

# Briefing Document: Contact Hours Metric in Child Care Settings

**Date:** October 26, 2023 **Prepared for:** [Intended Audience - e.g., Child Care Regulators, Researchers] **Subject:** Review of the Contact Hour Metric for Monitoring Child Injuries and Illnesses in Child Care Centers

This briefing document summarizes the main themes and important ideas presented in the provided sources regarding the "Contact Hour" metric as a potential tool for monitoring child safety and health outcomes in child care centers.

## Main Theme: Introduction and Potential Application of the Contact Hour Metric

The central theme across these sources is the introduction and exploration of the "Contact Hour" (CH) metric as a novel statistical methodology for monitoring child injuries and illnesses in child care centers. Developed by Dr. Richard Fiene, this metric aims to provide a quantitative measure of the density and duration of contact between adults and children within these facilities.

The core idea is that by understanding the "contact hours," which takes into account the number of children, the number of staff, and the duration of their interaction, it may be possible to identify facilities at potentially higher risk for injuries and the spread of infectious diseases.

## Key Concepts and Ideas:

**Definition of Contact Hours:** The Contact Hour metric is based on a mathematical model that uses data from six key questions to construct the "area of a trapezoid" representing the density of contact between adults and children over time within a specific space.

**Six Key Questions:** The data for calculating Contact Hours is derived from the answers to the following six questions:

- When does your first teaching staff arrive or when does your facility open?
- When does your last teaching staff leave or when does your facility close?
- Number of teaching/caregiving staff?
- Number of children on your maximum enrollment day?
- When does your last child arrive?
- When does your first child leave?

**Mathematical Formulae:** Based on the answers to these questions, particularly the total hours the facility is open (TO) and the total hours at full enrollment (TH), several formulae can be used to calculate Contact Hours (CH):

- (1)  $CH = ((NC(TO + TH)) / 2) / TA$
- (2)  $CH = (NC \times TO) / TA$
- (3)  $CH = ((NC \times TO) / 2) / TA$
- (4)  $CH = (NC^2) / TA$  Where: CH = Contact Hours; NC = Number of Children; TO = Total number of hours the facility is open; TA = Total number of teaching staff; TH = Total number of hours at full enrollment.

**Historical Context:** The Contact Hour metric was initially proposed in 1979 for monitoring compliance with federal staff-child ratio and group size regulations (FIDCR). However, it was never implemented on a large scale due to the rescission of FIDCR in 1980.

**Relevance During COVID-19:** The pandemic in 2020 brought renewed interest in the Contact Hour metric for virtual monitoring and assessing potential exposure rates to the virus. Pilot testing in Washington State showed promising results as a model for determining potential exposure rates. As stated in the November 2023 paper, "Suddenly the metric became relevant again. It was pilot tested in the state of Washington and again worked very well as a mathematical model for determining potential exposure rates."

**Proposed Application for Injury and Illness Monitoring:** The current proposal suggests utilizing the Contact Hour metric as a monitoring tool to determine potential risk levels for child injuries and illnesses in child care settings. The size of a child care center (number of children) has already been linked to the number of injuries. The model could potentially also be used to determine the potential spread of infectious diseases.

**Relatively Weighted Contact Hours (RWCH):** The metric can be enhanced by calculating Relatively Weighted Contact Hours (RWCH), which takes into account the adult-child ratios. Conversion tables are provided to illustrate how CH values translate across different ratios and group sizes.

**Hypothesized Relationship with Outcomes:** The sources hypothesize a direct correlation between higher Contact Hours and increased risk of negative outcomes, such as COVID-19 infections and potentially child

injuries and illnesses. The "Contact Hour (CH) Levels and COVID19 Infections" diagram illustrates this concept, categorizing CH levels into blue (lowest risk), green, yellow, and red (highest risk).

**Validation Study Needed:** The authors emphasize the need for a large-scale study to determine the efficacy of the Contact Hour metric in monitoring significant changes in child injury and illness data. This would involve matching existing state-collected data with the information gathered through the six CH questions. As stated, "The only way to determine if the Contact Hour metric and mathematical model is a proper methodology is to conduct a large-scale study to determine if it is capable of monitoring significant changes in the two outcome variables of child injury data and illness data."

**Potential to Replace Static Metrics:** The 2021 paper proposes Contact Hours as a dynamic metric that could potentially replace static measures like staff-child ratios and group size by incorporating the element of time and density of contact. As stated, "The purpose of this paper is to propose Contact Hours as a new metric replacing staff child ratios and group size as well as using it as a new threshold measure for COVID19 thresholds."

**Screening Tool for Regulatory Oversight:** The Washington State pilot study indicated that the Contact Hour methodology could serve as a valuable screening tool for licensing administrators to identify programs potentially exceeding staff-child ratios and to target limited on-site observational visits more effectively. However, the authors caution that it should not substitute for direct observation when possible.

**Consideration of Space (Square Footage):** A potential future enhancement to the Contact Hour metric involves incorporating the square footage of the classroom or facility to create a 3-dimensional metric that accounts for space and distancing, which could further mitigate the impact of high contact hours. The formula for this potential 3-D metric is proposed as:

$$CH2 = (((NC (TO + TH)) / 2) / TA) / (SQFT)$$

$$CH2 = ((NC \times TO) / TA) / (SQFT)$$

$$CH2 = (((NC \times TO) / 2) / TA) / (SQFT)$$

$$CH2 = ((NC^2) / TA) / (SQFT)$$

**Algorithms for Formula Selection:** Specific algorithms are provided to guide users in selecting the appropriate Contact Hour formula (1-4) based on the relationship between the total hours open (TO) and the total hours at full enrollment (TH), as well as the number of children (NC).

### Important Considerations:

The Contact Hour metric is presented as a *potential* monitoring tool and requires further large-scale validation.

The findings from the COVID-19 pilot study suggest its utility in assessing infection risk, but its applicability to child injuries and general illnesses needs to be rigorously tested.

While the metric offers a data-driven approach, it should not entirely replace on-site observations and professional judgment in regulatory oversight.

The inclusion of square footage in future iterations could provide a more comprehensive understanding of risk factors.

### Quotes:

"This paper will introduce a new metric called "Contact Hours" which is being proposed as a potential statistical methodology for monitoring child injuries and illnesses in child care centers." (Fiene, November 2023)

"As described in the attachments, the Contact Hours metric is a simple straightforward mathematical model based upon asking 6 questions which essentially provide the data for constructing the area of a trapezoid..." (Fiene, November 2023)

"It is being proposed that potentially the Contact Hour metric may be a methodology that could be used as a monitoring tool to determine potential risk levels." (Fiene, November 2023)

"The purpose of this proposal is to develop the key parameters for testing out the Contact Hour (CH) methodology in a series of facilities to determine its efficacy." (Fiene, April 2020 - Pilot Study Design)

"By knowing the number of contact hours (CH) it will be possible to rank order the exposure time of adults with children. This metric could then be used to determine if greater contact hours is correlated with the increased risk of the COVID19 virus." (Fiene, April 2020 - Pilot Study Design)

"As can be seen through the data the more contact hours a staff person has with more children increases the probability of infection rates; when educators spend less time with lower amounts of children there is a lower chance of infection and vice versa." (Fiene & Stevens, May 2021)

"The authors do want to caution licensing administrators in that the results from this methodology is not to substitute for on-site observations when they are possible. It is intended as a screening tool to determine in a very overarching way how to target limited observational visits." (Fiene & Stevens, May 2021)

**Conclusion:**

The Contact Hour metric presents an innovative approach to quantifying the density and duration of adult-child interactions in child care settings. Its past application in regulatory compliance and COVID-19 exposure assessment suggests potential utility in monitoring child injuries and illnesses. However, rigorous research and large-scale studies are crucial to validate its effectiveness and establish its role in enhancing child care safety and health practices. The proposed inclusion of space as a factor in future iterations holds promise for a more nuanced understanding of risk.