National Association for Regulatory Administration

Minnesota Key Indicator Report for Family Child Care

400 South 4th Street, Ste. 754E | Minneapolis, MN 55415 | (888) 674-7052
www.naralicensing.org
CONSUMER PROTECTION THROUGH PREVENTION

RESEARCH REPORT

Minnesota Family Child Care Key Indicator Study

Abstract

This report provides the results from the Minnesota Family Child Care Licensing Key Indicator Study which dealt with over 2000 sites. The study was unique in the level of data skewness, the need for dichotomization of the data base, the elimination of false negatives, the increased effect size, and the stringent p values.

Richard Fiene, Ph.D.

Updating the Licensing Key Indicator Methodology for Very Skewed Data: The Minnesota Family Child Care Study

Richard Fiene, Ph.D.

National Association for Regulatory Administration

Research Institute for Key Indicators and Penn State University

December 2019

INTRODUCTION

This report will describe the Minnesota Family Child Care Licensing Key Indicator Study completed in 2019. This study was very unique in utilizing several advancements in the Key Indicator Methodology. The first major change is dealing with the full population of family child care sites and not needing to select samples. Over 2000 sites were in the data base (over 17MB) with over 400 rules. Only full reviews were included in the analyses.

The second enhancement was the utilization of data dichotomization. This statistical technique has been used in the past with great success and has been recommended as the best model in determining licensing key indicators because of their skewed data distributions and nominal measurement scale. Within this study, this model was tested against other data base models and it was clearly determined that the 25/50/25 data dichotomization model was the best analytical model to use with these very skewed data. The 25/50/25 data dichotomization model uses the top 25% of compliant programs and the bottom 25% of the lowest compliant programs. The middle 50% compliant programs are not used in the statistical analyses. The data distribution from Minnesota family child care is one of the most skewed data distributions analyzed to date by this researcher and is in the Early Childhood Program Quality Improvement and Indicator Model (ECPQI2M).

The third enhancement was the use of full compliance (100% compliance with all rules) as defining the high group in the Key Indicator 2 x 2 Matrix. By utilizing this criterion it dramatically reduces the false negatives to practically zero. When dealing with population data, it is highly recommended in going forward with these types of data analyses to utilize this criterion. With sampled data, it may not be possible to be this stringent.

The fourth enhancement which added to the stringent threshold was placing the p value at .0001 which reduced the number of licensing key indicators to only those that were most significant. This along with a very large effect size (.40+) has increased the thresholds for inclusion as licensing key indicators. In the

past a .25+ coefficient has always been the threshold. But with the increased use of population data, this can be increased.

All of these above enhancements are highly recommended for future licensing key indicator research and analyses. It helps to really make the methodology more stable and stringent giving a more conservative estimate with the population data distributions. Please see the Appendix for a more detailed explanation of these enhancements.

RESULTS

Here are the results from the analyses performed on the full data distribution. There are 26 key indicator rules out of a total of over 400 rules which represents approximately 5% of all the rules. This is within the typical range of key indicator rule identification, albeit on the lower end (5-10%).

Rule/Item #	Brief Description	Phi Coefficient
1184	Written Policies: Non-Discriminatory	.41
1185	Policies for Ill Children	.41
1186	Fire Drill Log	.41
1190	Plans for Helper Emergencies	.41
1192	Complete Copy of Family Child Care Rules	.45
1193	Insurance Coverage	.41
1268	Self Closing Garage Door	.59
1297	Water Temperature	.54
1501	Training	.50
1504	First Aid Training w/I two Years	.41
1515	Sudden Infant Death Training	.51
1520	Sixteen Hours of Training Each Year	.55
1523	Training Supervision Safety	.53
1526	Information for Child's Record	.47
1529	Admission/Arrangement Forms Signed	.60
1530	Child's Name and Date of Birth	.42
1532	Home Address	.51
1533	Physician Contact for Emergencies	.66

1534	Case for Emergencies	.41
1536	Enrollment Dates	.52
1537	Financial Arrangements	.64
1538	Insurance	.61
1543	Toilet Training	.45
1554	Crib Information	.44
1555	Makes Available to Parents	.41
2028	Immunizations Records	.51

DISCUSSION

Although there were some limitations in dealing with this very skewed data distribution, there was a good deal of overlap with the ECPQIM International Data Base with several of the licensing key indicators being present on both (Immunizations, First Aid Training, Fire Drills, Toilet Training Rules). However, Minnesota licensing staff should pay particular attention to the reliability and validity of their monitoring system to ascertain overall face validity of their licensing system. Validation studies as outlined by Stevens & Fiene (2019) would be an appropriate next step.

Richard Fiene, Ph.D., Research Psychologist, Research Institute for Key Indicators LLC (RIKI); Senior Research Consultant, National Association for Regulatory Administration (NARA); Professor of Psychology (ret), Penn State University.

Appendices

Definitions:

Risk Assessment (RA) - a differential monitoring approach that employs using only those rules, standards, or regulations that place children at greatest risk of mortality or morbidity if violations/citations occur with the specific rule, standard, or regulation.

Key Indicators (KI) - a differential monitoring approach that employs using only those rules, standards, or regulations that statistically predict overall compliance with all the rules, standards, or regulations. In other words, if a program is 100% in compliance with the Key Indicators the program will also be in substantial to full compliance with all rules, standards, or regulations. The reverse is also true in that if a program is not 100% in compliance with the Key Indicators the program will also have other areas of non-compliance with all the rules, standards, or regulations.

Differential Monitoring (DM) - this is a relatively new approach to determining the number of visits made to programs and what rules, standards, or regulations are reviewed during these visits. There are two measurement tools that drive differential monitoring, one is Weighted Risk Assessment tools and the other is Key Indicator checklists. Weighted Risk Assessments determine how often a program will be visited while Key Indicator checklists determine what rules, standards, or regulations will be reviewed in the program. Differential monitoring is a very powerful approach when Risk Assessment is combined with Key Indicators because a program is reviewed by the most critical rules, standards, or regulations and the most predictive rules, standards, or regulations. See Appendix which presents a ***Logic Model & Algorithm for Differential Monitoring (DMLMA©***)(Fiene, 2012).

Early Childhood Program Quality Indicator Model (ECPQIM) – these are models that employ a key indicator or dashboard approach to program monitoring. Major program monitoring systems in early care and education are integrated conceptually so that the overall early care and education system can be assessed and validated. With these models, it is possible to compare results obtained from licensing systems, quality rating and improvement systems (QRIS), risk assessment systems, key indicator systems, technical assistance, and child development/early learning outcome systems. The various approaches to validation are interposed within this model and the specific expected correlational thresholds that should be observed amongst the key elements of the model are suggested. Key Elements of the model are the following (see Appendix for details): CI = state or federal standards, usually rules or regulations that measure health and safety ***- Caring for Our Children or Head Start Performance Standards*** will be applicable here. PQ = Quality Rating and Improvement Systems (QRIS) standards at the state level; ***ERS (ECERS, ITERS, FDCRS), CLASS, or CDPES*** (Fiene & Nixon, 1985). RA = risk assessment tools/systems in which only the most critical rules/standards are measured. Stepping Stones is an example of this approach. KI = key indicators in which only predictor rules/standards are measured. The ***Thirteen Indicators of Quality Child Care*** is an example of this approach. DM = differential monitoring decision making in which it is determined if a program is in compliance or not and the number of visits/the number of rules/standards are ascertained from a scoring protocol. PD = technical assistance/training and/or professional development system which provides targeted assistance to the program based upon the DM results. CO = child outcomes which assesses how well the children are developing which is the ultimate goal of the system. Please see the following Appendix for the ***Logic Model and Algorithm***.

Algorithms and Logic Model:

Theory of Regulatory Compliance Algorithm (Fiene KIS Algorithm)

1) ΣR = C
2) Review C history x 3 yrs
3) NC + C = CI
4) If CI = 100 -> KI
5) If KI > 0 -> CI or if C < 100 -> CI
6) If RA (NC% > 0) -> CI
7) KI + RA = DM
8) KI = ((A)(D)) - ((B)(E)) / sqrt ((W)(X)(Y)(Z))
9) RA = ΣR1 + ΣR2 + ΣR3 + ….. ΣRn / N
10) (TRC = 99%) + (ϕ = 100%)
11) (CI < 100) + (CIPQ = 100) -> KI (10% CI) + RA (10-20% CI) + KIQP (5-10% of CIPQ) -> OU

Legend:

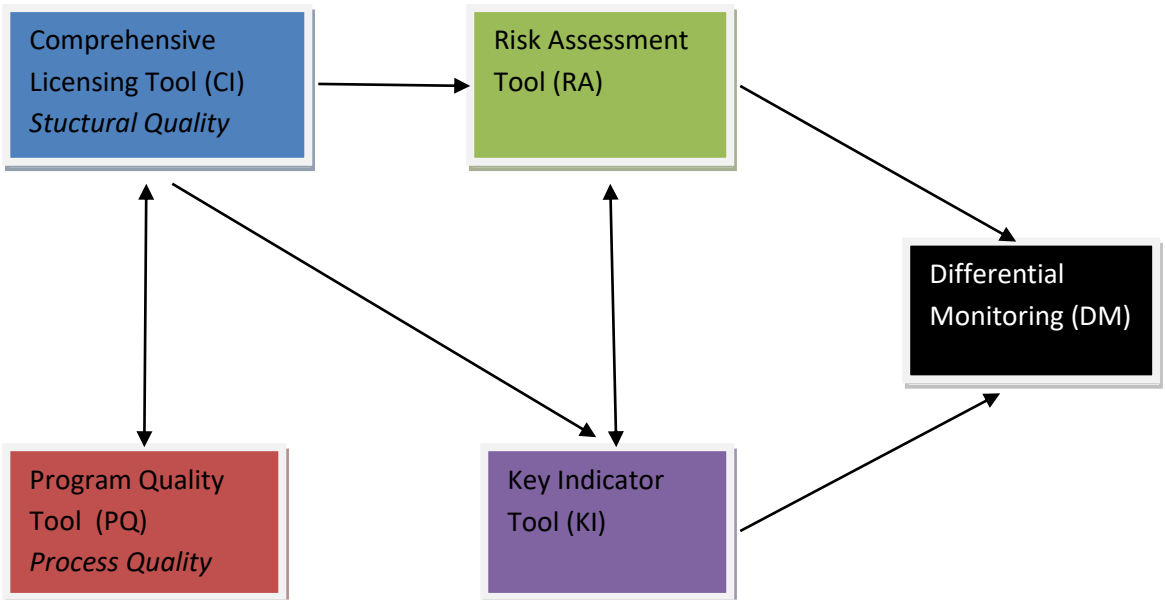
R = Rules/Regulations/Standards
C = Compliance with Rules/Regulations/Standards
NC = Non-Compliance with Rules/Regulations/Standards
CI = Comprehensive Instrument for determining Compliance
ϕ = Null
KI = Key Indicators; KI >= .26+ Include; KI <= .25 Null, do not include
RA = Risk Assessment
ΣR1 = Specific Rule on Likert Risk Assessment Scale (1-8; 1 = low risk, 8 = high risk)
N = Number of Stakeholders
DM = Differential Monitoring
TRC = Theory of Regulatory Compliance
CIPQ = Comprehensive Instrument Program Quality
KIPQ = Key Indicators Program Quality
OU = Outcomes
A = High Group + Programs in Compliance on Specific Compliance Measure (R1...Rn).
B = High Group + Programs out of Compliance on Specific Compliance Measure (R1...Rn).
E= Low Group + Programs in Compliance on Specific Compliance Measure (R1...Rn).
D = Low Group + Programs out of Compliance on Specific Compliance Measure (R1...Rn).
W = Total Number of Programs in Compliance on Specific Compliance Measure (R1...Rn).
X = Total Number of Programs out of Compliance on Specific Compliance Measure (R1...Rn).
Y = Total Number of Programs in High Group (ΣR = 98+).
Z = Total Number of Programs in Low Group (ΣR <= 97).
High Group = Top 25% of Programs in Compliance with all Compliance Measures (ΣR).
Low Group = Bottom 25% of Programs in Compliance with all Compliance Measures (ΣR).

DIFFERENTIAL MONITORING LOGIC MODEL & ALGORITHM (DMLMA©) (Fiene, 2012): A 4th Generation ECPQIM – Early Childhood Program Quality Indicator Model

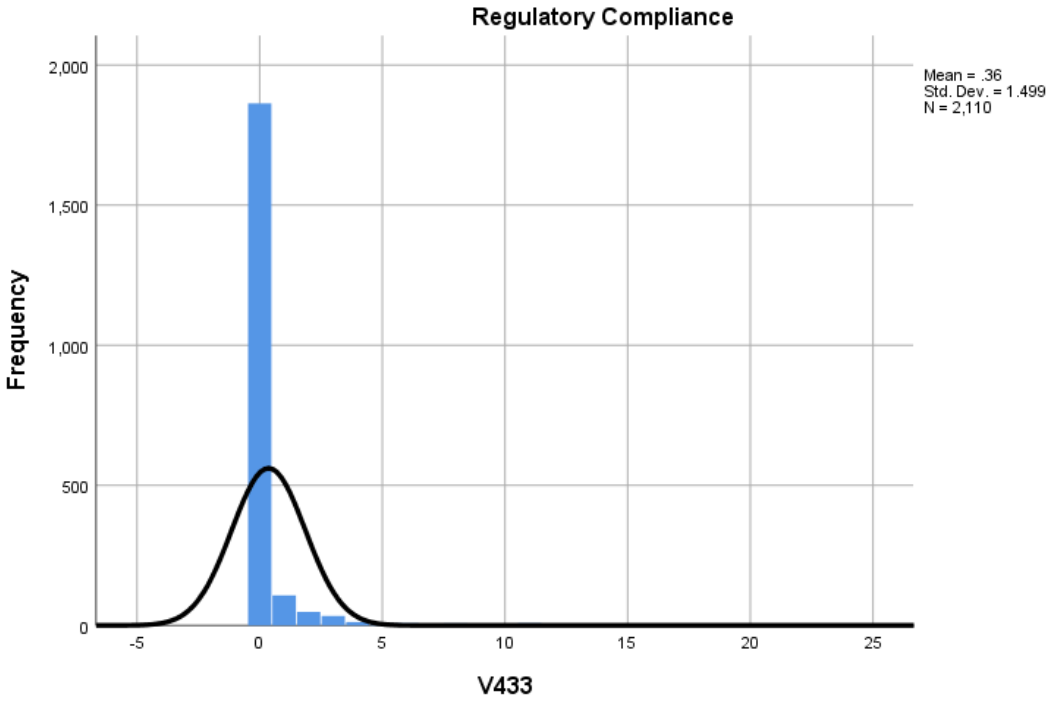
CI x PQ => RA + KI => DM + PD => CO

Definitions of Key Elements:

CI = Comprehensive Licensing Tool (Health and Safety)(***Caring for Our Children***)
PQ ***= ECERS-R, FDCRS-R, CLASS, CDPES*** (Caregiver/Child Interactions/Classroom Environment)
RA = Risk Assessment, (High Risk Rules)(***Stepping Stones***)
KI = Key Indicators (Predictor Rules)***(13 Key Indicators of Quality Child Care***)
DM = Differential Monitoring, (How often to visit and what to review)
PD = Professional Development/Technical Assistance/Training
CO = Child Outcomes (See Next Slide for PD and CO Key Elements)



Data Distribution Graphic:



Technical Detail Updates to the Fiene Key Indicator Methodology

January 2015

The Key Indicator Methodology has recently been highlighted in a very significant Federal Office of Child Care publication series on Contemporary Licensing Highlights. In that Brief the Key Indicator Methodology is described as part of a differential monitoring approach along with the risk assessment methodology. Because of the potential increased interest in the Key Indicator Methodology, a brief update regarding the technical details of the methodology is warranted. For those readers who are interested in the historical development of Key Indicators I would suggest they download the resources available at the end of the paper.

This brief paper provides the technical and statistical updates for the key indicator methodology based upon the latest research in the field related to licensing and quality rating & improvement systems (QRIS). The examples will be drawn from the licensing research but all the reader needs to do is substitute "rule" for "standard" and the methodology holds for QRIS.

Before proceeding with the technical updates, let me review the purpose and conceptual underpinning of the Key Indicator Methodology. Key Indicators generated from the methodology are not the rules that have the highest levels of non-compliance nor are they the rules that place children most at risk of mortality or morbidity. Key Indicators are generally somewhere in the middle of the pack when it comes to non-compliance and risk assessment. The other important conceptual difference between Key Indicators and risk assessment is that only Key Indicators statistically predict or are predictor rules of overall compliance with all the rules for a particular service type. Risk assessment rules do not predict anything other than a group of experts has rated these rules as high risk for children's mortality/morbidity if not complied with.

Something that both Key Indicators and risk assessment have in common is through their use one will save time in their monitoring reviews because you will be looking at substantially fewer rules. But it is only with Key Indicators that you can statistically predict additional compliance or non-compliance; this is not the case with risk assessment in which one is only looking at those rules which are a state's high risk rules. And this is where differential monitoring comes into play by determining which programs are entitled to either Key Indicators and/or risk assessment for more abbreviated monitoring reviews rather than full licensing reviews (the interested reader

should see the *Contemporary Licensing Series on Differential Monitoring, Risk Assessment and Key Indicators* published by the Office of Child Care.

Technical and Statistical Framework

One of the first steps in the Key Indicator Methodology is to sort the licensing data into high and low groups, generally the highest and lowest licensing compliance with all the rules can be used for this sorting. Frequency data will be obtained on those programs in the top level (usually top 20-25%) and the bottom level (usually the bottom 20-25%). The middle levels are not used for the purposes of these analyses. These two groups (top level & the bottom level) are then compared to how each program scored on each child care rule (see Figure 1). In some cases, especially where there is very high compliance with the rules and the data are extremely skewed, it may be necessary to use all those programs that are in full (100%) compliance with all the rules as the high group. The next step is to look at each rule and determine if it is in compliance or out of compliance with the rule. This result is cross-referenced with the High Group and the Low Group as depicted in Figure 1.

Figure 1	***Providers In Compliance on Rule***	***Programs Out Of Compliance on Rule***	***Row Total***
Highest level (top 20-25%)	***A***	***B***	***Y***
Lowest level (bottom 20-25%)	**C**	**D**	***Z***
Column Total	***W***	***X***	***Grand Total***

Once the data are sorted in the above matrix, the following formula (Figure 2) is used to determine if the rule is a key indicator or not by calculating its respective Key Indicator coefficient. Please refer back to Figure 1 for the actual placement within the cells. The legend (Figure 3) below the formula shows how the cells are defined.

Figure 2 – Formula for Fiene Key Indicator Coefficient

$$\phi = (A)(D) - (B)(C) \div \sqrt{(W)(X)(Y)(Z)}$$

Figure 3 – Legend for the Cells within the Fiene Key Indicator Coefficient

A = High Group + Programs in Compliance on Specific Rule.
B = High Group + Programs out of Compliance on Specific Rule.
C = Low Group + Programs in Compliance on Specific Rule.
D = Low Group + Programs out of Compliance on Specific Rule.

W = Total Number of Programs in Compliance on Specific Rule.
X = Total Number of Programs out of Compliance on Specific Rule.
Y = Total Number of Programs in High Group.
Z = Total Number of Programs in Low Group.

Once the data are run through the formula in Figure 2, the following chart (Figure 4) can be used to make the final determination of including or not including the rule as a key indicator. Based upon the chart in Figure 4, it is best to have a Key Indicator Coefficient approaching +1.00 however that is rarely attained with licensing data but has occurred in more normally distributed data.

Continuing with the chart in Figure 4, if the Key Indicator Coefficient is between +.25 and -.25, this indicates that the indicator rule is unpredictable in being able to predict overall compliance with the full set of rules. Either a false positive in which the indicator appears too often in the low group as being in compliance, or a false negative in which the indicator appears too often in the high group as being out of compliance. This can occur with Key Indicator Coefficients above +.25 but it becomes unlikely as we approach +1.00 although there is always the possibility that other rules could be found out of compliance. Another solution is to increase the number of key indicator rules to be reviewed but this will cut down on the efficiency which is desirable and the purpose of the key indicators.

The last possible outcome with the Key Indicator Coefficient is if it is between -.26 and -1.00, this indicates that the indicator is a terrible predictor because it is doing just the opposite of the decision we want to make. The indicator rule would predominantly be in compliance with the low group rather than the high group so it would be statistically predicting overall non-compliance. This is obviously something we do not want to occur.

Figure 5 gives the results and decisions for a QRIS system. The thresholds in a QRIS system are increased dramatically because QRIS standard data are less skewed than licensing data and a

more stringent criterion needs to be applied in order to include particular standards as Key Indicators.

Figure 4 – Thresholds for the Fiene Key Indicators for Licensing Rules

Key Indicator Range	Characteristic of Indicator	Decision
(+1.00) – (+.26)	Good Predictor	Include
(+.25) – (-.25)	Unpredictable	Do not Include
(-.26) – (-1.00)	Terrible Predictor	Do not Include

Figure 5 – Thresholds for the Fiene Key Indicators for QRIS Standards

Key Indicator Range	Characteristic of Indicator	Decision
(+1.00) – (+.76)	Good Predictor	Include
(+.75) – (-.25)	Unpredictable	Do not Include
(-.26) – (-1.00)	Terrible Predictor	Do not Include

RESOURCES AND NOTES

For those readers who are interested in finding out more about the Key Indicator Methodology and the more recent technical updates as applied in this paper in actual state examples, please see the following publication:
Fiene (2014). *ECPQIM4©: Early Childhood Program Quality Indicator Model4*, Middletown: PA; Research Institute for Key Indicators LLC (RIKI). (http://drfiene.wordpress.com/riki-reports-dmlma-ecpqim4/)
In this book of readings/presentations are examples and information about differential monitoring, risk assessment, key indicators, validation, measurement, statistical dichotomization of data, and regulatory paradigms. This publication delineates the research projects, studies, presentations, & reports completed during 2013-14 in which these updates are drawn from.

For those readers interested in a historical perspective to the development of the Key Indicator methodology and licensing measurement, please see the following publications (most of these publications are available at the following website (http://rikinstitute.wikispaces.com/home):

Lahti, Elicker, Zellman, & Fiene (2014). Approaches to validating child care quality rating and improvement systems (QRIS): Results from two states with similar QRIS type designs, *Early Childhood Research Quarterly*, available online 9 June 2014, doi:10.1016/j.ecresq.2014.04.005.

Fiene (2013***).*** A Comparison of International Child Care and US Child Care Using the Child Care Aware – NACCRRA (National Association of Child Care Resource and Referral Agencies) Child Care Benchmarks, *International Journal of Child Care and Education Policy, 7(1),* 1-15.

Zellman & Fiene (2012). *Validation of quality rating and improvement systems for early care and education and school-age care*, Washington, D.C.: OPRE and Child Trends.

Fiene & Carl (2011). Child Care Quality Indicators Scale, in T Halle (Ed.), *Quality Rating and Improvement Systems Tool Kit*, Washington, D.C.: Child Trends.

Fiene (2007). Child Development Program Evaluation & Caregiver Observation Scale, in T Halle (Ed.), *Early Care and Education Quality Measures Compendium*, Washington, D.C.: Child Trends.

Fiene (2003). Licensing related indicators of quality child care, *Child Care Bulletin*, Winter 2002-2003, 12-13.

Fiene (2002). *Thirteen indicators of quality child care: Research update*. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, US Department of Health and Human Services.

Fiene, & Kroh (2000). Measurement tools and systems, in *Licensing Curriculum*, National Association for Regulatory Administration, Minneapolis, Minnesota.

Fiene (1997). Potential solution to the child day care trilemma related to quality, accessibility and affordability. *Child Care Information Exchange*, September, 57-60.

Fiene (1997). Human services licensing information system. *National Association for Regulatory Administration: Research Column*, Spring, 9-10.

Fiene (1996). Using a statistical-indicator methodology for accreditation, in *NAEYC Accreditation: A Decade of Learning and the Years Ahead*, S. Bredekamp & B. Willer, editors, Washington, D.C.: National Association for the Education of Young Children.

Kuhns & Fiene (1995). Promoting health and safety in child care programs, *Child Care Bulletin*, January-February (1), 3.

Fiene (1995). *National early childhood program accreditation standards*. Atlanta, Georgia: National Early Childhood Program Accreditation Commission.

Griffin & Fiene (1995). *A systematic approach to policy planning and quality improvement for child care: A technical manual for state administrators.* Washington, D.C.: National Center for Clinical Infant Programs-Zero to Three.

Fiene (1994). The case for national early care and education standards: Key indicator/predictor state child care regulations, *National Association of Regulatory Administration*, summer 1994, 6-8.

Fiene (1991). New early childhood research, evaluation and training program has impact on Pennsylvania for the 1990's, *Dimensions*, Fall, 4.

Fiene (1988). Human services instrument based program monitoring and indicator systems, in *Information Technology and the Human Services*, B. Glastonburg, W. LaMendola, & S. Toole, editors, Chichester, England: John Wiley and Sons.

Fiene & McDonald (1987). *Instrument based program monitoring for child welfare*, Portland, Maine: University of Southern Maine.

Fiene (1987). Using licensing data in human service programs, in *Licensing*, H. Hornby, editor, Portland, Maine: University of Southern Maine.

Fiene (1987). The indicator system, in *Evaluation and outcome monitoring*, H. Hornby, editor, Portland, Maine: University of Southern Maine.

Kontos & Fiene (1987). Child care quality, compliance with regulations, and children's development: The Pennsylvania Study, in *Quality in Child Care: What Does Research Tell Us?*, Phillips, editor, Washington, D.C.: National Association for the Education of Young Children.

Fiene (1987). Indicator checklist system, in *Maximizing the Use of Existing Data Systems*, Portland, Maine: University of Southern Maine.

Fiene (1986). State child care regulatory, monitoring and evaluation systems as a means for ensuring quality child development programs, in *Licensing of Children's Services Programs*, Richmond, Virginia: Virginia Commonwealth University School of Social Work. (ERIC/ECE ED322997)

Morgan, Stevenson, Fiene, & Stephens (1986). Gaps and excesses in the regulation of child day care, *Reviews of Infectious Diseases--Infectious Diseases in Child Day Care: Management and Prevention, 8*(4), 634-643.

Kontos & Fiene (1986). Predictors of quality and children's development in day care, in *Licensing of Children's Services Programs*, Richmond, Virginia: Virginia Commonwealth University School of Social Work.

Fiene & Nixon (1985). Instrument based program monitoring and the indicator checklist for child care, *Child Care Quarterly, 14*(3), 198-214.

Fiene (1985). Measuring the effectiveness of regulations, *New England Journal of Human Services, 5*(2), 38-39.

Fiene & Nixon (1983). *Indicator checklist system for day care monitoring*, Washington, D.C.: National Children's Services Monitoring Consortium.

Fiene & Nixon (1981). *An instrument based program monitoring information system: A new tool for day care monitoring*, Washington, D.C.: National Children's Services Monitoring Consortium.

Fiene (1981). A new tool for day care monitoring introduced by children's consortium, *Evaluation Practice, 1*(2), 10-11.

Fiene, Cardiff, & Littles (1975). Ecological monitoring information system, *In the Best Interests of Children*, July-September, 1975.

For additional information regarding this paper please contact:
Dr Richard Fiene
Research Institute for Key Indicators LLC (RIKI)
41 Grandview Avenue
Middletown, PA. 17057
717-944-5868
http://DrFiene.wordpress.com/home

RIKI LLC

Fiene KIM Technical Updates 2015

Technical Detail Notes: Validation Updates to the Fiene Key Indicator Systems

January 2015

These notes will provide guidance on validating existing Key Indicator Licensing Systems. These notes are based upon the last three years of research and data analysis in determining the best means for conducting these validation studies.

These notes are based upon existing Key Indicator Systems in which data can be drawn from an already present data base which contains the comprehensive instrument (total compliance data) and the key indicator instrument (key indicator rule data). When this is in place and it can be determined how licensing decisions are made: full compliance with all rules or substantial compliance with all rules to receive a license, then the following matrix can be used to begin the analyses (see Figure 1):

Figure 1	***Providers who fail the Key Indicator review***	***Providers who pass the Key Indicator review***	***Row Totals***
Providers who fail the Comprehensive review	***W***	***X***	
Providers who pass the Comprehensive Review	**Y**	**Z**	
Column Totals			***Grand Total***

A couple of annotations regarding Figure 1.

W + Z = the number of agreements in which the provider passed the Key Indicator review and also passed the Comprehensive review.

X = the number of providers who passed the Key Indicator review but failed the Comprehensive review. This is something that should not happen, but there is always the possibility this could occur because the Key Indicator Methodology is based on statistical methods and probabilities. We will call these False Negatives (FN).

Y = the number of providers who failed the Key Indicator review but passed the Comprehensive review. Again, this can happen but is not as much of a concern as with "**X**". We will call these False Positives (FP).

Figure 2 provides an example with actual data from a national organization that utilizes a Key Indicator System. It is taken from 50 of its program providers.

Figure 2	***Providers who fail the Key Indicator review***	***Providers who pass the Key Indicator review***	***Row Total***
Providers who fail the Comprehensive review	***25***	***1***	***26***
Providers who pass the Comprehensive Review	***7***	***17***	***24***
Column Total	***32***	***18***	***50***

To determine the agreement ratio, we use the following formula:

$$\frac{A}{A + D}$$

Where A = Agreements and D = Disagreements.

Based upon Figure 2, A + D = 42 which is the number of agreements; while the number of disagreements is represented by B = 1 and C = 7 for a total of 8 disagreements. Putting the numbers into the above formula:

$$\frac{42}{42 + 8}$$

Or

.84 = Agreement Ratio

The False Positives (FP) ratio is .14 and the False Negatives (FN) ratio is .02. Once we have all the ratios we can use the ranges in Figure 3 to determine if we can validate the Key Indicator System. The FP ratio is not used in Figure 3 but is part of the Agreement Ratio.

Figure 3 – Thresholds for Validating the Fiene Key Indicators for Licensing Rules

Agreement Ratio Range	False Negative Range	Decision
(1.00) – (.90)	.05+	Validated
(.89) – (.85)	.10 - .06	Borderline
(.84) – (.00)	.11 or more	Not Validated

RESOURCES AND NOTES

For those readers who are interested in finding out more about the Key Indicator Methodology and the more recent technical updates as applied in this paper in actual state examples, please see the following publication:

Fiene (2014). *ECPQIM4©: Early Childhood Program Quality Indicator Model4*, Middletown: PA; Research Institute for Key Indicators LLC (RIKI). (http://drfiene.wordpress.com/riki-reports-dmlma-ecpqim4/)

In this book of readings/presentations are examples and information about differential monitoring, risk assessment, key indicators, validation, measurement, statistical dichotomization of data, and regulatory paradigms. This publication delineates the research projects, studies, presentations, & reports completed during 2013-14 in which these updates are drawn from.

For those readers interested in a historical perspective to the development of the Key Indicator methodology and licensing measurement, please see the following publications (most of these publications are available at the following website (http://rikinstitute.wikispaces.com/home):

For additional information regarding this paper please contact:
Dr Richard Fiene
Research Institute for Key Indicators LLC (RIKI)
41 Grandview Avenue
Middletown, PA. 17057
717-944-5868
http://DrFiene.wordpress.com/home

RIKI LLC