Regulatory Compliance Key Indicator Metric and Matrix Update/Revision Technical Research Note

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Over the past decade in doing research on the Regulatory Compliance Key Indicator Metric (RCKIm) it has become very clear that false negatives needed to be controlled for because of their potential to increase morbidity and mortality. When dealing with regulatory compliance and full compliance as the threshold for the high grouping variable in the 2 x 2 Regulatory Compliance Key Indicator Matrix (RCKIM)(see matrix below), false negatives could be either eliminated or reduced to the point of no concern.

However, in the event that substantial compliance rather than full compliance is used as the thresh old for the high grouping variable in the 2 x 2 Regulatory Compliance Key Indicator Matrix (RCKIM) this becomes a problem again. There is the need to introduce a weighting factor.

In utilizing the RCKIm, the following equation/algorithm is used to produce the Fiene Coefficient (FC):

FC = ((A)(D)) – ((B)(C)) / sqrt (WXYZ)

This RCKIm needs to be revised/updated to the following in order to take into account the need to again eliminate false negatives being generated by the results of the equation/algorithm; this can be accomplished by cubing B:

FC* = ((A)(D)) – ((B^3)(C)) / sqrt (WXYZ)

By this simple adjustment to cube (B) it will basically eliminate the use of any results in which a false negative occurs when substantial compliance is determined. The table below displays the variables of the Regulatory Compliance Key Indicator Matrix (RCKIM).

RCKIM	High RC Group	RC Low Group	Totals
KI In Compliance	A	B^3	Y
KI Violations	C	D	Z
Totals	W	X	

Regulatory Compliance Key Indicator Matrix (RCKIM)

In the above examples, FC can be used when the High RC Group is at full regulatory compliance, but FC* needs to be used when the High RC Group is including substantial as well as full regulatory compliance. By using both equations/algorithms, it better deals with the results of the Regulatory Compliance Theory of Diminishing Returns.

The results should clearly show that only positive (+) coefficients will become Regulatory Compliance Key Indicators versus those rules that do not show any relationship to overall regulatory compliance (0), but now the negative (-) coefficients will more clearly show when any false negatives appear and clearly not include them as Regulatory Compliance Key Indicators. This is a major improvement in the Regulatory Compliance Key Indicator methodology which clearly demonstrates the differences in the results. It provides a gateway in those regulatory compliance data distributions where substantial regulatory compliance is heavily present while full regulatory compliance is not. This could become a problem as the regulatory science field moves forward with the use of the Regulatory Compliance Theory of Diminishing Returns. Below are some data displays to support this revision/update:

RCKIM: Regulatory Compliance Key Indicator Metric (Fiene, 2023)

A	B	C	D	E	F	G	H	I	J	K	L	M	N
20	24	30	26	44	56	50	50	520	720	6160000	2481.934729	-200	-0.080582
20	0	30	26	20	56	50	26	520	0	1456000	1206.64825	520	0.430946
20	1000	30	26	1020	56	50	1026	520	30000	2.93E+09	54131.83906	-29480	-0.544596
20	1	30	26	21	56	50	27	520	30	1587600	1260	490	0.388889
20	24	1000	26	44	1026	1020	50	520	24000	2.3E+09	47982.7469	-23480	-0.489343
20	0	0	26	20	26	20	26	520	0	270400	520	520	1
0	24	30	0	24	30	30	24	0	720	518400	720	-720	-1
25	25	25	25	50	50	50	50	625	625	6250000	2500	0	0
20	5	30	26	25	56	50	31	520	150	2170000	1473.091986	370	0.251172
20	5	10	26	25	36	30	31	520	50	837000	914.8770409	470	0.51373
20	24	30	6	44	36	50	30	120	720	2376000	1541.427909	-600	-0.389249
10	24	30	6	34	36	40	30	60	720	1468800	1211.940593	-660	-0.544581

Variables Reference

Excel = RCKIM Variables

a=a	OK
b=b	False Negative (-)
c=c	False Positive (+)
d=d	OK
e=a+b	
f=c+d	
g=a+c	
h=b+d	
i=a*d	
j=b*c	
k=w*x*y*z	
l=sqrt wxyz	
m=(a*d)-(b*c)	
n=fc	+=OK
	0=Random
	-=NULL

Regulatory Compliance Key Indicator Equations/Algorithms and 2 x 2 Matrix:

*fc = ((a*d) - (b*c)) / sqrt wxyz* Full Regulatory Compliance
fc = ((a*d) - ((b^3*c)) / sqrt wxyz* Substantial Regulatory Compliance

A	B^3	W
C	D	X
Y	Z	RCKIMatrix

(Fiene (2023). Regulatory Compliance Key Indicator Metric & Matrix. Research Institute for Key Indicators, Etown, PA.)

A	B	C	D	E	F	G	H	I	J	K	L	M	N=FC	B^3
20	1	50	20	21	70	70	21	400	50	2160900	1470	350	0.238095	1
20	2	50	20	22	70	70	22	400	100	2371600	1540	300	0.194805	8
20	3	50	20	23	70	70	23	400	150	2592100	1610	250	0.15528	27
20	4	50	20	24	70	70	24	400	200	2822400	1680	200	0.119048	64
20	5	50	20	25	70	70	25	400	250	3062500	1750	150	0.085714	125
20	6	50	20	26	70	70	26	400	300	3312400	1820	100	0.054945	216
20	0	50	20	20	70	70	20	400	0	1960000	1400	400	0.285714	0
20	0	40	20	20	60	60	20	400	0	1440000	1200	400	0.333333	0
20	10	40	20	30	60	60	30	400	400	3240000	1800	0	0	1000
20	11	40	20	31	60	60	31	400	440	3459600	1860	-40	-0.021505	1331

A	B^3	C	D	A+B	C+D	A+C	B+D	A*D	B*C	WXYZ	sqrtWXYZ	(A*D)-(B*C)	FC*
20	1	50	20	21	70	70	21	400	50	2160900	1470	350	0.238095
20	8	50	20	28	70	70	28	400	400	3841600	1960	0	0
20	27	50	20	47	70	70	47	400	1350	10824100	3290	-950	-0.288754
20	64	50	20	84	70	70	84	400	3200	34574400	5880	-2800	-0.47619
20	125	50	20	145	70	70	145	400	6250	1.03E+08	10150	-5850	-0.576355
20	216	50	20	236	70	70	236	400	10800	2.73E+08	16520	-10400	-0.62954
20	0	50	20	20	70	70	20	400	0	1960000	1400	400	0.285714
20	0	40	20	20	60	60	20	400	0	1440000	1200	400	0.333333
20	1000	40	20	1020	60	60	1020	400	40000	3.75E+09	61200	-39600	-0.647059
20	1331	40	20	1351	60	60	1351	400	53240	6.57E+09	81060	-52840	-0.651863

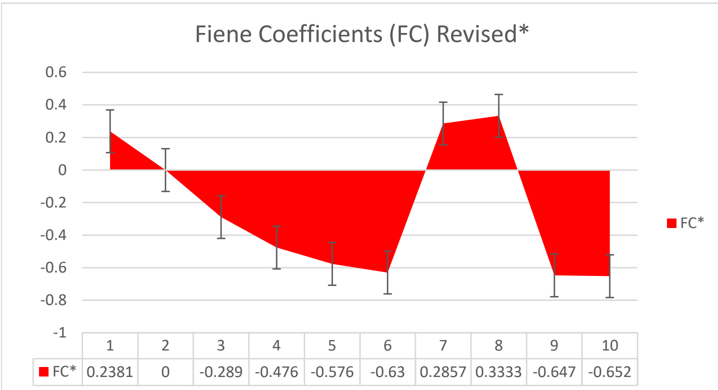


Chart 1: Revised/Updated Fiene Coefficients

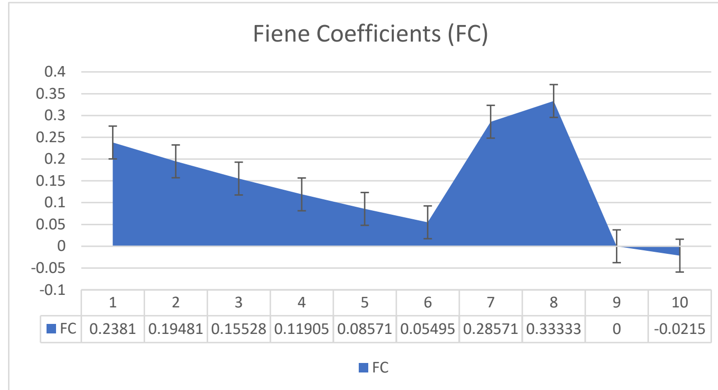
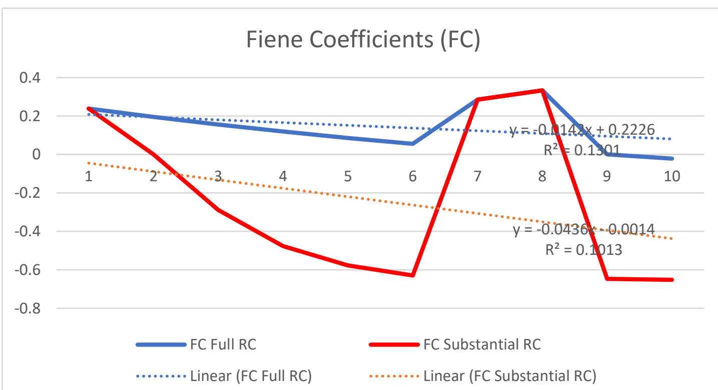


Chart 2: Standard Fiene Coefficients

It is clear from the above two charts that the revised/updated Fiene Coefficients take the risk factor more into account than the standard Fiene Coefficient.
Using Chart 1 will be a more effective and efficient methodology to determing the regulatory compliance key indicators, especially when substantial compliance is utilized in determining the high regulatory compliant group. Chart 1 utilizies a weighting factor while that is not the case in Chart 2.
When full compliance is utilized in determining the high regulatory compliance group than Chart 2: Standard Fiene Coefficients is sufficient.



0.238095	0.238095	1
0.194805	0	2
0.15528	-0.288754	3
0.119048	-0.47619	4
0.085714	-0.576355	5
0.054945	-0.62954	6
0.285714	0.285714	7
0.333333	0.333333	8
0	-0.647059	9
-0.021505	-0.651863	10
FC Full	FC Subst	Pairings

Chart 3: Fiene Coefficients side by side for full regulatory compliance and substantial regulatory compliance.

FC for substantial regulatory compliance clearly demonstrates the effectiveness and efficiency of the revised and updated Regulatory Compliance Key Indicator Metric.
It eliminates any potential key indicator that has significant false negatives present within the Regulatory Compliance Key Indicator Matrix.
It should be noted the perfect match on the 7th and 8th pairing when there are not any false negatives present.