Four technical research notes follow this brief introduction which will provide a blueprint for integrating data analysis within licensing and the various program quality interventions available in the early care and education field, such as quality rating and improvement systems, accreditation, professional development, pre-k programs, and such standards drawn from *Caring for Our Children*.

The four technical research notes are the following:

- *The Cumulative Effect of Standards on Early Care and Education Quality 2020,*
- *Regulatory Compliance Law of Diminishing Returns 2020,*
- *Theory of Early Childhood Outcomes 2019,*

These technical research notes when taken together will provide licensing researchers and other researchers interested in the relationship between regulatory compliance and quality a roadmap for doing this type of data analysis. Particular limitations and parameters are pointed out in the technical research notes. These technical research notes were written between the summer of 2018 to the winter of 2019-20.

These technical research notes build upon the regulatory science research literature in the human services over the past 50 years (for the interested reader, additional information can be found at the following website – [http://RIKInstitute.com](http://RIKInstitute.com).

For questions or comments about the four technical research notes, please contact:

Richard Fiene, Ph.D., Research Psychologist & Professor of Psychology (ret), The Pennsylvania State University.
[rf8@psu.edu](mailto:rf8@psu.edu)
Cumulative Effect of Standards on Early Care and Education Quality

Richard Fiene, Ph.D.

Research Institute for Key Indicators & Penn State University

January 2020

The purpose of this technical research note is to extend an early childhood program quality model first proposed by Gwen Morgan (1979). In that model, regulatory and non-regulatory interventions were proposed that would influence the overall quality of early childhood programs. This research note will only focus on the regulatory side, but it will attempt to depict the relationships amongst these interventions in mathematical and graphic terms (see Figure 1).

The advantage in this approach is to begin to tie the empirical data being generated by jurisdictions as they collect and analyze the data from licensing, quality initiatives, QRIS systems, accreditation, and Caring for Our Children standards. Although the graphic below and the relationship between the various standards are depicted in a linear fashion, it has been demonstrated that this linear relationship is not as smooth as it appears. The Regulatory Compliance Law of Diminishing Returns is an example of the non-linear relationship between licensing and program quality (Fiene, 2020).

The idea that possibly a step wise progression in moving from licensing to QRIS to accreditation may be more appropriate. Only with the use of the new empirical evidence emerging from these systems will we be able to confirm such a model. For now, what we know is that the move from licensing to QRIS in a linear fashion may not be as smooth as depicted in figure 1. In order to ensure a smooth transition as depicted in figure 1, additional standards, such as from a Pre-K program may need to be introduced.

Figure 1: The Cumulative Effect of Standards on Early Care & Education Quality
In figure 1 above, licensing is broken down into the major categories of low, mid, substantial (sub), and full regulatory compliance levels. This progression is depicted as a linear relationship with program quality; however, based upon the Regulatory Compliance Law of Diminishing Returns this is not usually the case. The progression is linear in moving from low to mid to substantial but it decreases or plateaus in moving from substantial to full. QRIS is depicted as a five star system (S1, S2, S3, S4, S5) but in some jurisdictions it may only be a four star system. And lastly is accreditation (acc) which is usually tied to the highest QRIS star level.

Three other program quality interventions need to be considered in this depiction: 1) professional development, 2) Pre-K programs, and 3) Caring for Our Children standards. All these quality interventions have a value added, strengthening effect on the relationship depicted in figure 1.
This brief technical research note will provide an update regarding the relationship between regulatory compliance and program quality/outcomes. Based upon the most recent research from studies with the national Head Start program, early care and education programs in Georgia and Washington, it is possible now to begin to address the limitations of full regulatory compliance and its lack of support for program quality/outcomes. The following figure (Figure 1) provides a graphic display of the relationship between these variables from the above-mentioned studies.

For sake of presentation, the data have been smooth-out so that it presents a clearer picture of the relationship. The important aspect of this relationship is not moving from low compliance to mid and substantial compliance. The relationship holds up as it should in demonstrating a consistent linear distribution. The most important aspect is in moving from substantial to full regulatory compliance in which the linear relationship breaks down and there is at least a plateau effect and in many cases a statistically significant drop off in quality outcomes (see Chart 1).

Figure 1: Relationship Between Regulatory Compliance and Program Quality/Outcomes
Based upon the empirical evidence from the above-mentioned studies (see Chart 1), it provides support in demonstrating the need to re-think how we approach regulatory compliance. It would appear to be more cost effective and efficient to determine which rules/regulations have the greatest impact on quality outcomes rather than looking at all rules/regulations as being equal in importance. So does regulatory compliance follow the economic rules of the law of diminishing returns in providing a healthy and safe setting for our clients. And do these findings in human services generalize to other services in the private economic sectors?

The following chart (Chart 1) provides data distributions from states and a national organization showing the relationship between specific program quality tools (ERS and CLASS) and regulatory compliance (RC) data. The last row gives the result as either the data dropping off or plateauing.

### Chart 1: Data Distributions for ERS and CLASS from Selected States

<table>
<thead>
<tr>
<th>RC</th>
<th>ERS1</th>
<th>ERS2</th>
<th>CLASS1</th>
<th>CLASS2</th>
<th>CLASS3</th>
<th>CLASS4</th>
<th>CLASS5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>3.84</td>
<td>3.40</td>
<td>5.91</td>
<td>2.55</td>
<td>3.03</td>
<td>5.99</td>
<td>5.59</td>
</tr>
<tr>
<td>Subst</td>
<td>4.26</td>
<td>3.77</td>
<td>6.22</td>
<td>2.77</td>
<td>3.15</td>
<td>5.93</td>
<td>5.50</td>
</tr>
<tr>
<td>Medium</td>
<td>4.18</td>
<td>3.26</td>
<td>-----</td>
<td>-----</td>
<td>2.87</td>
<td>5.85</td>
<td>5.37</td>
</tr>
<tr>
<td>Low1</td>
<td>3.92</td>
<td>2.51</td>
<td>6.14</td>
<td>2.55</td>
<td>2.65</td>
<td>5.71</td>
<td>5.32</td>
</tr>
<tr>
<td>Low2</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>2.56</td>
<td>5.52</td>
<td>4.93</td>
</tr>
<tr>
<td>Result</td>
<td>Drop Off</td>
<td>Drop Off</td>
<td>Drop Off</td>
<td>Drop Off</td>
<td>Plateau</td>
<td>Plateau</td>
<td></td>
</tr>
<tr>
<td>P values</td>
<td>.03</td>
<td>.001</td>
<td>n.s.</td>
<td>n.s.</td>
<td>.001</td>
<td>.001</td>
<td>.003</td>
</tr>
</tbody>
</table>

It is evident from the above data displays in Chart 1 that there is a plateau effect (n = 2) or in 5 cases the average quality scores showed a statistically significant decrease in moving from substantial (Subst) regulatory compliance to full regulatory compliance (Full).
A Theory on the Relationship With Professional Development, Program Quality and Regulatory Compliance Predicting Early Childhood Outcomes

Richard Fiene, Ph.D.

July 2019

This abstract is the compilation of 50 years of research into early childhood professional development, program quality indicators and regulatory compliance and their respective impact on early childhood outcomes. Professional development, program quality and regulatory compliance all have impacts on early childhood outcomes (ECO) but if we put them all in the same equation, what are their relative impact on outcomes. That is the purpose of this abstract. Based upon results from the Research Institute for Key indicators (RIKI) Early Childhood Program Quality Improvement and Indicators Model (ECPQIM) data base, it is now possible to ascertain their relative weights.

For purposes of this abstract, professional development (PD) includes any training, coaching or technical assistance which focuses on teaching staff. Program quality (PQ) includes Quality Rating and Improvement Systems (QRIS) standards and their respective observational evaluations (ERS, CLASS). Regulatory compliance (RC) includes licensing health and safety rules and regulations as promulgated and enforced by state agencies. In the past, these systems have been dealt with in silos and there has been very little attempts at combining them in any fashion. One of the results of the ECPQIM data base was and is to attempt combining these various systems into a unified equation or algorithm.

Based on the results of the ECPQIM data base results, the following equation/algorithm can depict this unified relationship:

\[ ECO = \Sigma (.50PD + .30PQ + .20RC) \]

In this relationship, the largest impact comes from the PD system, followed by the PQ system and lastly by the RC system. The implications of this relationship are that states may want to reconsider how they are allocating resources based upon this above equation/algorithm. This is a controversial proposal but one that should be considered since it is driven by empirical evidence into the relative impact over the past 50 years of research related to professional development, program quality and regulatory compliance as they relate to early childhood outcomes.
Three models are presented here which depict the theory of regulatory compliance as it has evolved over the past four decades. Initially, it was thought that there was a linear relationship between regulatory compliance and program quality as depicted in the first line graph below (see Figure 1). As compliance increased a corresponding increase in quality would be seen in the respective programs.

This initial graphic needed to be modified because of various studies conducted in order to confirm this regulatory compliance theory. It was discovered that at the lower ends of regulatory compliance there still was a linear relationship between compliance and quality. However, as the compliance scores continued to increase to a substantial level of compliance and then finally to full (100%) compliance with all rules, there was a corresponding drop off in quality as depicted in the second line graph below (see Figure 2).
This Non-Linear Model has worked well in explaining the Theory of Regulatory Compliance and the studies conducted for the past three decades. However, the most recent studies related to the theory appear to be better explained by the latest proposed model in Figure 3 which suggests using a Stepped or Tiered Model rather than a Non-Linear Model. The Stepped/Tiered Model appears to explain more fully how certain less important rules can be significant predictors of overall compliance and quality.
This last model (Stepped/Tiered) has more flexibility in looking at the full regulatory field in attempting to find the “predictor” or right rules that should be selected as key indicators. It is about identifying those key indicator rules that move the needle from one step/tier to the next rather than focusing on the plateau. So rather than having just one plateau, this model suggests that there are several plateaus/tiers.

Mathematically, the three models appear as the following:

1) \[ PQ = a (PC) + b \] (Linear)
2) \[ PQ = a (PC)^b \] (Non-Linear)
3) \[ PQ = a + \left(\frac{b - a}{1 + \left(\frac{PC}{b}\right)^b}\right) \] (Stepped/Tiered)

Where \( PQ = \text{Program Quality}; PC = \text{Regulatory Program Compliance}; a \text{ and } b \text{ are regulatory constants} \)

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