29	3.278689	6.791569
409	428	399	414	0.03271028	0.06775701	14	29	3.271028	6.775701
410	429	400	415	0.03263403	0.06759907	14	29	3.263403	6.759907
411	430	401	416	0.03255814	0.06744186	14	29	3.255814	6.744186
412	431	402	417	0.03248260	0.06728538	14	29	3.248260	6.728538
413	432	403	418	0.03240741	0.06712963	14	29	3.240741	6.712963
414	433	404	419	0.03233256	0.06697460	14	29	3.233256	6.697460
415	434	405	419	0.03456221	0.06682028	15	29	3.456221	6.682028
416	435	406	420	0.03448276	0.06666667	15	29	3.448276	6.666667
417	436	406	421	0.03440367	0.06880734	15	30	3.440367	6.880734
418	437	407	422	0.03432494	0.06864989	15	30	3.432494	6.864989
419	438	408	423	0.03424658	0.06849315	15	30	3.424658	6.849315
420	439	409	424	0.03416856	0.06833713	15	30	3.416856	6.833713
421	440	410	425	0.03409091	0.06818182	15	30	3.409091	6.818182
422	441	411	426	0.03401361	0.06802721	15	30	3.401361	6.802721
423	442	412	427	0.03393665	0.06787330	15	30	3.393665	6.787330
424	443	413	428	0.03386005	0.06772009	15	30	3.386005	6.772009
425	444	414	429	0.03378378	0.06756757	15	30	3.378378	6.756757
426	445	415	430	0.03370787	0.06741573	15	30	3.370787	6.741573
427	446	416	431	0.03363229	0.06726457	15	30	3.363229	6.726457
428	447	417	432	0.03355705	0.06711409	15	30	3.355705	6.711409
429	448	418	433	0.03348214	0.06696429	15	30	3.348214	6.696429
430	449	419	434	0.03340757	0.06681514	15	30	3.340757	6.681514

431	450	420	435	0.03333333	0.06666667	15	30	3.333333	6.666667
432	451	421	436	0.03325942	0.06651885	15	30	3.325942	6.651885
433	452	422	437	0.03318584	0.06637168	15	30	3.318584	6.637168
434	453	422	438	0.03311258	0.06843267	15	31	3.311258	6.843267
435	454	423	439	0.03303965	0.06828194	15	31	3.303965	6.828194
436	455	424	440	0.03296703	0.06813187	15	31	3.296703	6.813187
437	456	425	441	0.03289474	0.06798246	15	31	3.289474	6.798246
438	457	426	442	0.03282276	0.06783370	15	31	3.282276	6.783370
439	458	427	442	0.03493450	0.06768559	16	31	3.493450	6.768559
440	459	428	443	0.03485839	0.06753813	16	31	3.485839	6.753813
441	460	429	444	0.03478261	0.06739130	16	31	3.478261	6.739130
442	461	430	445	0.03470716	0.06724512	16	31	3.470716	6.724512
443	462	431	446	0.03463203	0.06709957	16	31	3.463203	6.709957
444	463	432	447	0.03455724	0.06695464	16	31	3.455724	6.695464
445	464	433	448	0.03448276	0.06681034	16	31	3.448276	6.681034
446	465	434	449	0.03440860	0.06666667	16	31	3.440860	6.666667
447	466	435	450	0.03433476	0.06652361	16	31	3.433476	6.652361
448	467	436	451	0.03426124	0.06638116	16	31	3.426124	6.638116
449	468	437	452	0.03418803	0.06623932	16	31	3.418803	6.623932
450	469	438	453	0.03411514	0.06609808	16	31	3.411514	6.609808
451	470	438	454	0.03404255	0.06808511	16	32	3.404255	6.808511
452	471	439	455	0.03397028	0.06794055	16	32	3.397028	6.794055
453	472	440	456	0.03389831	0.06779661	16	32	3.389831	6.779661
454	473	441	457	0.03382664	0.06765328	16	32	3.382664	6.765328
455	474	442	458	0.03375527	0.06751055	16	32	3.375527	6.751055
456	475	443	459	0.03368421	0.06736842	16	32	3.368421	6.736842
457	476	444	460	0.03361345	0.06722689	16	32	3.361345	6.722689
458	477	445	461	0.03354298	0.06708595	16	32	3.354298	6.708595
459	478	446	462	0.03347280	0.06694561	16	32	3.347280	6.694561
460	479	447	463	0.03340292	0.06680585	16	32	3.340292	6.680585
461	480	448	464	0.03333333	0.06666667	16	32	3.333333	6.666667
462	481	449	465	0.03326403	0.06652807	16	32	3.326403	6.652807
463	482	450	465	0.03526971	0.06639004	17	32	3.526971	6.639004
464	483	451	466	0.03519669	0.06625259	17	32	3.519669	6.625259
465	484	452	467	0.03512397	0.06611570	17	32	3.512397	6.611570
466	485	453	468	0.03505155	0.06597938	17	32	3.505155	6.597938
467	486	454	469	0.03497942	0.06584362	17	32	3.497942	6.584362
468	487	455	470	0.03490760	0.06570842	17	32	3.490760	6.570842
469	488	455	471	0.03483607	0.06762295	17	33	3.483607	6.762295
470	489	456	472	0.03476483	0.06748466	17	33	3.476483	6.748466
471	490	457	473	0.03469388	0.06734694	17	33	3.469388	6.734694
472	491	458	474	0.03462322	0.06720978	17	33	3.462322	6.720978
473	492	459	475	0.03455285	0.06707317	17	33	3.455285	6.707317

474	493	460	476	0.03448276	0.06693712	17	33	3.448276	6.693712
475	494	461	477	0.03441296	0.06680162	17	33	3.441296	6.680162
476	495	462	478	0.03434343	0.06666667	17	33	3.434343	6.666667
477	496	463	479	0.03427419	0.06653226	17	33	3.427419	6.653226
478	497	464	480	0.03420523	0.06639839	17	33	3.420523	6.639839
479	498	465	481	0.03413655	0.06626506	17	33	3.413655	6.626506
480	499	466	482	0.03406814	0.06613226	17	33	3.406814	6.613226
481	500	467	483	0.03400000	0.06600000	17	33	3.400000	6.600000

Below are the detailed ***Acceptable Ranges*** for tier 2 cut point (the last four columns):

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T2crit
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	size	lower	upper	outlow	outupp	tablow	tabupp	tabPlow	tabPupp
1	100	97	100	0.000000000	0.03000000	0	3	0.0000000	3.000000
2	101	98	101	0.000000000	0.02970297	0	3	0.0000000	2.970297
3	102	99	102	0.000000000	0.02941176	0	3	0.0000000	2.941176
4	103	100	103	0.000000000	0.02912621	0	3	0.0000000	2.912621
5	104	101	104	0.000000000	0.02884615	0	3	0.0000000	2.884615
6	105	102	105	0.000000000	0.02857143	0	3	0.0000000	2.857143
7	106	103	106	0.000000000	0.02830189	0	3	0.0000000	2.830189
8	107	104	107	0.000000000	0.02803738	0	3	0.0000000	2.803738
9	108	105	108	0.000000000	0.02777778	0	3	0.0000000	2.777778
10	109	106	109	0.000000000	0.02752294	0	3	0.0000000	2.752294
11	110	107	110	0.000000000	0.02727273	0	3	0.0000000	2.727273
12	111	108	111	0.000000000	0.02702703	0	3	0.0000000	2.702703
13	112	109	112	0.000000000	0.02678571	0	3	0.0000000	2.678571
14	113	110	113	0.000000000	0.02654867	0	3	0.0000000	2.654867
15	114	111	114	0.000000000	0.02631579	0	3	0.0000000	2.631579
16	115	112	115	0.000000000	0.02608696	0	3	0.0000000	2.608696
17	116	113	116	0.000000000	0.02586207	0	3	0.0000000	2.586207
18	117	114	117	0.000000000	0.02564103	0	3	0.0000000	2.564103
19	118	115	118	0.000000000	0.02542373	0	3	0.0000000	2.542373
20	119	116	119	0.000000000	0.02521008	0	3	0.0000000	2.521008
21	120	117	120	0.000000000	0.02500000	0	3	0.0000000	2.500000
22	121	118	121	0.000000000	0.02479339	0	3	0.0000000	2.479339
23	122	119	122	0.000000000	0.02459016	0	3	0.0000000	2.459016
24	123	120	123	0.000000000	0.02439024	0	3	0.0000000	2.439024
25	124	121	124	0.000000000	0.02419355	0	3	0.0000000	2.419355
26	125	122	125	0.000000000	0.02400000	0	3	0.0000000	2.400000
27	126	123	126	0.000000000	0.02380952	0	3	0.0000000	2.380952
28	127	124	127	0.000000000	0.02362205	0	3	0.0000000	2.362205

29	128	125	128	0.000000000	0.02343750	0	3	0.0000000	2.343750
30	129	126	129	0.000000000	0.02325581	0	3	0.0000000	2.325581
31	130	127	130	0.000000000	0.02307692	0	3	0.0000000	2.307692
32	131	128	131	0.000000000	0.02290076	0	3	0.0000000	2.290076
33	132	129	132	0.000000000	0.02272727	0	3	0.0000000	2.272727
34	133	130	133	0.000000000	0.02255639	0	3	0.0000000	2.255639
35	134	131	134	0.000000000	0.02238806	0	3	0.0000000	2.238806
36	135	132	135	0.000000000	0.02222222	0	3	0.0000000	2.222222
37	136	133	136	0.000000000	0.02205882	0	3	0.0000000	2.205882
38	137	134	137	0.000000000	0.02189781	0	3	0.0000000	2.189781
39	138	134	138	0.000000000	0.02898551	0	4	0.0000000	2.898551
40	139	135	139	0.000000000	0.02877698	0	4	0.0000000	2.877698
41	140	136	140	0.000000000	0.02857143	0	4	0.0000000	2.857143
42	141	137	141	0.000000000	0.02836879	0	4	0.0000000	2.836879
43	142	138	142	0.000000000	0.02816901	0	4	0.0000000	2.816901
44	143	139	143	0.000000000	0.02797203	0	4	0.0000000	2.797203
45	144	140	144	0.000000000	0.02777778	0	4	0.0000000	2.777778
46	145	141	145	0.000000000	0.02758621	0	4	0.0000000	2.758621
47	146	142	146	0.000000000	0.02739726	0	4	0.0000000	2.739726
48	147	143	147	0.000000000	0.02721088	0	4	0.0000000	2.721088
49	148	144	148	0.000000000	0.02702703	0	4	0.0000000	2.702703
50	149	145	149	0.000000000	0.02684564	0	4	0.0000000	2.684564
51	150	146	150	0.000000000	0.02666667	0	4	0.0000000	2.666667
52	151	147	151	0.000000000	0.02649007	0	4	0.0000000	2.649007
53	152	148	152	0.000000000	0.02631579	0	4	0.0000000	2.631579
54	153	149	153	0.000000000	0.02614379	0	4	0.0000000	2.614379
55	154	150	154	0.000000000	0.02597403	0	4	0.0000000	2.597403
56	155	151	155	0.000000000	0.02580645	0	4	0.0000000	2.580645
57	156	152	156	0.000000000	0.02564103	0	4	0.0000000	2.564103
58	157	153	157	0.000000000	0.02547771	0	4	0.0000000	2.547771
59	158	154	158	0.000000000	0.02531646	0	4	0.0000000	2.531646
60	159	155	159	0.000000000	0.02515723	0	4	0.0000000	2.515723
61	160	156	160	0.000000000	0.02500000	0	4	0.0000000	2.500000
62	161	157	161	0.000000000	0.02484472	0	4	0.0000000	2.484472
63	162	158	162	0.000000000	0.02469136	0	4	0.0000000	2.469136
64	163	159	163	0.000000000	0.02453988	0	4	0.0000000	2.453988
65	164	160	164	0.000000000	0.02439024	0	4	0.0000000	2.439024
66	165	161	165	0.000000000	0.02424242	0	4	0.0000000	2.424242
67	166	162	166	0.000000000	0.02409639	0	4	0.0000000	2.409639
68	167	163	167	0.000000000	0.02395210	0	4	0.0000000	2.395210
69	168	164	168	0.000000000	0.02380952	0	4	0.0000000	2.380952
70	169	165	169	0.000000000	0.02366864	0	4	0.0000000	2.366864
71	170	166	170	0.000000000	0.02352941	0	4	0.0000000	2.352941

72	171	167	171	0.000000000	0.02339181	0	4	0.0000000	2.339181
73	172	168	172	0.000000000	0.02325581	0	4	0.0000000	2.325581
74	173	169	173	0.000000000	0.02312139	0	4	0.0000000	2.312139
75	174	170	174	0.000000000	0.02298851	0	4	0.0000000	2.298851
76	175	171	175	0.000000000	0.02285714	0	4	0.0000000	2.285714
77	176	172	176	0.000000000	0.02272727	0	4	0.0000000	2.272727
78	177	173	177	0.000000000	0.02259887	0	4	0.0000000	2.259887
79	178	174	178	0.000000000	0.02247191	0	4	0.0000000	2.247191
80	179	175	179	0.000000000	0.02234637	0	4	0.0000000	2.234637
81	180	176	180	0.000000000	0.02222222	0	4	0.0000000	2.222222
82	181	177	181	0.000000000	0.02209945	0	4	0.0000000	2.209945
83	182	178	182	0.000000000	0.02197802	0	4	0.0000000	2.197802
84	183	179	183	0.000000000	0.02185792	0	4	0.0000000	2.185792
85	184	180	184	0.000000000	0.02173913	0	4	0.0000000	2.173913
86	185	181	185	0.000000000	0.02162162	0	4	0.0000000	2.162162
87	186	182	186	0.000000000	0.02150538	0	4	0.0000000	2.150538
88	187	183	187	0.000000000	0.02139037	0	4	0.0000000	2.139037
89	188	184	188	0.000000000	0.02127660	0	4	0.0000000	2.127660
90	189	185	189	0.000000000	0.02116402	0	4	0.0000000	2.116402
91	190	186	190	0.000000000	0.02105263	0	4	0.0000000	2.105263
92	191	187	191	0.000000000	0.02094241	0	4	0.0000000	2.094241
93	192	188	192	0.000000000	0.02083333	0	4	0.0000000	2.083333
94	193	189	193	0.000000000	0.02072539	0	4	0.0000000	2.072539
95	194	190	194	0.000000000	0.02061856	0	4	0.0000000	2.061856
96	195	191	195	0.000000000	0.02051282	0	4	0.0000000	2.051282
97	196	192	196	0.000000000	0.02040816	0	4	0.0000000	2.040816
98	197	193	197	0.000000000	0.02030457	0	4	0.0000000	2.030457
99	198	194	198	0.000000000	0.02020202	0	4	0.0000000	2.020202
100	199	194	199	0.000000000	0.02512563	0	5	0.0000000	2.512563
101	200	195	200	0.000000000	0.02500000	0	5	0.0000000	2.500000
102	201	196	201	0.000000000	0.02487562	0	5	0.0000000	2.487562
103	202	197	202	0.000000000	0.02475248	0	5	0.0000000	2.475248
104	203	198	203	0.000000000	0.02463054	0	5	0.0000000	2.463054
105	204	199	204	0.000000000	0.02450980	0	5	0.0000000	2.450980
106	205	200	205	0.000000000	0.02439024	0	5	0.0000000	2.439024
107	206	201	206	0.000000000	0.02427184	0	5	0.0000000	2.427184
108	207	202	207	0.000000000	0.02415459	0	5	0.0000000	2.415459
109	208	203	208	0.000000000	0.02403846	0	5	0.0000000	2.403846
110	209	204	209	0.000000000	0.02392344	0	5	0.0000000	2.392344
111	210	205	210	0.000000000	0.02380952	0	5	0.0000000	2.380952
112	211	206	211	0.000000000	0.02369668	0	5	0.0000000	2.369668
113	212	207	212	0.000000000	0.02358491	0	5	0.0000000	2.358491
114	213	208	213	0.000000000	0.02347418	0	5	0.0000000	2.347418

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115  214   209   214 0.000000000 0.02336449      0       5 0.0000000 2.336449
116  215   210   215 0.000000000 0.02325581      0       5 0.0000000 2.325581
117  216   211   216 0.000000000 0.02314815      0       5 0.0000000 2.314815
118  217   212   217 0.000000000 0.02304147      0       5 0.0000000 2.304147
119  218   213   218 0.000000000 0.02293578      0       5 0.0000000 2.293578
120  219   214   219 0.000000000 0.02283105      0       5 0.0000000 2.283105
121  220   215   220 0.000000000 0.02272727      0       5 0.0000000 2.272727
122  221   216   221 0.000000000 0.02262443      0       5 0.0000000 2.262443
123  222   217   222 0.000000000 0.02252252      0       5 0.0000000 2.252252
124  223   218   223 0.000000000 0.02242152      0       5 0.0000000 2.242152
125  224   219   224 0.000000000 0.02232143      0       5 0.0000000 2.232143
126  225   220   225 0.000000000 0.02222222      0       5 0.0000000 2.222222
127  226   221   226 0.000000000 0.02212389      0       5 0.0000000 2.212389
128  227   222   227 0.000000000 0.02202643      0       5 0.0000000 2.202643
129  228   223   228 0.000000000 0.02192982      0       5 0.0000000 2.192982
130  229   224   229 0.000000000 0.02183406      0       5 0.0000000 2.183406
131  230   225   230 0.000000000 0.02173913      0       5 0.0000000 2.173913
132  231   226   231 0.000000000 0.02164502      0       5 0.0000000 2.164502
133  232   227   232 0.000000000 0.02155172      0       5 0.0000000 2.155172
134  233   228   233 0.000000000 0.02145923      0       5 0.0000000 2.145923
135  234   229   234 0.000000000 0.02136752      0       5 0.0000000 2.136752
136  235   230   235 0.000000000 0.02127660      0       5 0.0000000 2.127660
137  236   231   236 0.000000000 0.02118644      0       5 0.0000000 2.118644
138  237   232   237 0.000000000 0.02109705      0       5 0.0000000 2.109705
139  238   233   238 0.000000000 0.02100840      0       5 0.0000000 2.100840
140  239   234   239 0.000000000 0.02092050      0       5 0.0000000 2.092050
141  240   235   240 0.000000000 0.02083333      0       5 0.0000000 2.083333
142  241   236   241 0.000000000 0.02074689      0       5 0.0000000 2.074689
143  242   237   242 0.000000000 0.02066116      0       5 0.0000000 2.066116
144  243   238   243 0.000000000 0.02057613      0       5 0.0000000 2.057613
145  244   239   244 0.000000000 0.02049180      0       5 0.0000000 2.049180
146  245   240   245 0.000000000 0.02040816      0       5 0.0000000 2.040816
147  246   241   246 0.000000000 0.02032520      0       5 0.0000000 2.032520
148  247   242   247 0.000000000 0.02024291      0       5 0.0000000 2.024291
149  248   243   248 0.000000000 0.02016129      0       5 0.0000000 2.016129
150  249   244   249 0.000000000 0.02008032      0       5 0.0000000 2.008032
151  250   245   250 0.000000000 0.02000000      0       5 0.0000000 2.000000
152  251   246   251 0.000000000 0.01992032      0       5 0.0000000 1.992032
153  252   247   252 0.000000000 0.01984127      0       5 0.0000000 1.984127
154  253   248   253 0.000000000 0.01976285      0       5 0.0000000 1.976285
155  254   249   254 0.000000000 0.01968504      0       5 0.0000000 1.968504
156  255   250   255 0.000000000 0.01960784      0       5 0.0000000 1.960784
157  256   251   256 0.000000000 0.01953125      0       5 0.0000000 1.953125
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158	257	252	257	0.000000000	0.01945525	0	5	0.0000000	1.945525
159	258	253	258	0.000000000	0.01937984	0	5	0.0000000	1.937984
160	259	254	259	0.000000000	0.01930502	0	5	0.0000000	1.930502
161	260	255	260	0.000000000	0.01923077	0	5	0.0000000	1.923077
162	261	256	261	0.000000000	0.01915709	0	5	0.0000000	1.915709
163	262	257	262	0.000000000	0.01908397	0	5	0.0000000	1.908397
164	263	257	263	0.000000000	0.02281369	0	6	0.0000000	2.281369
165	264	258	264	0.000000000	0.02272727	0	6	0.0000000	2.272727
166	265	259	265	0.000000000	0.02264151	0	6	0.0000000	2.264151
167	266	260	266	0.000000000	0.02255639	0	6	0.0000000	2.255639
168	267	261	267	0.000000000	0.02247191	0	6	0.0000000	2.247191
169	268	262	268	0.000000000	0.02238806	0	6	0.0000000	2.238806
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171	270	264	270	0.000000000	0.02222222	0	6	0.0000000	2.222222
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399  498   489   496 0.004016064 0.01807229      2      9 0.4016064 1.807229
400  499   490   497 0.004008016 0.01803607      2      9 0.4008016 1.803607
401  500   491   498 0.004000000 0.01800000      2      9 0.4000000 1.800000
```

Key Function

The key calculations are done by the customized function **CalcLmt**

```
CalcLmt
```

```
function (size, pct, alpha = 0.05)
{
    n <- length(size)
    low <- rep(NA, n)
    upp <- rep(NA, n)
```

```
    for (i in 1:n) {
        k <- floor(size[i] * pct)
        pval <- pbinom(k, size = size[i], prob = pct, lower.tail = TRUE)
        while (pval >= alpha & k > 0) {
            k <- k - 1
            pval <- pbinom(k, size = size[i], prob = pct, lower.tail = TRUE)
        }
        if (pval < alpha) {
            low[i] <- k + 1
        }
        else {
            low[i] <- 0
        }
        k <- ceiling(size[i] * pct)
        pval <- pbinom(k, size = size[i], prob = pct, lower.tail = FALSE)
        while (pval >= alpha & k < size[i]) {
            k <- k + 1
            pval <- pbinom(k, size = size[i], prob = pct, lower.tail = FALSE)
        }
        if (pval < alpha) {
            upp[i] <- k
        }
        else {
            upp[i] <- size[i]
        }
    }
    lowpct <- low/size
    upppct <- upp/size
    if (pct > 0.5) {
        outlow <- 1 - upppct
        outupp <- 1 - lowpct
        out <- data.frame(size = size, lower = low, upper = upp,
            outlow = outlow, outupp = outupp)
    }
    else {
        out <- data.frame(size = size, lower = low, upper = upp,
            lowpct = lowpct, upppct = upppct)
    }
    out
}
<bytecode: 0x0000000023601330>
```

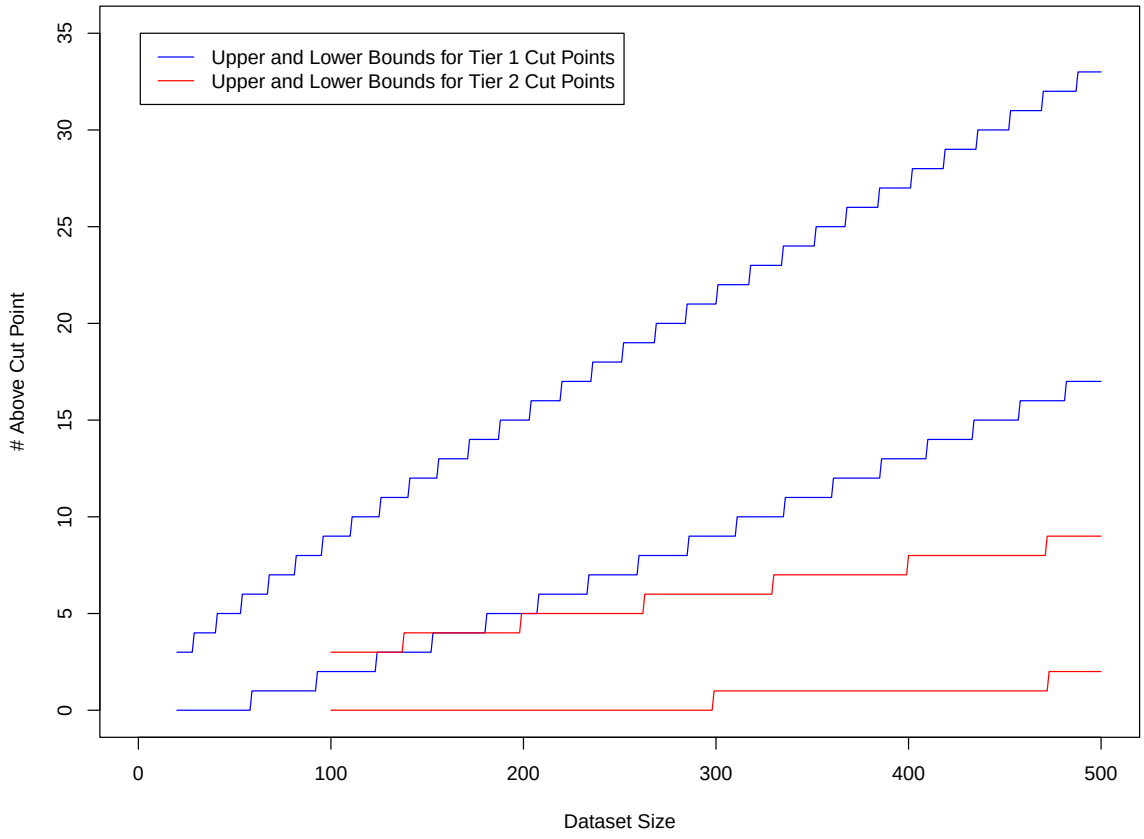
Codes to Produce Figs 1&2

Here are the codes to produce Fig 1:

```
plot(T1crit$size, T1crit$size-T1crit$upper, xlim=c(0, 500), ylim=c(0, 35),
     xlab="Dataset Size", ylab="# Above Cut Point", type="l", col="blue")
lines(T1crit$size, T1crit$size-T1crit$lower, lty=1, col="blue")

lines(T2crit$size, T2crit$size-T2crit$upper, lty=1, col="red")
lines(T2crit$size, T2crit$size-T2crit$lower, lty=1, col="red")

legend(1, 35, lty=c(1,1), col=c("blue","red"),
       legend=c("Upper and Lower Bounds for Tier 1 Cut Points",
                "Upper and Lower Bounds for Tier 2 Cut Points"))
```

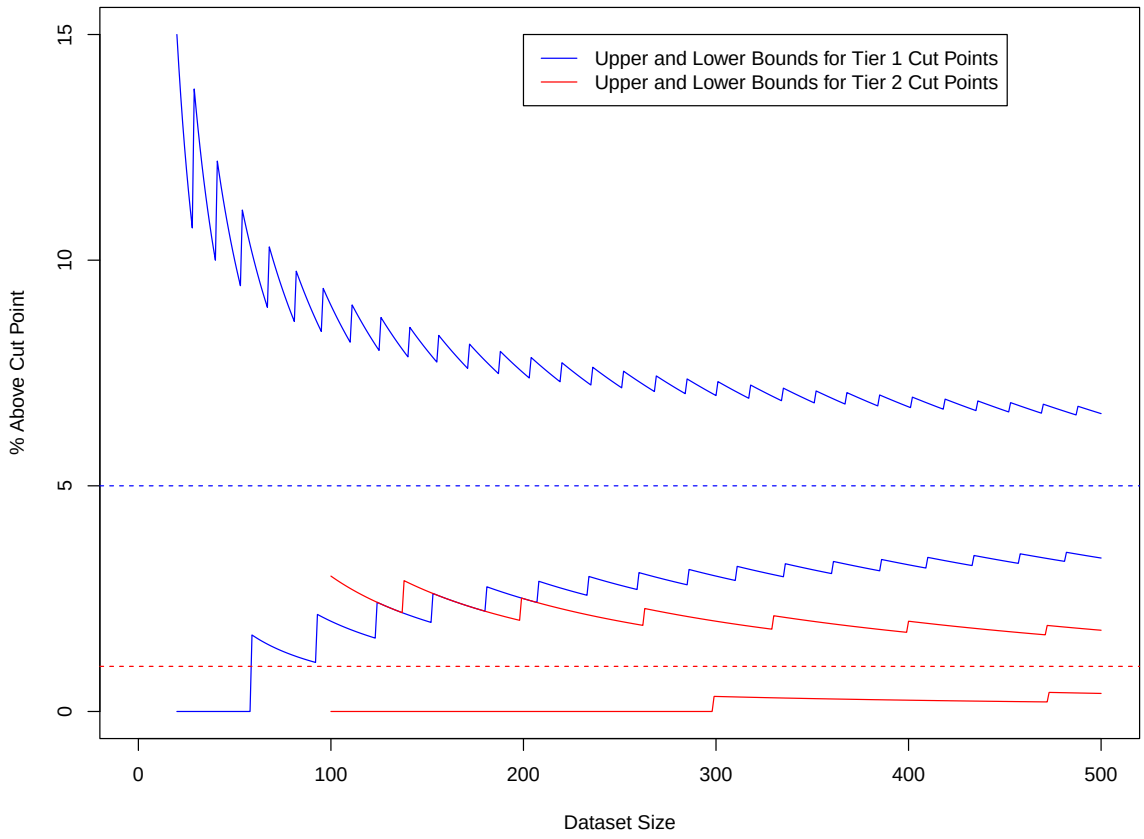


Here are the codes to produce Fig 2:

```
plot(T1crit$size, T1crit$outupp*100, xlim=c(0, 500), ylim=c(0, 15),
     xlab="Dataset Size", ylab="% Above Cut Point", type="l", col="blue")
lines(T1crit$size, T1crit$outlow*100, lty=1, col="blue")
abline(h=5, lty=2, col="blue")

lines(T2crit$size, T2crit$outupp*100, lty=1, col="red")
lines(T2crit$size, T2crit$outlow*100, lty=1, col="red")
abline(h=1, lty=2, col="red")

legend(200, 15, lty=c(1,1), col=c("blue","red"),
       legend=c("Upper and Lower Bounds for Tier 1 Cut Points",
                "Upper and Lower Bounds for Tier 2 Cut Points"))
```



Reference

Tan, Charles Y., Gregory S. Steeno, Zhiping You, Puneet Gaitonde, Chun-Hua Cai, John Kamerud, Boris Gorovits, and Daniel J. Baltrukonis. 2020. "Criteria to Reevaluate Anti-Drug Antibody Assay Cut Point Suitability in the Target Population." Journal Article. *The AAPS Journal* 22 (2): 19. https://doi.org/10.1208/s12248-019-0400-4.