

Theoretical Model For Computing Adult-Child Ratios in Day Care Centers



Dr. Richard Fiene

Dr. Richard Fiene here presents a theoretical model for computing adult-child ratios which takes both numbers (caregivers and children) and time (hours at the day care center) into account. Its purpose is to increase accuracy and save time in the computation of ratios to determine compliance with requirements, whether for FDCR or for licensing.

He is beginning an adaptation of this model for use in residential or twenty-four hour facilities.

He has confidence that his model can be put into State regulatory systems, using the expertise of program oriented licensers and statistics/research oriented technicians.

If you care to explore this presentation further, you may call Dr. Fiene at 717-787-2724. He is Director, Bureau of Information Systems, Pa. DPW, 1514 N. 2nd St., Harrisburg, Pa. 17102.

There has been much controversy over the Federal Day Care Requirements, in particular, the adult-child ratios. The majority of the discussion has revolved around the dichotomous points of view of the states and the federal role in enforcing the various standards. There is another issue that is equally important, which has been addressed only in a side-glance manner. Once it is decided what the ratios will be, how are we going to measure compliance with the ratios?

There have been various attempts at doing this - the most recent had been tried by Health, Education and Welfare (1977) and it does get at the required information. There is only one problem with it: it is rather time consuming. If a state or region has a great number of programs, it becomes almost an impossible task. Past methods have tried the direct approach of dividing the total number of children by the total number of teachers. This works, but does not give the overall day picture; therefore it is only good as a very gross measure.

The staff-child ratio question is a very critical item when it comes to monitoring of child development/child care facilities. However, it has eluded proper measurement because of inadequate or time-consuming measures. I am proposing a new theoretical model for compu-

ting adult-child ratios which is not time-consuming and gives accurate information in a very concise fashion.

With this new approach, all a day care monitor needs to do is ask six questions of the provider, and then put the data into a formula to find if the program is within compliance or not.

The six questions are as follows:

- (1) When does your first staff member (teaching) arrive?
- (2) When does your last staff member (teaching) leave?
- (3) Number of teaching staff?
- (4) Number of children present on your maximum enrollment day? Their ages and which staff members are assigned to each age group? (If there is vertical grouping).
- (5) When does your last child arrive?
- (6) When does your first child leave? (If vertical grouping, give breakdown according to age.)

After these questions are answered, then the day care monitor will compute the number of contact hours (CH) between staff and children using the following formula:

$$CH = \frac{NC(TH+TO)}{2} \quad \text{Formula 1}$$

In the formula, NC = total number of children present on the maximum enrollment day. TO = total number of hours the center is open. TH = total number of hours at full enrollment. CH = contact hours between staff and children in any type of caring arrangement.

After the CH is computed, the data are then put into another formula which will determine the relatively weighted contact hours for horizontal grouping (RWCH), or the relatively weighted contact hours range (RWCHR) for a vertically grouped program.

$$RWCH = \left[\frac{NC(TH+TO)}{2} \right] \left[\frac{1}{TA} \right] \quad \text{Formula 2}$$

$$RWCHR = \left[\frac{\sum NC_i (TH_i + TO_o)}{2} \right] \left[\frac{1}{TA} \right] \quad \text{Formula 3}$$

$$NC_o = NC_p + NC_i + NC_s \quad \text{Formula 4}$$

$$TH_o = TH_p + TH_i + TH_s \quad \text{Formula 5}$$

$$TO_o = TO_p + TO_i + TO_s \quad \text{Formula 6}$$

In the formulae above, NC_o = total number of children on the maximum enrollment day. TO_o = total number of hours the center is open. TH_o = total number of hours at full enrollment. RWCH = relatively weighted contact hours - indicator of compliance for horizontally grouped programs. RWCHR = relatively weighted contact hours range - indicator of compliance for vertically grouped programs. TA = total number of teaching staff.

NC_i = total number of infants. NC_p = total number of preschoolers. NC_s = total number of school age children. TH_p = total number of hours at full enrollment with preschoolers. TH_i = total number of hours at full enrollment with infants-toddlers. TH_s = total num-

ber of hours at full enrollment with school-age children. I = infant-toddlers. P = preschoolers. S = school-age children.

Once the RWCH or the RWCHR figures are computed, now we can find if the programs are within compliance by using the Table of Conversions for RWCH and RWCHR. (See Table 1).

This table is computed from an ideal where TO and TH both equal eight hours. In other words, all staff and children arrive and leave at the same time which is an ideal programmatic set-up. By using the Table of Conversions, it is relatively easy to compute if a program is within compliance.

I think a few examples will suffice: Example A: Day care monitor asks the six questions and gets:

- (1) 6:30 a.m.
- (2) 5:30 p.m.
- (3) six staff
- (4) 35 children - all four years old
- (5) 9:30 a.m.
- (6) 3:15 p.m.

Compute CH:

$$\begin{aligned} CH &= \frac{NC(TH+TO)}{2} \\ &= \frac{35(5.45+11)}{2} \\ &= \frac{35(16.45)}{2} \\ &= 287.87 \end{aligned}$$

Compute RWCH: (because it is a horizontally grouped program).

$$\begin{aligned} RWCH &= \left[\frac{NC(TH+TO)}{2} \right] \left[\frac{1}{TA} \right] \\ &= \left[\frac{35(5.45+11)}{2} \right] \left[\frac{1}{6} \right] \\ &= \left[\frac{35(16.45)}{2} \right] \left[\frac{1}{6} \right] \\ &= \left[287.87 \right] \left[\frac{1}{6} \right] \\ &= 47.97 \end{aligned}$$

Now refer to the Table of Conversions. Look under NC = 35, CH = 280. Now look under RWCH in the P column. The score here is 56, which indicates that this program is well within compliance. In reading the Table of Conversions, if a program receives a score equal to or less than the score on the Table it will always be within compliance. If the program receives a score greater than the score on the Table for that particular category, then the program will always be out of compliance.

Example B: Day Care monitor asks the six questions and gets:

- (1) 6:00 a.m.
- (2) 6:00 p.m.
- (3) three staff
- (4) 15 children - five infants, five preschoolers, five school age children
- (5) 10:00 a.m.
- (6) 4:00 p.m.

Compute CH:

$$\begin{aligned} CH &= \frac{NC(TH+TO)}{2} \\ &= \frac{15(6+12)}{2} \\ &= \frac{15(18)}{2} \\ &= 135 \end{aligned}$$

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Compute RWCHR: (because it is a vertically grouped program).

$$\begin{aligned}
 RWCHR &= \left[\frac{\sum NC_i (TH_i + TO_i)}{2} \right] \left[\frac{1}{TA} \right] \\
 RWCHR &= \left[\frac{NC_1 (TH_1 + TO_1) + NC_2 (TH_2 + TO_2) + NC_3 (TH_3 + TO_3)}{2} \right] \left[\frac{1}{TA} \right] \\
 &= \left[\frac{[5(6+12)] + [5(6+12)] + [5(6+12)]}{2} \right] \left[\frac{1}{3} \right] \\
 &= \left[\frac{90+90+90}{2} \right] \left[\frac{1}{3} \right] \\
 &= [135] \left[\frac{1}{3} \right] \\
 &= 45.00
 \end{aligned}$$

Now refer to the Table of Conversions. Look under NC = 15, CH = 120. Now look under RWCHR in the P column because we have an equal number of infants, preschoolers and school age children. The score here is 40-50 which indicates this program is well within compliance.

Example C: Day care monitor asks the six questions and gets:

- (1) 6:00 a.m.
- (2) 6:00 p.m.
- (3) Three staff
- (4) 20 children — all four years old
- (5) 7:00 a.m.
- (6) 5:00 p.m.

Compute CH:

$$\begin{aligned}
 CH &= \frac{NC (TH+TO)}{2} \\
 &= \frac{20(10+12)}{2} \\
 &= \frac{20(22)}{2} \\
 &= \frac{440}{2} \\
 &= 220
 \end{aligned}$$

Compute RWCH: (because it is horizontally grouped program).

$$\begin{aligned}
 RWCH &= \left[\frac{NC (TH+TO)}{2} \right] \left[\frac{1}{TA} \right] \\
 &= \left[\frac{20(10+12)}{2} \right] \left[\frac{1}{3} \right] \\
 &= \left[\frac{20(22)}{2} \right] \left[\frac{1}{3} \right] \\
 &= \left[\frac{440}{2} \right] \left[\frac{1}{3} \right] \\
 &= [220] \left[\frac{1}{3} \right] \\
 &= 73.33
 \end{aligned}$$

Now refer to the Table of Conversions. Look under NC = 20, CH = 160. Now look under RWCH in the P column. The score here is 53, which indicates that this program is well out of compliance.

The aspect of the above theoretical model is that it takes both time and numbers of staff into account. It is a simple one-shot mathematical calculation, and it can determine if a program is within compliance or not.

TC=8
TH=8

TABLE I
TABLE OF CONVERSIONS
FOR ADULT-CHILD RATIO

NC	CONTACT HOURS			RELATIVELY WEIGHTED CONTACT HOURS RANGE			NC	CONTACT HOURS			RELATIVELY WEIGHTED CONTACT HOURS RANGE			
	I	P	S	I	P	S		I	P	S	I	P	S	
1	8	8	8+	8	8	8+	31	248	35	50	62+	42	43-49	50+
2	16	16	16+	16	16	16+	32	256	37	51	64+	44	45-57	58+
3	24	24	24+	24	24	24+	33	264	38	53	66+	45	46-59	60+
4	32	32	32+	32	32	32+	34	272	39	54	68+	46	47-60	61+
5	40	40	40+	40	40	40+	35	280	40	56	70+	48	49-56	57+
6	48	48	48+	36	37-48	49+	36	288	36	48	72+	42	43-60	61+
7	56	56	56+	42	43-56	57+	37	296	37	49	74+	43	44-61	62+
8	64	32	64+	32	33-48	49+	38	304	38	51	76+	44	45-57	58+
9	72	36	72+	36	37-54	55+	39	312	39	52	78+	54	46-59	60+
10	80	40	80+	40	41-60	61+	40	320	40	53	80+	46	47-60	61+
11	88	44	44+	37	38-44	45+	41	328	36	55	66+	45	46-51	52+
12	96	48	48+	40	41-48	49+	42	336	37	56	67+	46	47-52	53+
13	104	52	52+	43	44-52	53+	43	344	38	49	69+	43	44-54	55+
14	112	37	56+	37	37-46	47+	44	352	39	50	70+	44	45-55	56+
15	120	40	60+	40	40-50	51+	45	360	40	51	72+	45	46-56	57+
16	128	43	64+	37	38-53	54+	46	368	37	53	74+	45	46-56	57+
17	136	45	68+	39	40-56	57+	47	376	38	54	75+	46	47-57	58+
18	144	48	72+	42	43-55	56+	48	384	38	55	77+	46	47-58	59+
19	152	51	76+	44	45-57	58+	49	392	39	56	78+	47	48-59	60+
20	160	53	80+	46	47-60	61+	50	400	40	50	80+	45	46-61	62+
21	168	34	56+	38	39-46	47+	51	408	37	51	68+	44	45-53	54+
22	176	35	59+	39	40-47	48+	52	416	38	52	69+	45	46-54	55+
23	184	37	61+	41	42-49	50+	53	424	39	53	71+	46	47-56	57+
24	192	38	64+	43	44-53	54+	54	432	39	54	72+	46	47-56	57+
25	200	40	67+	45	46-54	55+	55	440	40	55	73+	47	48-57	58+
26	208	35	69+	43	44-51	52+	56	448	37	56	75+	46	47-56	57+
27	216	36	72+	45	46-55	56+	57	456	38	51	76+	44	45-57	58+
28	224	37	75+	46	47-56	57+	58	464	39	52	77+	45	46-58	59+
29	232	39	77+	42	43-53	54+	59	472	39	52	79+	45	46-59	60+
30	240	40	80+	44	45-61	62+	60	480	40	53	80+	46	47-60	61+