



Ratios for four and five year olds: What does the research say? What else is important?

Introduction

Research and expert perspectives agree that one of the key elements that determines the quality of an early childhood education and care program is the number of adults to children – the ratio. However, it is also clear that the adult:child ratio is not the *sole* quality-determining element. Other important elements, especially training and qualifications, interact with ratio to form the structural and pedagogical base for quality in an ECEC program. This BRIEFing NOTE reviews research and expert opinion from the child care, kindergarten and blended ECEC program literature to consider what is known about effects of staff: child ratios on child outcomes and program quality for four and five year olds, and what other key factors should be taken into account.

ECEC ratios in Canada

In Canada today, four and five year olds and some three year olds, can be in any of a number of different ratio regimes. Not only are there differences in ratios and teacher qualifications among the provinces/territories but children in this age group can be – sometimes on one day or in one week – in several programs of different types. Regulated centre-based child care, usually under a social services ministry and kindergarten, usually under education ministries and both serving four and five year olds, have different approaches to ratio regimes and to teacher qualifications.

For example, in Ontario four and five year olds in centre-based early childhood education and care (ECEC) programs may be in settings operating under any of four different ratio regimes. In child care centres and nursery schools regulated under *The Day Nurseries Act*, four and five year olds may be with early childhood educators in rooms with ratios of 1:8 as part of 3-5 year old groups, rooms with a 1:10 ratio for junior kindergarten or 1:12 for senior kindergarten groups. Children from 3.8 years to grade one may be in kindergartens under *The Education Act* for part or full days with one teacher and 20 or more children. Do adult:child ratios make a difference for child outcomes and for ECEC program quality, which has a significant impact on children. What other key factors also make a difference? Table 1 shows the range of ratios for this age group in Canada by program type by province (the term “class size” is usually used in kindergarten).

Are better ratios linked to better outcomes?

Generally, the research shows better ratios during preschool/kindergarten (children aged approximately 4-5 years) to be associated with higher developmental outcomes, although other factors such as teacher qualifications and group size are found to be inextricably linked (Bennett, 2008; Fiene, 2002; HEROS Inc., 1997; Mathers, Sylva, Hansen, Plewis, Johnson, & George, 2007; Nye, Hedges, & Kostantopoulos, 2000; Ruopp, 1979; Vandell & Wolfe, 2000).

TABLE 1. Ratios/class size, teacher training/education in child care and kindergarten – 4 and 5 year olds - 2008

P/T	Child care ratios 4, 5 yrs ¹	Kindergarten class sizes	Teacher/staff training and education
NL	1:8, 1:12	20	K - Degree, no ECE required. CC - 1 yr ECE - 1 staff/group
PE	1:10, 1:12	1:12 (<i>Child Care Act</i>)	K - 2 year ECE diploma. CC - 1 yr ECE - 1 staff member
NS	1:8, 1:12, 1:15	25	K - Degree, no ECE required. CC - ECE training - 2/3 staff
NB	1:7, 1:10, 1:12	22 (collective agreement)	K - Degree, no ECE required. CC - 1 yr ECE - 1/4 staff
QC	1:10, 1:20	20 – 5s, 18 – 4s (collective agreements)	K - Degree, ECE not required. CC - 3 year ECE - 2/3 staff
ON	1:8, 1:10, 12	20 (goal)	K - Degree, no ECE required. CC - 2 yr ECE - 1 staff/group
MB	1:8, 1:9, 1:10	Not specified	K - Degree, no ECE required. CC - 2 yr ECE - 2/3 staff
SK	1:10	Not specified.	K - Degree, no ECE required. CC - 1 yr ECE 30% staff; add. 20% 2 yr.
AB	1:8, 1:10	Not specified.	K - Degree, no ECE required. CC - 1 yr ECE (1/4 staff)
BC	1:8	22	K - Degree, no ECE required. CC - 1 yr ECE (one staff/group)
NT	1:9, 1:10	Not specified.	K - Degree, no ECE required. CC - None required
NU	1:9, 1:10	Not specified.	K - Degree or 2 yr ECE, 1 yr teacher training. CC - None required
YT	1:8	20 (collective agreements)	K - Degree, no ECE required. CC - 1 yr ECE 30% staff; add. 20% 2 yr.

1. Most jurisdictions have more than one ratio regime in child care, as children may be grouped.

Note: For further detail, see *ECEC in Canada 2006*, online at www.childcarecanada.org/ECEC2006

Most studies find that better ratios are associated with better ratings on social outcomes. Ruopp found that preschool-aged children in programs with better ratios were more responsive to adults and peers, showed increased verbal initiative and more cooperative behaviour (1979). Palmerus (1996) found that ECEC programs with poorer ratios had fewer child-initiated verbal activities with caregivers and more adult-initiated verbal activities. A number of studies show that smaller class sizes and fewer children per adult are correlated with fewer child behavioural problems (Allen & Kickbush, 1995; Blatchford et al., 2003, Vandell & Wolfe, 2000, Finn & Pannozzo, 2004).

What effect do ratios have on ECEC program quality?

The US Cost, Quality, and Outcomes Study (Helburn et al, 1995) concluded that, while group size, staff wages, turnover, and curriculum support all play a role in the production of quality, “in regression analyses to predict the determinants of quality, the staff:child ratio is the most significant determinant of quality, even when controlling for other factors affecting quality” (p.320). These findings are supported in most other studies of child care quality (Phillips, Howes & Whitebook, 1992; Phillips, Scarr, McCartney & Abbott-Shim, 2000; Shim, Hestenes & Cassidy, 2004; Vandell & Wolfe, 2000) including Canadian research (Doherty & Stuart, 1997; Goelman, Forer, Kershaw, Doherty, Lero & LaGrange, 2006). Goelman et al. (2006) found that the number of staff in a room, along with staff education and satisfaction, is also a significant direct predictor of child care quality scores.

Overall, the research finds that while ratios are not *singularly* important, ratios are a central part of a package of important structural features – staff training, group size, wages, and experience – that are key to the achievement of quality in ECEC programs.

Do ratios have an impact on teacher and classroom processes?

The British Class Size Study (Blatchford, Bassett, Goldstein and Martin, 2003) examined the relationship between ratio (class size), quality, and child outcomes. The study hypothesized that it may be through the impact of ratio on teacher and classroom processes that quality is increased, which in turn may result in better child outcomes. The study found that ratio has an impact on teachers' ability to give individual learning support, teachers' management techniques, and teacher stress. This is widely supported by other research in both child care and kindergarten settings, although some studies have examined much better ratios than the class sizes of 20 that were defined as “small” here. For example, Allen & Kickbush (1995) found that reducing class size to 15 in grades K-3 was associated with

fewer discipline problems and classroom management issues. In the child care literature, the 1979 National Day Care Study (Ruopp) was one of the first to find effects of ratios: teachers in rooms with better ratios had more social interaction with the children. Fiene's 2002 review of child care quality indicators concluded that in groups with better ratios, caregivers were more actively involved and spent more time interacting with children, were more responsive, more socially stimulating, and less restrictive. Shim, Hestenes & Cassidy (2004) found better ratios to be associated with higher quality, more child teacher interactions and more positive teacher behaviour. Finn and Pannozzo (2004) found that smaller classes are more engaged in appropriate behaviour, along with more developmentally appropriate activities, than are large classes.

What other key factors make a difference? Teacher education/qualifications, classroom organization/ staffing structure

The large majority of studies identify the inextricable linkage of staff: child ratios (child care), class size (kindergarten), group size (child care), and teacher qualifications; some of these studies observe that separating these factors to study independent effects is complicated (Barnett, Schulman & Shore, 2004; Blatchford et al., 2003; Doherty & Stuart, 1997; European Commission Childcare Network, 1996; Munton et al., 2002; Phillips, Howes, & Whitebook, 1992; Ruopp, 1979; Vandell & Wolfe, 2000). Other structural factors shown to have an impact on quality and outcomes are wages, working conditions (e.g., availability of support staff), and staff turnover (Goelman, et al., 2006; Helburn 1995; Howes, Phillips, & Whitebook, 1992; Phillips, et al., 2000). In addition, several studies point out that the child population (that is, low income or special needs) also mediates the impact of ratios (Allen & Kickbush, 1996; Blatchford et al, 2003; HEROS Inc, 1997; Mashburn et al., 2006; Barnett, et al., 2007; European Commission Childcare Network, 1996).

Asking the key question “How do early years teachers excel at their crafts?”, a review of the research literature on the effect of qualifications on quality and ECEC teacher behaviour by Kontos and Wilcox-Herzog (2003) found that the amount of teachers' formal schooling had an impact on quality (correlational) as well as (less often) on effective teacher behaviour. Citing Cassidy, et al. (1996) and Kontos, et al. (1997) in particular, they note that specialized education (that is, in early childhood education/child development) was found to be *causally* related to quality and correlated with positive teacher behaviour. Citing studies across preschool age groups including four and five year olds, the review noted that “there is a considerable amount of evidence that specialised education is related to quality of the learning environment for children and to the quality of teachers' interactions with children” (pg. 88).

Classroom organization and staffing structure has also been shown to have an impact. Shim, Hestenes and Cassidy (2004) found that a co-teacher structure is associated with higher quality compared to either a hierarchical teacher structure or a single

teacher structure. Blatchford, et al. (2007) found a positive association with child-to-child interaction in large (30+) classes. The explanation given for this finding is that in larger classes, the strategic organizing of smaller groups *within* the classroom may have a positive influence on outcomes.

Recommendations, expert reviews, overviews and policy analysis re: ECEC ratios and other key factors

In the 1990s the European Union's Child Care Network set 40 Quality Targets for all EU countries to strive toward. The Childcare Network set a target of 1:15 (one adult to fifteen children) for children aged three to six years. The analysis also emphasized the importance of such things as qualifications and organization of staff, group size, characteristics of children, attendance patterns and hours, and the pedagogical and philosophical concepts underpinning the system.

The US National Association for the Education of Young Children's (NAEYC) current recommended ratio/group sizes for four and five year olds are: 1:8/16; 1:9/18; and 1:10/20; 1:11/22; 1:12/24 for kindergarten.

The U.S. National Institute for Early Childhood Education Research's (NIEER) recommended standard for state preschool and child care programs is to limit "class sizes to 20 at most, and to have no more than 10 children per teacher" (2007: 26)

A ten year international comparative analysis by the Organization for Economic Co-operation and Development (OECD) includes comments and recommendations about ratios specifically with regard to Canada (2004). As well, the OECD's comparative report *Starting Strong 2* identified poor ratios and poor pedagogical preparation as key structural barriers to quality ECEC (2006: 131).

In the OECD's review of Canadian ECEC in 2004, the international team noted that in the kindergartens they visited, they found "child/staff ratios in excess of the 15:1 practiced in kindergarten in most [other] countries". They went on to observe that,

the research indicates that a ratio of 15:1 in kindergartens is an upper limit for children under five years... and that for more individualized attention, lower ratios are more appropriate. This is generally recognised in the child care sector, which leads to curious situations in some countries where the Education Act may allow groups of 25:1 or more in kindergarten settings catering for 3-4 year old children, while the corresponding Child Care Act allows a maximum ratio of 10:1 for children of the same age in child care services. (OECD 2004: 59)

They also noted that,

Many kindergarten teachers, we were informed, are not trained to work with younger children. Pedagogical practice in several instances alternated between direct group teaching and, it seemed, weakly planned activities in various corners, table top games and some indoor play. Sometimes, children seemed bored or disoriented (pg. 64).

They expressed concern about quality in child care centres as well, in particular focusing on qualifications and training, although not singling out ratios.

Most recently, UNICEF's Innocenti Research Centre developed a set of 10 benchmarks or indicators of ECEC provision. One of the quality benchmarks is specifically concerned with ratios, stating "child: *trained* adult ratio for 4-5 year olds in publicly subsidized, centre-based services not greater than 15:1 and group size not exceeding 24 children per group" (2008: 26). This benchmark specifies that the adults included in the ratio should be trained or educated in early childhood. This is consistent with the research, which supports the idea that ECEC/young child-specific training at a post-secondary level is key.

Lessons and conclusions

1. The research indicates that adult: child ratios are important. Overall, the research shows fewer children per adult during the preschool/ kindergarten period (children aged approximately 4-5 years) to be associated with better academic, cognitive, social and behavioural outcomes, better staff: child interactions, and global quality. "Fewer" is defined in the literature as not greater than 1:15 (although an absolute number cannot be set without considering other program features).
2. While there is a general assumption that 'smaller is always better', ratios/class size cannot be considered independently from teacher qualifications, classroom structure and composition, group size and working conditions.
3. While the available literature on the effects of adult:child ratios makes it clear that there is no single 'magic' ratio number per se, the research suggests that – as was proposed in the UNICEF (2008) benchmarks document – an acceptable model for ECEC classes for four and five year olds would be a group of 22-24 children with two adults, assuming that both have education related to working with young children in an ECEC setting.
4. A number of commentators (Bennett, 2008; Munton et al, 2002; European Commission Childcare Network, 1996) make a strong argument that an important first step to considering the issue of ratios is to be clear about the nature of the program and the pedagogical approach to be taken.

— Martha Friendly, Carolyn Ferns & Nina Prabhu

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