

Research on Ratios, Group Size and Staff Qualifications and Training in Early Years and Childcare Settings

Thomas Coram Research Unit
Institute of Education, University of London

Part A: A Review of International Research on the Relationship Between Ratios, Staff Qualifications and Training, Group Size and the Quality of Provision in Early Years and Childcare Settings

Dr. Tony Munton, Ann Mooney, Professor Peter Moss, Dr. Pat Petrie, Alison Clark and Janette Woolner

Part B: Adult: Child Ratios for Early Years Settings in the Private/Independent Sector: A Report of Empirical Research

Dr. Tony Munton, Linda Barclay, Maria Rosa Mallardo and Dr. Sofka Barreau

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This research report puts together, in one volume, reports of two separate but linked projects on child:adult ratios in early years and childcare settings. Both projects were commissioned by the Department for Education and Employment (DfEE) (now the Department for Education and Skills) from the Thomas Coram Research Unit. Firstly, a literature review of international research on the relationship between ratios, staff qualifications and training, group size and the quality of provision. Secondly, empirical research (using fifty day care settings) that was announced by the DfEE, in August 1999, on relaxing adult:child ratios in early years and day care settings.

**Review of international research on the
relationship between ratios,
staff qualifications and training, group size
and the quality of provision
in early years and childcare settings**

**Dr. Tony Munton, Ann Mooney, Professor Peter Moss, Dr. Pat Petrie,
Alison Clark and Janette Woolner**

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Executive Summary

ES1 Introduction

ES1.1 This report develops an earlier review of the research literature published in 1995, *Staff-Child Ratios in Care and Education Services for Young Children*. The earlier review concluded that higher ratios (i.e. more staff per group of children) result in better outcomes for staff and children; research cannot identify ideal ratios; different ratios in day care services and nursery education are justifiable.

ES1.2 The brief for the current review was to identify key messages on the relationship between ratios, staff qualifications and training, group size and the quality of day care. It updates the 1995 review by covering material published up to the early part of 2000. It also includes reviews of material published in French, German, Spanish and the Nordic languages.

ES1.3 The 1995 report provided information on recommended staff:child ratios in other countries. For this report, we have checked and updated this information where necessary. We also conducted a survey of English local authorities to evaluate the extent to which they enforce ratios other than those recommended in Volume 2 of the Children Act 1989 Guidance and Regulations. Unlike the previous report, included in this study is evidence concerning provision for children up to the age of fourteen years i.e. out-of-school services.

ES1.4 The report is written in three sections: Section A examines issues concerning ratios, Section B examines issues concerning staff qualifications and training, and group size, Section C contains conclusions and recommendations.

Section A Ratios

ES2 Making sense of ratios

ES2.1 The fact that staff:child ratios can be defined in different ways must be taken into account when interpreting research findings. Some studies use the total number of childcare places available divided by the number of full-time equivalent staff employed. Others divide childcare places by the number of staff at work at any given time. The latter is the preferred method when staff work a shift system. A third and most accurate way of measuring ratios is to use the number of staff and children actually observed in the same area over a given period of time.

ES2.2 Regulations often vary staff:child ratios according to the age and special needs of children. When making international comparisons, it is worth noting differences in the number of children within each age band likely to be in early years services. For example, although regulations may cover children aged 0-3 years, in countries with generous maternity leave, few children aged under twelve months are likely to use early years provision.

ES2.3 Comparisons of ratios and service quality in different countries must be made in the context of local philosophies of childcare. Early years services both within and between countries can have very different aims and objectives. For this reason it often makes no sense to make direct comparisons of quality between two or more different countries. The services may simply be modelled on completely different notions of best practice.

ES3 Recommended ratios in the UK and other countries

ES3.1 In England and Wales, the Children Act Guidance offers standard recommendations on ratios. A postal survey of English local authorities found that nearly one third enforced ratios that were different to those recommended. At least two authorities made ratios contingent on staff qualifications.

ES3.2 The Scottish Executive has published new proposals for staff:child ratios that include a ratio of 1:10 for children aged three and over cared for in any non-domestic premises.

ES3.3 Appendices A and B of this report set out recommended ratios (at the time of writing) in services for children in Western European countries, North America, Australia, New Zealand and Japan. Apart from specific ratios recommended, other differences between countries include:

- local versus national government responsibility for regulating ratios;
- the age categories used;
- the extent to which legislation links other staff characteristics to ratios.

ES4 Research on staffing ratios in pre-school settings

ES4.1 A search of the recent research literature uncovered twelve recent empirical studies that looked at the issue of staff:child ratios in early years settings. Eight were conducted in the US, two in New Zealand, one in Canada, and one was a cross-national study involving settings in Germany, Portugal, Spain and the US.

ES4.2 Research evidence is consistent with the view that staff:child ratios can have a significant impact on the quality of care that children receive. Broadly speaking, the more staff that work with children, the better the quality of care is likely to be. However, the influence of staff:child ratios on quality is inextricably linked to other elements of the care environment including staff education and training, staff salaries and group size.

ES4.3 Evidence suggests that one of the ways in which ratios influence quality is through adult:child interactions. Higher staff:child ratios (i.e. more staff per group of children) are more likely to facilitate positive adult:child interactions. Furthermore, experiences in good quality early years settings can have a small but positive impact on developmental outcomes for infants and pre-school aged children.

ES5 Research on staffing in out-of-school settings

ES5.1 Out-of-school provision is an under-researched area. The search of recent literature found only three empirical studies. One was conducted in Australia, one in the UK and a third in the US.

ES5.2 Evidence suggests that the relationship between staff:child ratios and the quality of services for older children is the same as that found in pre-school services. One is more likely to find high quality in settings with higher ratios (i.e. more staff per group of children). Research with parents indicates that they tend to be more satisfied with services that operate with higher ratios.

ES5.3 Older children, at least for some activities, may be happier with the degree of autonomy they get when staff:child ratios are lower.

Section B Staff training and qualifications, and group size

ES6 Staff training and qualifications: The international context

ES6.1 The types and levels of qualification found among early years workers in different countries vary considerably. Differences are related to a wide range of issues, in particular how the workforce and the services themselves are structured; and how early childhood work, and therefore the role of early childhood worker, is understood.

ES6.2 Early childhood workers in centre-based services can be categorised into three broad types:

1. *The pedagogue*
2. *The early childhood teacher*
3. *Early years workers in the 'split system'*

This categorisation largely reflects the extent to which early years services are integrated across the early years age range within one system (education or welfare) or split between the two. The first two types - the pedagogue and the early childhood teacher - have been adopted by most countries that have either established, or are in the process of establishing, an integrated early childhood service. The latter, typical of the UK, has been adopted in countries where

services are split, or have been split, between education and welfare services. In these countries, the early years workforce is made up of either teachers or childcare workers.

ES6.3 The categorisation of early childhood work as described has major implications for training, pay and status. Broadly speaking, pedagogues and teachers (including teachers in split systems) have relatively high levels of training and consequently relatively good pay and conditions of employment. For example, in the UK, teachers working with children aged under five have a four year, post-18 university level training. Child care workers, often employed in day nurseries, often have a 2 year post-16 training below university level. Teachers generally earn far more than child care workers.

ES6.4 Issues around the training and qualifications of early childhood workers, and the structuring of the workforce itself, are inextricably linked to fundamental questions about the nature and purpose of early childhood services. Different countries (or even groups within countries) do, and will, come up with different answers to these questions.

ES7 Research on training and group size in early childhood education

ES7.1 All of the empirical studies identified by the review were designed to consider a range of structural variables known to affect quality of care and child outcomes. All but six of the studies were conducted in the USA. Of the remainder, two were conducted in New Zealand, two in Canada, one was conducted in the Netherlands, and another one was a cross-national study involving Germany, Portugal, Spain and the USA. Evidence from four reviews was also considered.

ES7.2 Research evidence is consistent with the view that group size and staff training and qualifications are two of several factors, including adult:child ratios, that have some small but significant impact on the quality of interactions between staff and children. Because several factors are implicated in the quality of adult

child interactions in care settings, it is difficult for research to identify the unique influence of either group size or staff qualifications and training.

ES7.3 Through their impact on the quality of adult child interactions, evidence suggests that group size, and staff qualifications and training, can have a positive influence on developmental outcomes for children. Smaller group sizes and better trained staff are more likely to provide environments for effective child development. However, evidence for the impact of the same two factors on more global measures of service quality is more equivocal. The education and training of centre managers has a greater influence on global quality.

ES7.4 In-service training can be an important route to delivering continuous improvements in service quality. Evidence suggests that specialised training for at least 20 hours per year is enough to produce improvements in caregiver behaviour.

ES7.5 Changes creating more strict adult:child ratios can have links with children being organised into larger groups across activities. Consequently, regulations specifying adult:child ratios should also address the issue of group sizes.

Section C Conclusions and Recommendations

ES8 Conclusions

ES8.1 Local variations in childcare theory and practice make it difficult to draw direct comparisons between staff:child ratios and quality across different countries. However, most of the relevant empirical research into childcare has been done in the US. While there are clearly some differences between early years sectors in the US and UK, there are important similarities. Both are heavily influenced by the same underlying philosophy: attachment theory, and both have a burgeoning private sector. Early years services in the US and the UK both have a structure of staffing based on a split system. Consequently, findings from US research are often relevant to the situation facing early years

provision in the UK. In contrast, early years research and practice in mainland Europe is often based on different philosophies, and more relevant to countries with integrated services and little or no private provision.

ES8.2 Research supports the view that staff:child ratios influence the quality of care provided for pre-school and school aged children. When staff work with fewer children, they are more able to provide sensitive, responsive care. However, the influence of staff:child ratios cannot be considered independently of other factors including staff education and training, staff salaries and group size. Because of these complex interactions, it is impossible to draw precise conclusions from the research concerning optimum staff:child ratios.

ES8.3 Research findings concerning staff qualifications and group size can be summarised:

- Evidence suggests some degree of association between staff qualifications, group size and positive caregiver behaviour;
- Positive caregiver behaviour is linked with better developmental outcomes for children.
- Links between staff qualifications, group size and global measures of service performance are more tenuous.

ES9 Recommendations

ES9.1 Evidence from this, and the previous review conducted in 1995, supports the following recommendations:

- 1. National Care Standards should include clear regulations concerning staff:child ratios in services for pre-school and school-aged children.**
- 2. National Care Standards should not relax, unconditionally, staff:child ratios recommended in guidance to the 1989 Children Act.**
- 3. National Care Standards might usefully make recommended staff:child ratios contingent on staff qualifications.**
- 4. National Care Standards should include clear recommendations concerning group size.**

- 5. National Care Standards should link specific adult:child ratios with recommended group sizes.**
- 6. National Care Standards should include clear regulations concerning staff education and training.**
- 7. National Care Standards should address the issue of in-service training for childcare workers.**
- 8. National Care Standards concerning training should distinguish between care staff and managers.**

Chapter

1 Introduction

1.1 Background

1.1.1 The search for appropriate adult:child ratios for early childhood and school-age child care services has been a recurring issue in England and Wales over the last 10 years. Expanding provision and the introduction of a new regulatory framework following the implementation of the 1989 Children Act kept ratios on the policy agenda. Reforms introduced in the wake of the 2000 Care Standards Act have once again focused attention on the ratio issue. The Act established a new regulatory framework for providers of day care services for young children, drawn up by the National Care Standards Commission. One of the Commission's duties is to keep the Secretary of State informed as to the quality of provision in England. This review of research is timely. By establishing the extent to which ratios, group size, and staff training and qualifications contribute to the quality of early years services, it can inform policy aimed at establishing national minimum standards and improving the quality of early years services.

1.1.2 This report builds on an earlier review of the research literature published in 1995, *Staff-Child Ratios in Care and Education Services for Young Children*, conducted at the Thomas Coram Research Unit (TCRU) by the late Professor Harry McGurk and colleagues. That review was undertaken for the Department of Health, then the government department responsible for 'day care services'. It was commissioned in the light of controversies surrounding the regulation of ratios, including '*the justification for different ratios applying to children of the same age in day care settings on the one hand compared to education services on the other*' (McGurk, Mooney, Moss & Poland, 1995: 1).

1.1.3

The 1995 review came to three important conclusions:

- Staff ratios do matter: *'other things being equal, the burden of evidence is to the effect that higher ratios¹ result in better outcomes for children and staff alike....[but] there are levels of provision beyond which no further improvement can be anticipated'* (ibid.: 23).
- Research cannot identify ideal ratios: *'ideal ratios will depend on many factors, including: the objectives of the service; the needs of the children; job descriptions of the staff and their working conditions....[and] staff:child ratios are only one of a variety of staffing issues that need to be taken into account in deciding what is necessary to achieve a certain level of performance'* (ibid.: 23).
- Different staff ratios in day care services and nursery education are justifiable: *'there are good grounds for arguing that the higher ratios recommended for day care are justified. Comparing play groups and nursery education, the lower ratio in the latter can be justified on several counts including: the higher level of training, and better pay and conditions, of teachers and nursery nurses in school; better toys and learning aides in nursery education....; better premises in nursery education....Comparing nurseries and nursery education, the former need a higher ratio because they are normally open for substantially longer hours....and [children] therefore require more individual treatment than children who spend relatively shorter periods in sessional nursery education...Further, nursery staff, in general, have lower standards of training and pay compared to nursery teachers. The real question posed by comparison between nursery education and day care services concerns the justification for discrepancies in such key areas as levels of training and pay and conditions between workers in these different settings'* (ibid.: 24-25).

¹In this report, as in the 1995 report, higher ratios refers to a situation where there are more staff per group of children, i.e a ratio of 1:4 is higher than 1:8.

1.2 Updating the review of key research and evidence

1.2.1 The brief for the current review called for '*a literature review of key research and evidence on adult:child ratios in early years and childcare settings*'. The general aim was to '*identify key messages on the relationship between ratios and the quality of day care*'.

1.2.2 The Department for Education and Employment (DfEE)² subsequently commissioned a second, supplementary review to examine evidence concerning the impact of staff qualifications and group size on quality. It was commissioned in light of research evidence suggesting that the impact of ratios on quality cannot be divorced from these other features of early years settings.

1.3 The review of research on adult:child ratios

1.3.1 The 1995 report reviewed research published between 1980 and 1993. The current review updates the 1995 report, covering material published up to the early part of 2000. It also reviews current research on ratios being conducted in the United Kingdom, and research completed but as yet unpublished. Included are descriptions of the Effective Provision of Pre-School Education (EPPE) Project, the Effective Early Learning (EEL) Project, and the Avon Longitudinal Study of Parents and Children (ALSPAC).

1.3.2 The previous report focused on English-language research. For this review, in addition to reviewing the English language literature, colleagues in four other European countries were commissioned to search for material, published since 1990, in languages other than English. Specifically:

- French language research (reviewed by Dr. Perrine Humblet, Free University of Brussels);
- German language research (reviewed by Dr. Norbert Huhn, Deutsches Jugendinstitut, München);
- Spanish language research (reviewed by Dr. Maria-José Lera, University of Seville);

- Research from the Nordic countries (reviewed by Dr. Björn Flissing, University of Gothenberg).

1.3.3 The previous report from TCRU provided information on recommended adult:child ratios in a range of different countries. This report updates that information.

1.3.4 The current report also reports briefly the results of a survey of ratios enforced across English local authorities³. Previous work undertaken by TCRU suggested some local authority registration and inspection units enforced ratios other than those recommended in Volume 2 of the Children Act 1989 Guidance and Regulations (Department of Health, 1991: referred to below as *Children Act guidance*). A postal survey of all local authorities in England was conducted to establish the extent of local variation.

1.3.5 This review is confined to research undertaken in group settings. It does not update the review of research conducted in family day care (childminding) settings reported in the 1995 report. However, it does include evidence concerning provision for children aged up to 14 years i.e. out-of-school services.

1.3.6 The review of evidence concerning adult:child ratios addresses seven specific research questions:

1. What impact do adult:child ratios have on outcomes and progress, how are outcomes/progress defined, and how does this impact vary by age of child and setting?
2. What impact do adult:child ratios have on process variables (e.g. the amount of physical and social interaction with children), and how does this impact vary by age of child and setting?
3. What impact do adult:child ratios have on service performance, and how does this impact vary by age of child and setting?

² Now the Department for Education and Skills (DfES).

³ In September 2001, regulation of childcare providers moved from local authorities to OFSTED.

4. What is the relationship of other variables (e.g. staff training) with service quality, and how do these interact with ratios?
5. What different definitions of adult: child ratios are used by stakeholders, and how do these varying definitions impact on quality?
6. What impact do adult:child ratios have on child safety?
7. What are the methodological and ethical issues and challenges surrounding research on ratios?

1.4 The review of research on staff training, qualifications and group size.

1.4.1 This additional review examines evidence concerning the impact of staff training and qualifications, and group size, on the quality of care provided in early years and childcare settings. It also looks at policy across different countries concerning the regulation of early years settings in the context of staff qualifications and group size. The review of evidence concerning staff qualifications and training, and group size, set out to address the following four questions:

1. What impact do staff qualifications and group size have on children's outcomes and progress, how are outcomes/progress defined, and how does this impact vary by age of child and setting?
2. What impact do staff training and group size have on process variables (e.g. the amount of physical and social interaction with children), and how does this impact vary by age of child and setting?
3. What impact do staff training and group size have on service performance, and how does this impact vary by age of child and setting?
4. How have issues of staff qualifications and group size influenced the development of regulatory frameworks for early years provision in countries other than England and Wales?

1.5 Evaluating the quality of studies included in the review

1.5.1 This report reviews all the available empirical evidence identified in the research literature. However, to reduce the possibility of drawing unreliable conclusions, the report takes into account the conduct and design of research studies reviewed. Research studies need to be evaluated as to their validity i.e.

how much confidence one can have in their findings. Good quality research studies are those in which results are not subject to bias. For example, in day care research, studies investigating the impact of parental versus non-parental care on later development are common. Studies of this sort often compare children who are cared for at home during their early years, with children in private care. Because of the costs involved, children in private day care facilities are more likely to have parents who are better educated and more affluent than the average. Since we know that parental income and education positively influence child outcomes, the results of such studies may be biased.

1.5.2 Designing studies to examine the impact of staff:child ratios, staff qualifications or group size can be very difficult. To be confident that observed effects result from variations in the factor under investigation, rather than any other features of a setting, requires studies to employ particular types of design. Probably the most robust design would involve randomly assigning comparable children and comparable teachers to comparable settings differing only in terms of ratio densities, for example. This type of design is often described as a randomised controlled trial (RCT). None of the studies reported in this review (or in the previous one) employ such a design. Methodological and ethical issues make studies of the type described very difficult to implement in the social sciences in general and in early years research in particular. Consequently, few such rigorously designed studies exist. To create a situation where all variables, other than staffing ratios, group size or staff qualifications, are held equal is virtually impossible. In a systematic review of research evidence, Zoritch, Roberts and Oakley (1998) concluded that in the field of day care, as with other social interventions ‘...*finding methodologically sound studies has been described as akin to the metaphorical search for a needle in a haystack.*’ (p.323)

1.5.3 To evaluate the validity of the research reviewed, the report includes descriptions of important design features of the studies cited. Appendix D provides a more detailed discussion of the main issues concerning the conduct and design of research and how those issues influence the degree of

confidence one can have in research findings. It also contains a table describing a hierarchy of research designs.

1.6 How the report is organised

- 1.6.1 The remainder of the report is written in three sections: Section A (containing Chapters Two, Three, Four and Five) examines issues concerning adult:child ratios in early years settings. Chapter Two includes a discussion of the practical and theoretical issues involved in trying to make sense of ratios and research on ratios. It also looks at the limitations of using research findings to deliver precise formulae on ratios. Chapter Three reviews recommended ratios (at the time of writing) not only in different parts of the United Kingdom, but also in a wide range of Minority World countries. Chapter Four reviews the research on adult:child ratios in services for children below compulsory school age, while Chapter Five reviews the research on services for children of compulsory school age.
- 1.6.2 Section B (Chapters Six and Seven) examines issues concerning group size, and staff qualifications and training. Chapter Six includes a discussion of general issues concerning comparisons of international research into staff training and qualifications. Chapter Seven summarises recent research on training and group size in early childhood settings.
- 1.6.3 Section C (chapters eight and nine) draws conclusions and makes recommendations based on all the evidence reviewed.
- 1.6.4 Appendix A contains an international comparison of staff:child ratios recommended or required for children below compulsory school age: full day care in group settings (at the time of writing). Appendix B describes the same comparisons for out-of-school care (at the time of writing). Appendix C describes international comparisons of staffing requirements for children with disabilities and other special needs (at the time of writing). Appendix D highlights issues concerning the design and conduct of research in early years.

Section A

Research on adult : child ratios in early years and childcare settings

Chapter

2 Making sense of ratios

2.1 Background

2.1.1 Interpreting research on ratios is complicated by several factors, the combination of which makes identifying ‘ideal’ ratios somewhat unrealistic. We have organised our discussion of these factors under four main headings:

- (1) How are ratios defined?
- (2) For which children do ratios apply?
- (3) What other features of staffing may mediate the impact of ratios on quality?
- (4) What purpose (i.e. pedagogical theory and practice) informs the setting being researched?

2.2 How are ratios defined?

2.2.1 One problem in interpreting research in this area concerns the formula used to define ratios. Some studies use the total number of places divided by the total number of full-time equivalent staff. Others use the number of staff supposed to be working with children at any given time or at certain key times in the daily routine. There will be little or no difference between these two definitions when staff working hours coincide with the opening hours of the service (as, for example, in nursery classes in the UK). However, in some forms of provision, staff working hours and service opening hours are different. For example, where staff work an 8 hour day with six weeks annual leave in a centre open for a 10 hour day and for 50 weeks a year. In such centres, the two measures of ratio will produce different figures. In publicly-funded nurseries in the French-speaking community of Belgium, for example, the recommended ratio for children aged 0 to 3 years is 1:7. However, because nurseries are open for 50 hours a week and staff work 37 to 39 hours a week, the effective ratio is 1:9.45.

2.2.2 The contrast is greater if some part of the working week is specifically allocated to work *not* involving direct contact with the children, such as in-service training, work preparation, or contact with parents. For example, workers in nursery services in parts of Spain and Italy (including the famous early childhood services in Reggio Emilia) have 6 hours out of their 36 hour week allocated to such activities. In its report on *Quality Targets in Services for Young Children*, the European Commission Childcare Network (1996) recommended that '*at least one tenth of the working week should be non-contact time allocated to preparation and continuous training*' (22). If that recommendation were applied to settings in the UK, it would have major implications for interpreting ratios.

2.2.3 The definitions of ratios discussed so far are based on a formula that includes the number of children enrolled in a nursery and the number of staff employed. Another way to define ratios is in terms of what actually happens in practice i.e. the number of staff and children observed in the same space either at given points of time or averaged out over a period. This approach takes account of both absent children (due to unfilled places, illness, or other reasons) and absent staff (due to illness, leave or unfilled posts). This in turn raises the question of availability of supply staff to cover for absence, and whether and how to take such arrangements into account when considering ratios. Last but not least, there is the question of what other duties child care staff may be expected to undertake, over and above working with children. For example, child care staff may have administrative or domestic tasks to undertake unless others are specifically employed for these purposes.

2.2.4 Staff:child ratios can evidently be defined in several ways. An American researcher, discussing differences between her findings and those from another study, draws attention to the potential significance of how ratio is defined and measured:

'One reason for the differences in the findings from these two studies might arise from the difference in the methods of calculating teacher-child ratios in the two studies. In the first study, ratios were recorded at 15 minute intervals

during observation and then averaged across the intervals. Thus, ratios could vary across intervals as caregivers entered or left the room. In the second study ratios were computed by dividing the total number of caregivers assigned to the classroom by the total number of infants enrolled in the classroom regardless of the number of caregivers or infants present at any given moment during the observations...A child classified by the first method into a 1:3 or better ratio group might actually be enrolled in a centre that employs a 1:4 teacher-child ratio and thus be classified by the second method into a 1:4 ratio group. If this is true, then the findings of the two studies cited above may be more similar than they appear' (Allhusen, 1992).

2.3 To which children do ratios apply?

2.3.1 As we shall see in the next chapter, it is common practice to vary ratios according to the age of children. Generally, ratios encourage more staff to work with younger children. However, where a recommended ratio covers a wide age range (e.g. children aged under 2 or 3 years), it is important to know what proportion of these children are likely to be very young. In Hungary and Sweden, for example, generous maternity leave means that nurseries in these countries have few children (less than 500 in both cases) under 12 months: most children start at centres between the ages of 12 and 18 months. By contrast, countries like the UK and the US, with less generous leave policies, are likely to have proportionately more children under 12 months among 0-2 year olds in nursery.

2.3.2 Individual characteristics of children, other than age, should also influence staffing levels. For example, children with special educational needs, depending on the nature and extent of those needs, are likely to benefit significantly from more adult attention. Similarly, children from disadvantaged family backgrounds have been shown to benefit from greater adult attention. Consequently, a single adult:child ratio applied to all children within a specified age range, irrespective of individual needs, can be inappropriate. A more flexible approach would make allowance to vary ratios to take account of the differing needs of children in different settings. We shall

consider the extent to which recommended ratios take this into account in the next chapter.

2.4 What other features of staffing may mediate ratios?

2.4.1 Ratios are just one element in a wider staffing and organisational picture, and cannot be considered in isolation from the other parts. The 1995 TCRU report concluded that research *'tends to suggest that ratios are just one of a number of staffing variables which have an important effect on the performance of services'* (McGurk et al., 1995: 9). Three other aspects of staffing emerged as particularly important:

- training;
- pay and other employment conditions;
- other characteristics of the work environment.

'While wages may provide a pre-condition for long-term satisfaction and tenure in child care, the adequacy with which centers provide supportive work environments for their staff is not unimportant. Paid preparation time was a consistent predictor of job satisfaction and for teachers, good co-worker relations and advancement opportunities were negatively associated with turnover. Centers that provide for adult needs such as offering opportunities for professional development and separate adult space...also offered higher quality care' (Phillips, Howes & Whitebook, 1991: 67).

2.4.2 The EC Childcare Network (1996), in its report on *Quality Targets in Services for Young Children*, allocated 10 of its 40 targets to a range of staff-related issues. In addition to ratios, other targets covered:

- levels of basic and continuous training;
- supply cover and provision for administrative, domestic and janitorial work;
- levels of pay and trade union affiliation;
- the recruitment of male workers and an ethnically diverse workforce.

2.4.3 Other structural features of group day care environments may mediate levels of staffing, in particular group size. The major US National Child Care

Staffing Study, conducted in the late 1980s, reported that quality was associated, *inter alia*, with centres which met ‘*adult-child ratios, group size and staff training provisions contained in the 1980 Federal Interagency Day Care Requirements*’ (Whitebook, Howes & Phillips, 1990). This leads some countries to combine recommendations on ratios and group size. However, these are not the only considerations; as Bjorn Flising observes in his overview of staffing in the Scandinavian countries:

‘. . . there are so many factors involved when composing an appropriate group that it is not possible to give any recommendations in terms of number of children or ratios of staff/children. Among the important factors are the competences of the staff, the ages of the children, the number of children in need of extra support, the quality of the premises, access to extra support when needed, amount of co-operation with other groups or activities.’

2.5 What purpose (i.e. pedagogical theory and practice) informs the setting being researched?

2.5.1 Judgements about the adequacy of adult:child ratios will depend on the purpose of services involved in research, i.e. the pedagogical theories and practices that apply to the provision. Across different countries, or even across different settings within a single country, the same questions need to be asked:

- What functions do early childhood institutions serve and for whom?
- What, according to local beliefs, constitutes good pedagogical work?
- What are local understandings of the young child?

(For a full discussion of these and other critical questions, see Dahlberg, Moss, & Pence (1999)). Different countries will often provide different answers to these questions. Consequently, it often makes no sense to make simple comparisons between ratios found in different cultures or countries, as the following examples illustrate.

2.5.2 The classic cross-national study of *Preschool in Three Cultures* (Tobin, Wu & Davidson, 1989) contrasted attitudes to ratios in the US, ‘*where the smaller the class size and the smaller the student/teacher ratio the better*’, and Japan,

where the ratios preferred by teachers and administrators in kindergartens with 4 and 5 year olds were typically 1:30:

'In Japan, the worlds of preschool and home, of teacher and mother, are viewed as largely discontinuous....[Low ratios] keep teachers from being too mother-like in their interactions with students...Though agreeing with the Americans that large class size and large student/teacher ratios tend to lead to chaos, many of the Japanese we spoke to view chaos in preschools as normal and even desirable, an important transition between the sheltered life of the homebound toddler and the tumult of the real world....[L]arge class sizes and large ratios have become increasingly important strategies for promoting the Japanese values of groupism and selflessness' (Tobin, Wu & Davidson, 1987: 539, 541-3).

2.5.3

Similar contrasts have been observed within Europe. In some countries, approaches to early years provision are dominated by what Singer (1993) has called *'attachment pedagogy'*. Rooted firmly in John Bowlby's ideas (Bowlby, 1951), *'attachment pedagogy'* is based on the claim that exclusive maternal care is needed for secure development and that, in its absence, non-maternal care should be modelled on a dyadic mother-child relationship. Attachment pedagogy encourages the view that women are best suited to early childhood work, supports enforcement of high ratios, especially with younger children, and is linked to individualistic approaches to working with children. Despite the fact that a substantial body of empirical research has failed to support the claim that successful development is contingent on exclusive maternal care (see Rutter, 1995 for a review), *'attachment pedagogy'* is still extremely influential. Some of its adherents (e.g. Morgan, 1996) have been critical of the view contained in the National Childcare Strategy that, although *'parents are the first and often the greatest influence on their children's development and education'* good quality care can add other dimensions which will stimulate, motivate and provide valuable developmental opportunities for children both socially and intellectually. One consequence of the influence that attachment pedagogy still enjoys is that nurseries in Britain operate with substantially higher staff ratios for work with children under 3

than, say, nurseries in Italy and Spain.

2.5.4 In a comparison of 12 publicly funded nurseries in Italy, Spain and the UK, Penn (1997) explored some of these differences in staffing and related them to pedagogical theory and practice in the three countries. The purpose of this kind of study is not to collect empirical data that can be generalised to entire populations. The sample size would make such generalisations unsafe. Rather, these descriptive studies serve to uncover some of the complex processes that underpin relationships between ratios, quality and pedagogical practice. Penn used several approaches:

- analysis of local and national documentation, to establish the wider policy context;
- attendance at meetings and use of questionnaires, to better understand organisation and staffing;
- observations of children and staff using ethnomethodological methods, in effect living the life of each nursery through the week.

In addition, working with Bronfenbrenner's concept of 'ecological validity' (do the findings make sense to the people being investigated?), Penn met regularly with administrators and other relevant professionals to relay back findings and clarify points that were unclear.

2.5.5 Apart from the difference in staff ratios, Penn noted another major difference in staffing. Unlike the British nurseries, both the Italian and Spanish nurseries were run as collectives without managers or hierarchies: *'the principle on which the Spanish and Italian nurseries were organised was that in a cooperative and collectively organized nursery the adults will have more egalitarian relationships with each other and with the children, and the children will in turn model their relationship with each other on this cooperative and collective pattern'* (*ibid.*:9). Penn concluded that these and other features of staffing structures (including relatively high numbers) in British nurseries encouraged staff to see themselves, and the children they worked with, as individuals rather than, as in Spain and Italy, also as part of a group, sharing and working towards common objectives. In the British

nurseries: *'there was little sense of the children as a group able to influence or to help each other, and in general the organizational format of the nurseries would make it difficult to achieve, even if it was considered a worthwhile objective. The overall objective was instead the surveillance and monitoring of individual children to make sure they did not come to harm...In so far as any theoretical assumptions underpinned the approach to children in the UK nurseries, it was that...emotional security, and therefore learning, only takes place in a one to one adult-child relationship, and all other situations are irrelevant. The contribution of the peer group is completely disregarded'* (ibid.:52,53). Compared with their British counterparts, Penn judged the pedagogical work to be, in general (though with one striking exception), of a much higher standard in Italian and Spanish nurseries, despite the fact they operated with fewer staff. Penn's study emphasises how ratios form only part of a much wider set of influences which shape both ideas about good practice as well as pedagogical practice itself – influences which include not only organisation, but also values, assumptions and theory.

2.5.6 Loris Malaguzzi, the first director of the early childhood services in Reggio, Italy, expressed part of his pedagogical theory when he spoke of *'a pedagogy of relationships'* and of *'children as pedagogues'*. He viewed the group of children as fundamental to learning, with the pedagogue (worker) as co-creator and facilitator, rather than transmitter or substitute parent (for a fuller discussion of these and other constructions of early childhood workers, see Dahlberg et al., 1999; Moss, 2000):

'Interaction among children is a fundamental experience during the first years of life. Interaction is a need, a desire, a vital necessity that each child carries within... Children's self learning and co-learning, supported by interactive experiences constructed with the help of adults, determine the selection and organization of processes and strategies that are part of and coherent with the overall goals of early childhood education... Constructive conflicts transform the individual's cognitive experience and promote learning and development. Placing children in small groups facilitates this process because among children there are not strong relationships of authority and dependence;

therefore, such conflicts are more attractive and advantageous' (Malaguzzi, 1993: 11-12).

2.5.7

A co-author of the current report found similar thinking and practice during a recent visit to some nurseries for children aged 6 months to 3 years in a small local authority in Tuscany. The *pedagogista* (pedagogical consultant) who worked with these nurseries emphasised the critical importance of the group of children in the pedagogical philosophy and practice of the nurseries:

'Nurseries are places where children can be with children. We place a very high importance on the relationships between and among children. During the first few months [at nursery - children are admitted at one time each year], the group is created, takes shape. The group gets its own structure...The experiences each child has becomes the experience of the whole group...Each child makes a contribution to the history of the group, each child brings something to the group and the group helps each child build her identity - difference and solidarity...Pedagogy mainly occurs through the group, the nursery is a place for social groups....The children here learn in the sense of constructing knowledge in relation with other children and adults. In school, learning is predefined, given. Here, it is important that the individual develops as a result of interaction, it is important not to receive information and knowledge from someone who knows more'.

This pedagogical approach produced a particular construction, or understanding, of the early childhood worker:

'The educator is the mediator of the relations (within the group). The adult has a high capacity to draw children's attention to herself, so we try not to draw attention on us, but leave children to have experiences among themselves...We must redefine the role of the educator so the potentialities of children are helped to come out. The educator does not violate the environment of children - but is not absent. She follows the children, but not to intervene, there but not being there, she observes but does not try to intervene, she lets the children act, be together...There are two strong images - the mother and the teacher. In our nurseries, we are creating a third image, the

educator, someone who is also developing with the children, also learning, with a professionalism that is evolving, not fixed, never ending’.

- 2.5.8 This philosophy stresses the importance of encouraging children to operate as a group of children as active learners and pedagogues, and of early childhood workers as facilitators of the group. In that context, it makes sense to have what (in British terms at least) are low staff ratios averaging 1 adult to 6 children under 3 years (or 1 adult to 8 children where there were no children under 12 months). Moreover, a conversation with early childhood workers found no support for increasing ratios (i.e. having more adults), but rather a consensus that existing ratios were adequate and suited to the pedagogical work.
- 2.5.9 A few final points should be made about the experiences of Italian early childhood workers. First, staff expressed high levels of job satisfaction, reflected in a low staff turnover. This contributed to a very strong sense of the group among staff, to the extent to which co-operative working with no hierarchy was the norm, with no officers in charge, supernumerary or otherwise. Second, staff were well supported in their work, not only by the *pedagogista*, but also through having 6 hours non contact time out of their 36 hour week available for preparation, and for documentation involving discussion, confrontation and reflection. Third, there was a shared and strong commitment to a pedagogical philosophy and practice that emphasised the importance of group working, both for children and adults.
- 2.5.10 The provision of childcare for children of school age raises yet more considerations. Services are varied in many respects. Activities range from supervised homework, through trips to places of interest, swimming, free play and a variety of what are called ‘learning activities’ such as arts, crafts and dance. Each type of activity has different implications for staffing. In particular, where a high value is placed on play and children’s own culture, there may be a corresponding wish to promote interactions between children, rather than interactions with staff. Staff intervention may be thought less

desirable than allowing children to occupy themselves and themselves find solutions for their own problems. For example, in the Scandinavian countries, childcare services for children of school age are known as ‘free-time services’. Children’s play, initiated by themselves, is often given prominence; intervention in children’s quarrels is not automatic. This is not to say that children are neglected by staff, who are often highly qualified, nor that the approach should be dismissed as *laissez faire*. The approach derives from professional reflection and educational policy across many domains. For example Norway’s Framework Curriculum Plan for Kindergartens states:

‘Childhood as a life phase has a high intrinsic value, and children’s own free-time, own culture and play are fundamentally important...[T]he need for control and management of the barnehager (kindergarten) must at all times be weighed against the children’s need to be children on their own premises and based on their own interests’.

While this is a statement about kindergartens, it could apply equally to free-time services in Scandinavia. Given this underlying philosophy, higher numbers of staff may not always be desirable.

2.6 Conclusion

2.6.1 Providing examples of apparently good quality services operating with lower staff ratios, as we have done above, is not to argue in favour of low ratios *per se*. On the contrary, the examples illustrate how any approach to the issue of adult:child ratios should reflect a philosophy underpinning early years service provision. That philosophy should say something about how we choose to understand young children, their institutions and the pedagogical work undertaken within these institutions. For this reason, there can be no general formula for calculating ideal ratios, a universal best practice. There can only be particular choices situated within particular contexts. This view is summed up by the EC Childcare Network (1996) in its discussion of targets for staff:child ratios:

‘The aim of setting any conditions for staffing is to create conditions which will maximise or enhance the quality of relationships between adults and children, between children themselves and between the adults working in or

making use of the services... All the [other] targets so far specified are contextualised, but for adult-child relationships the overall context is probably most critical. This target cannot be considered in isolation. The notion that high staff-child ratios are per se a guarantee of quality is simplistic. The concept that underlies the notion of high staff-child ratios, that a very young child learns best through the close emotional security of a relationship with one adult, is a culturally specific one and is not generally shared throughout all member states. There are considerable differences in approach [in Europe] about how children are grouped, about who are the best people to look after them and about other aspects of the circumstances in which they are looked after. We stress that these approaches and the concepts underlying them should be made explicit and thereby open to debate' (ibid.:21; emphasis added)

2.6.2 The reviews of recommended ratios and the research in the chapters that follow need to be interpreted with care. There are practical issues about how ratios are defined and calculated, and how they relate to the actual experience of children and adults who work with them. There are also theoretical issues about how the purpose and practice of the work itself are understood. Evidence concerning relationships between adult:child ratios and the quality of children's experiences can inform choices, but cannot provide a formula for best practice. Policy-makers, politicians and practitioners ultimately have to make these choices themselves. In the words of Carlina Rinaldi, director of pre-school services in Reggio Emilia: *'behind every solution and organisation is a choice, a choice of values and ethics, a social and political choice, and a responsibility for that choice'*. (presentation made to a British study tour to Reggio Emilia, April 1999).

2.6.3 Ratios are an important consideration in ensuring children experience good quality non-parental care. However, when looking to maximise quality, ratios need to be considered in conjunction with a range of other issues, including the training, pay and working conditions of the early years workforce. The

issue is not one of simply levelling a playing field, but of thinking about what game or games are to be played on it, and by whom.

Chapter

3 Recommended ratios in the UK and other countries⁴

3.1 Recommended ratios in England and Wales⁵

3.1.1 Table 3.1 shows the staff ratios recommended in the Children Act guidance for England and Wales. These range from 1:3 for children under 2 years to 1:8 for children over 3 in non-school settings to 1:13 in nursery classes (1:10 in nursery schools).

Table 3.1

Current recommended staff: child ratios in England and Wales

Age group of children	Type of provision		
	Full day care (group settings)	Sessional day care (group settings)	Maintained nursery schools and classes
0-2 years	1 : 3	-	-
2-3 years	1 : 4	-	-
3-5 years	1 : 8	1 : 8	1 : 10 (schools) 1 : 13 (classes)

Source: Guidance and Regulations to the Children Act Vol. 2, HMSO 1991

3.1.2 The Guidance and Regulations to the Children Act also qualifies these recommendations in a number of ways, including:

- *for full day care in group settings*, a higher ratio may be justified, for example if not all staff are qualified or sufficiently trained or if there are babies under 12 months needing constant attention. Officers in charge should be treated as supernumerary when considering ratios where the service has more than 20 children. Finally, only staff working directly with

⁴ At the time of writing.

⁵ At the time of writing, regulation was carried out by local authorities. In September 2001, regulation moved to OFSTED with a new set of minimum National Standards.

children are to be included in the computation of ratios: additional support staff should be employed for cooking, cleaning, maintenance work and routine administration (para.6.41).

- *for sessional day care in group settings*, the ratio of 1:8 for children aged 3 years and over is based on the assumption that workers will not have a break during the session but will be in continuous direct contact with the children (para. 6.42).
- *for educational provision*, the ratio in nursery schools is higher than in nursery classes to allow for the administrative workload of the head teacher (para. 6.43).
- *for provision for school age children*, a higher ratio may be justified when children with disabilities attend (no reference is made to children with disabilities in provision for pre-school age children). The person in charge should be treated as supernumerary in the calculation of ratios in the case of full day care holiday schemes where there are places for more than 24 children, but not in the case of sessional facilities (para.6.50).

3.1.3 How were these ratios arrived at? The rationale for recommended ratios in nursery education is not apparent: *'like nursery class ratios, nursery school ratios appear to have been informally arrived at, with no research or formal review process, and no subsequent evaluation or review'* (McGurk et al., 1995: 5). The current standards for nursery education are indeed the same as those proposed in the 1972 Department of Education and Science Circular 2/73, which appear in turn to have been based on then current practice.

'The present ratio of staff...to children in nursery classes....is about 1:13....A ratio of 1:13 is acceptable, except when some of the children require special help. But the Secretaries of State hope that the proportion of qualified teachers will rise steadily so that by 1982 they account for at least half the total staff.' (paras.13,14).

3.1.4 A consultation paper, *Policy and Standards of Day Care and Educational Services*, preceded the Children Act guidance. It proposed somewhat different ratios to those finally adopted. For example, a 1:5 ratio was suggested for 2 to

5 year olds, which was amended to 1:4 for 2 year olds and 1:8 for 3 and 4 year olds. The guidance provides a general explanation for the ratios recommended, rather than a detailed justification, and indicates that local decisions on ratios need to take account of a variety of other considerations:

‘The staff/child ratios in this chapter are those that will normally be needed to secure good quality care or education for young children. Local authorities should use them in deciding what requirements should be observed by people providing day care for under eights and by childminders. Factors to be taken into account include:

- *the opening hours of the different services;*
- *the need for staff to spend most of their working day in direct contact with the children;*
- *the particular need for very young children to receive one-to-one attention;*
- *qualifications, training and experience of the staff;*
- *the overall size of the facility;*
- *the stage of development reached by particular children, e.g. the presence of children with disabilities.*

***The ratios recommended are derived from judgements of how to put into practice the general objectives quality of care in paragraph 6.25. Local authorities should base their requirements in respect of each application for registration on an overall assessment of the quality and standards of the particular facility’.** (Paras. 6.19, 6.20: emphasis added).*

3.1.5

As well as ratios, the Children Act guidance makes recommendations about the qualifications of staff in *day care services*, albeit in rather broad terms: ‘*At least half the staff should be qualified in child care, early years education or social work’*. In contrast, the qualifications for staff in nursery education are quite specific, i.e. qualified teachers and qualified nursery assistants. On group size, it offers even more general guidance for *day care services* (in nursery education, the group size by implication is 26 for 3 and 4 year olds). In provision offering day care for children under 5 years, guidance notes:

'Generally children do better in small groups rather than large groups. This is so for a wide range of developmental indicators. The size of group which is most beneficial will change with the age of the children. Babies and toddlers generally need smaller groups than older children. For three and four year olds research suggests an upper limit of 6-8 for peer group size to optimise peer interaction. Larger groups may lead to overstimulation and disruption. This also applies to sessional facilities'. (Para.6.41).

There is no discussion of how the recommended peer group size for 3 and 4 year olds relates to nursery education where classes form a group of more than 20 children.

3.1.6

In day care provision for school age children:

'There is insufficient information available to advise on maximum numbers. Organisers need to give careful consideration to this point and in so doing consider such points as viability, and likely catchment area. In care settings where children are likely to remain for two hours and more during the holidays, high overall numbers may mean that proportionately fewer children receive individual attention regardless of the actual staff/child ratios. It is suggested that where a very large facility is concerned - with over 100 places for example - it should be organised so that the children are in self-contained units of not more than 30. The group size of children aged 8 should not normally exceed ten' (para.6.50).

The recommendation reflects a lack of experience of this type of provision at the time when the guidance was drafted. Any grouping within out of school services is most frequently based on activities and on the number of rooms available, rather than on narrowly defined age bands. For example, where premises lend themselves to a variety of activities, children may choose whether they wish to play informally in a playground – making their own choice of group and group size – or cook in the kitchen, or make use of an art room. In other out-of-school services, they may be confined to a large room or church hall, where organisation into groups would be largely unrealistic. Sometimes activities are provided with an older, rather than a younger age group in mind, but even where this is the case, for other purposes children are

most frequently treated as one group – unlike in the pre-school settings on which the guidance seems to have been modelled.

3.1.7 Services for school aged children have developed in response to local need, and were not regulated until the implementation of the 1989 Children Act. Local services have typically made use of whatever premises were available. So-called open door, or open access, holiday play schemes and play centres present particular problems of regulation. In services of this type, the number of children may vary dramatically from day to day. Under these conditions, organising children into stable groups is not feasible, even if staff thought it was desirable. Maintaining staff numbers at a level that would enable the service to meet required ratios during periods when the maximum number of children are present can be a problem. The issue is not just one of expense and efficiency. In a play setting, staff may not choose to be closely involved in children's activities unless they are invited to be so.

3.2 Local variations on ratios

3.2.1 The Children Act guidance offers *standard recommendations* on ratios. Local authorities have scope to modify these. The research team conducted a postal survey of all 150 local authorities to determine the extent to which they do so.

3.2.2 Questionnaires were posted to 150 local authorities. One hundred and twenty returned the questionnaire, a response rate of 80%. Of the 120 authorities who responded, 36 (30%) enforced ratios different to those recommended in the guidance to the Children Act. The majority (22) set higher ratios. In many cases, higher ratios were applied to children under the age of two.

3.2.3 At least two local authorities made the ratios they enforced contingent on staff qualifications. Where all staff are qualified, providers are allowed to operate on lower ratios.

3.3 Ratios in other parts of the UK

3.3.1 The Scottish Executive has published *Regulation of Early Education and Childcare: The Way Ahead*. The paper sets out plans to make the regulation of early education and childcare more effective. The proposals for staff:child ratios in non-domestic premises are:

- 1:3 for children aged under 2
- 1:5 for children aged 2 to under 3
- 1:10 for children aged 3 and over
- 1:15 for children aged 8 or over (where cared for separately).

3.3.2 In Northern Ireland, recommended ratios are part of the regulations and guidance associated with Part XI of the Children Order. The recommended ratios are the same as those outlined in the Children Act guidance for England and Wales.

3.3.3 In the Channel Islands, Guernsey uses the Children Act ratios as guidelines, while Jersey enforces the following ratios for what they term day nurseries:

- 1:3 for 0-2 year olds
- 1:4 for 2-3 year olds
- 1:8 for 3-5 year olds
- 1:10 for 5-12 year olds.

3.4 Ratios in countries outside the UK

3.4.1 Appendices A and B set out recommended ratios in services for children below compulsory school age, as well as in services providing care for children of school age, in Western European countries, North America, Australia, New Zealand and Japan. The parameters under which ratios are specified vary considerably.

3.4.2 First, different countries give the responsibility for setting ratios to either national or local government. In some countries (e.g. Ireland, New Zealand, France), ratios are set nationally, with no variation regionally or locally. At the other extreme (e.g. Germany, US, Canada, Austria, Denmark, Sweden), there

are no national standards: ratios are specified by regional or local authorities. The former four cases have federal constitutions, in which many powers are devolved to states or provinces. In the last two Nordic examples, other processes are at work. In both Denmark and Sweden, the absence of national standards is the end result of a wider process of decentralisation from central to local government, which coincided with the end of a process of building-up early childhood and school-age services. Originally, in the 1960s and 1970s, as systems for the delivery of services were built up, central government applied national recommendations and earmarked funds. Later, from the 1980s, earmarked funds were replaced by block grants, and local authorities were left to determine standards in close collaboration with staff and parents: *'[in Denmark] many feared this decentralisation...but in general a good child:staff ratio has been built up in the centres in alliance with the parents and political opinion in general, so it is not possible to cut down'* (personal communication from Jytte Juul Jensen).

3.4.3 The experience of Denmark and Sweden suggests that national standards are not a necessary requirement of high quality services, if certain other conditions exist. For example, provision in these countries is characterised by high levels of staff training, involving at least 3 years education at a post-18 level; sustained political commitment, reflected in high public funding of services; and a strong democratic tradition, including high levels of parental participation.

3.4.4 Between the extremes of ratios being specified by either local or national government, there are countries like the UK, where recommended national standards can be varied by regional authorities. Consequently, in these countries, recommended ratios may not be an accurate reflection of the situation in individual nurseries. In Japan, the standard set by the Ministry of Health for childcare centres is a minimum and local authorities can provide higher standards: in Tokyo, for example, the adult:child ratio for 3 year olds is 1:18, rather than the recommended 1:20. Actual ratios in Japan are also higher than the minimum recommended for other reasons:

' [The standard in kindergartens for 3 to 6 year olds] is 35 children in a class. As many kindergartens are private, there is a wide variety in numbers, from less than 15 to 35. Because of the decline in birth rate many private kindergartens are have problems recruiting children. Mothers prefer classes of 20...So class size becomes smaller and smaller. Statistics for actual class sizes in all kindergartens do not exist' (personal communication, Professor Hoshi-Watanabe).

For these and other reasons, the average class size in Japanese kindergartens is 24.4 (1999), down from 25.4 in 1994, while the actual teacher:child ratio in this form of provision is now 16.9, down from 18 in 1994 (although the teacher:child ratio statistics include principals, vice-principals and other managers, as well as classroom teachers, illustrating yet another complication in defining and measuring ratios).

3.4.5 In Austria, to take another example, ratios in practice are often better than those set as minimum standards, either because providers have higher standards or because of problems recruiting children. Consequently, actual average ratios are 1:4.1 for children under 3 years, 1:9 for children from 3 to 6, and 1:9.7 in provision for school-age children, all considerably higher than the minimum standards set by states in Austria.

3.4.6 A second variation in how ratios are defined concerns the age categories used. In the UK, children under 2 years of age are grouped together. However, other countries draw a line between children under and over 12 months (or, in one or two cases such as France, between children who can and cannot walk), while yet others have a broader category of children under 3 years.

3.4.7 Among older pre-school children, UK ratios for nursery education of 2:26 apply to children up to the age of 5 years. However in most other countries, nursery education or kindergarten spans a wider age range, from 3 to 6 years: 4 and 5 year olds in many countries therefore experience higher staff ratios than their peers in the UK.

3.4.8 In relation to services for children of school age, the most striking feature of the tables is the many countries that have no ratio standards at all. In this respect, this area of work with children seems to be more neglected than early childhood services. However, where standards do exist, the upper age limit may vary, from 7 in the UK to 10 or older in most other countries with recommended ratios.

3.4.9 Third, differences between countries exist in terms of other staffing requirements linked with specifications of ratios. Most countries link ratios with some criteria concerning staff qualifications. Partly because of the wide range of early years qualifications available to staff, the UK requirements are less precise than in many other countries. In some countries, specific standards for group size are also set. To take two examples:

- In Canada, provinces and states may set ratios and maximum group sizes. The province of Ontario specifies a ratio of 3:10 for children under 18 months, and a maximum group size of 10. For children aged 18-23 months, the ratio is 1: 5 and the group size is 15, while for children aged 2-5 years, the ratio is 1:8 and the group size 16;
- In the United States, states may set ratios and maximum group sizes, although many do not set standards for group size. Pennsylvania, for example, specifies a ratio of 1:4 for 9 month olds, and a maximum group size of 8. For 19 month olds, the ratio is 1:5 with a maximum group size of 10; for 3 year olds, it is 1:6 with a maximum group size of 20; and for 7 year olds, the ratio is 1:12 with a maximum group size of 24.

3.4.10 Fourth, specific staff:child ratios vary considerably between countries. For example for children under 12 months, the ratio is 1:3 in Ireland but 1:8 in Spain. In general, UK ratios appear to be near to or at the top of the international league tables (i.e with high levels of staff in relation to numbers of children), at least for non-educational services. Ratios for educational services in the UK are more in line with other countries, especially when it is remembered that 5 year olds in the UK, and many 4 year olds, are in ordinary primary school classes with low ratios. In most other countries, children of the

same age are still in nursery schools or kindergartens with higher ratios. However, as already noted, comparing ratios between countries is not always straightforward. Comparisons need to take account of differences in pedagogical theory and practice, as well as other variables such as staff qualifications, pay and other employment conditions. For example, ratios in services for children under the age of 3 years are similar in the UK and Denmark. However, the two countries differ considerably when it comes to ideas about the functions of early years services. Because ideas about what constitutes good practice differ, straightforward comparisons between the quality of services provided in the UK and Denmark are difficult to make. What might be considered good practice from a Danish perspective might not necessarily be consistent with definitions of quality widely held in the UK. Similarly, any comparisons of how staff:child ratios influence quality would have to take account of the fact that Danish and British early years workers vary considerably in terms of both training and pay.

3.4.11 Finally, it should be noted that ratios in mainland European countries apply almost exclusively to publicly funded services. Most of these countries have very little private, unsubsidised group care for children under 3. By contrast, in the UK and the US, the majority of group day care places are provided by the private sector, without direct public funding. In mainland Europe, governments specify ratios as an indicator of public funding requirements. In countries like the US and UK, government specified ratios are more of an element in regulating the private market.

3.4.12 Furthermore, most mainland European countries already have, or are moving towards, a unitary system of 3 years publicly funded nursery education or kindergarten, for all children from 3 to 6 years of age. Issues about creating a ‘level playing field’ between different types of providers simply do not apply in most European countries outside of the UK. Instead they have opted to deliver early years education through a unitary system. However, where ‘day care’ and ‘nursery education’ systems cover similar age groups (e.g. 2 year olds in Belgium and France), then ratios are higher for the day care services.

The difference is justified on the grounds that day care services are open longer hours, and staff in the education system usually have a higher level of training compared with day care staff.

3.5 Children with disabilities and other special needs

3.5.1 Where they exist, staffing requirements for groups that include children with disabilities or other special needs take two forms: either a reduction in the size of the group *or* additional staff *or* both (this refers to mainstream services rather than services exclusively for children with disabilities) (Table 3.4). In general, however, the requirements (as opposed to what may happen in practice) appear to be rather broad and modest. For example, in the UK, as already noted, Children Act guidance says only that ‘*a higher ratio may be necessary when children with disabilities attend a facility*’ (para.6.50), and this in respect of services for school-age children. Otherwise there is only a general reference to the need, when local authorities determine staffing requirements, to take account of *inter alia* ‘*the stage of development reached by particular children, e.g. the presence of children with disabilities*’ (para.6.19).

Chapter

4 Research on staffing ratios in pre-school settings

4.1 Conclusions from the 1995 review

4.1.1 The previous review of literature on staff:child ratios in care and education settings for young children carried out by TRCU (McGurk, Mooney, Moss and Poland, 1995) covered publications from 1980 to 1993. The review drew four key conclusions:

- higher ratios (more staff per group of children) resulted in better outcomes for both children and staff;
- staff:child ratios could not be viewed in isolation from other staffing variables, such as training and working conditions, and may be mediated by group size;
- identifying a universally applicable ideal ratio was not possible;
- staff:child ratios should continue to be regulated to ensure high standards of care.

4.2 Scope of the current review

4.2.1 The following databases were searched for English language papers, concerning staffing ratios in pre-school services, published since 1994:

- British Educational Index (BEI);
- Australian Education Index;
- Canadian Education Index;
- ERIC, the major US indexing service for education;
- International Bibliography of the Social Sciences (IBSS);
- British Library of Political and Economic Sciences;
- Social Sciences Citation Index.

4.2.2 The search identified 58 publications mentioning staffing ratios, and two unpublished documents. The research team also approached researchers from the following projects, currently in progress in England, for information relating to staffing ratios:

- the Effective Provision of Pre-School Education (EPPE) Project;
- the Effective Early Learning (EEL) Project;
- the Avon Longitudinal Study of Parents and Children (ALSPAC).

4.2.3 Most publications we found were published in the US. Eighteen of the papers identified reported findings from empirical research. The remaining publications were either review or discussion papers. In many, the issue of ratios was only a minor part of a much broader discussion (e.g. Frede, 1995; Lamb, 1998). Other articles reported the same results in different journals and to different audiences (e.g. Cost Quality & Child Outcome Study Team, 1995; Helburn, et al., 1995 and 1996;), or reported results already discussed in the previous TCRU review (e.g. Clarke-Stewart, 1994; Palmerus, 1996).

4.2.4 All twelve of the empirical studies reported in the eighteen papers are observations of naturally occurring variations in staff:child ratios. None of the studies specifically set out to consider the effect *per se* of different staffing ratios. Rather, they were designed to consider a range of structural variables (e.g. ratios, group size, staff education and training, working conditions) known to affect quality of care and child outcomes, and their impact on: (a) childcare quality, (b) staff:child interactions or (c) developmental outcomes. All but four of the 12 studies were conducted in the USA. Of the remainder, two were conducted in New Zealand and another one in Canada. The fourth was a cross-national study involving Germany, Portugal, Spain and the USA.

4.2.5 The majority of the studies reviewed had been conducted in nursery settings. Only one study, from New Zealand, considered other types of group settings, including playcentres and kindergartens (Wylie, 1996). The National Institute of Child Health and Human Development (NICHD) study, conducted in the US, included children attending all non-maternal childcare settings, of which centre care (i.e. nurseries) was the only group setting (NICHD, 1996).

4.2.6 Most studies calculated staff:child ratios by counting the number of adults and number of children present in the room at specified times during an

observation period. The results were then usually averaged to provide a mean group size and ratio score. Thus, in the NICHD study, the number of adults and awake children were recorded at the beginning and end of four ten-minute observation periods and averaged to represent the staff:child ratios. However, in the Cost Quality and Outcomes Study (Phillipsen et al., 1997), although data were collected on numbers of children and staff present upon arrival in an observed group, and then at hourly intervals for a further four observations, only the mid-morning ratio was used in their analyses. The researchers do not say why they used this ratio, rather than an average. It is possible that since the first observations were made at about 8.00 - 9.00 a.m and the last were made at about 2.00 - 3.00 p.m, the mid-morning ratio provided the maximum number of children and staff attending the setting.

4.2.7 Not all studies, however, calculated ratios based on observational data. Smith (1999) relied on supervisors' reports, which gave the number of children and staff enrolled for each class or group within the setting. Studies collecting data on group size and ratio through both observation and report have noted discrepancies between the two, with the reported figures larger than those observed (Burchinal et al, 1996; Fink, 1995). Burchinal et al suggested that the reported figures may be a more stable measure and probably reflect more typical ratios and group sizes than can be observed on a single day of observation.

4.2.8 In yet another variation on defining ratio, Howes (1997) used observed ratio to classify each classroom as complying or not complying with recommended ratios. Staff:child ratios in this analysis were therefore a categorical rather than a continuous variable. The reason for defining staff:child ratios in this way was to create a national standard for a large sample of centres drawn from several American States, which differed regarding their regulations on ratio.

4.2.9 Two further points should be made about the way in which staff:child ratios are measured. First, researchers have tended to use the term adult and staff interchangeably. However, whether it is all adults in the setting, including for

example placement students or parents helping out, or only childcare and teaching staff who are counted for ratio purposes, may make a significant difference. Wylie et al (1996) found that in over a third of their observations, parent-helpers (ranging from 1 to 6 in number) were present. Second, using averages may be a problem, particularly where there are large fluctuations in ratio and group size. For example, children's activities can affect these variables. Classes and groups might be combined for joint activities, such as outdoor play or watching a video, or divided into small learning groups (Clawson, 1997).

4.2.10 Results from empirical studies identified in the current search have been divided into five sections:

- staff:child ratios and childcare quality;
- staff:child ratios and adult:child interactions;
- staff:child ratios and developmental outcomes;
- data from UK studies;
- reviews of research reported in languages other than English.

4.3 Staff:child ratios and childcare quality

4.3.1 The childcare research literature commonly divides indicators of quality into *structure* and *process* variables. Structural variables include group size, staff:child ratios, staff education and training, staff salaries and the physical characteristics of day care centres. Process variables include adult:child interactions, adult and child behaviours and teaching styles. Policy relevant research often looks at the relationship between structural and process variables. This approach aims to investigate how regulating the structural elements of early years environments might influence process elements.

4.3.2 The Cost Quality and Outcomes Study (CQOS Team, 1995) found that across all age groups, staff:child ratios were the most significant determinant of quality. The researchers concluded: "*In the statistical analysis to predict the determinants of quality, the staff-to-child ratio is the most significant determinant of quality, even when controlling for other factors affecting*

quality” (p.4). Staff salaries, education and training were also important discriminators of quality. These findings are consistent with research reported in the previous review (e.g. Phillips et al., 1991; Ruopp et al, 1979). In a more recent study, Fink (1995) reported that for children of all ages, centres with larger groups and, to a lesser degree, lower staffing ratios had lower scores on standardised measures of quality. However, because the sample was small, results need to be treated with some caution.

- 4.3.3 In secondary analysis of data from the National Child Care Staffing Study, Blau (1996) used statistical modelling techniques to look at the determinants of quality in day care centres. Group size, staff:child ratios, and staff education and training all had small impacts on quality. The original analysis of data from the National Child Care Staffing Study found that children in centres with higher staff:child ratios received more sensitive care from adults, and experienced more developmentally appropriate activities (Howes et al., 1992).
- 4.3.4 An international study of pre-school provision provides further evidence that structural variables cannot be treated in isolation. Researchers found no significant differences between measures of quality taken in centres from four countries (USA, Portugal, Spain and Germany). However, in each country, different structural variables predicted quality scores (Cryer et al., 1999): *‘The strongest predictors included adult:child ratio in the German data, physical size in the Portuguese data, and teacher education in Spanish and U.S. data’* (p.349). Several structural variables were related to quality, albeit with weak to modest correlations, and these varied from country to country.
- 4.3.5 Not all studies have concluded that relationships between structural and process elements of quality are robust. Scarr et al., (1994) found staff salaries, not ratios, were the best predictor of quality provided by childcare centres. However, staff:child ratios were significantly correlated with process measures of quality.

4.3.6 Lyon & Canning (1997) reported a significant association between three structural variables and a global measure of quality (the Early Childhood Environment Rating Scale; ECERS):

- a qualification specifically related to early childhood education for centre directors;
- more experienced staff;
- higher salaries.

No such relationship was found between quality, group size or staff:child ratios. However, this might have been due to the fact that staff:child ratios did not vary significantly across the 48 centres in the study.

4.3.7 A study conducted in New Zealand (Wylie et al., 1996) also reported consistent associations between more experienced staff, higher salaries, group size and quality ratings. However, larger group size was associated with higher ratings rather than the reverse as usually reported. The staffing ratio was indicatively rather than significantly related to quality ratings, but in private pre-schools, the relationship was in the reverse direction (i.e. there was a trend for higher quality ratings to be related to lower ratios). The research team suggested that inconsistencies with US research might reflect the fact that early years staff in New Zealand are generally better qualified than their US counterparts: *'structural characteristics do not operate mechanically, or separately from one another – they impinge upon one another, and alter each other's potential effects. Thus the higher levels of kindergarten staff training can mitigate, albeit not eliminate the demand of the larger group sizes and higher children to staff ratios in kindergartens through offering a higher quality programme'* (Wylie et al, 1996, p.111).

4.3.8 Results from the most recent studies we have reviewed are generally consistent. Most (CQOS Team, 1995; Fink, 1995; Blau, 1996; Howes et al, 1992; and Cryer et. al., 1999), unequivocally suggest that staff:child ratios can significantly influence quality. Other studies (Scarr et. al., 1994, Lyon & Canning, 1997, & Wylie et. al., 1996) are more equivocal rather than contradictory. Scarr et al looked at 363 classrooms in 120 different nursery

settings. Despite the fact that staff:child ratios were significantly correlated with measures of quality, the authors concluded that a measure of ratios could not be '*substituted for process measures of quality care*'. The study conducted by Lyon and Canning found no relationship between quality and staff:child ratios. However, this is likely to be a result of the fact that ratios did not vary significantly across the 48 centres included in their sample. Finally, the study reported by Wylie et al involved only a small sample of each type of childcare provision (20 or less). Despite this limitation, small but statistically significant relationships were found between staff:child ratios and quality in kindergartens, playcentres and childminding settings. The same relationship was not evident in private pre-schools.

4.3.9 All the studies reviewed illustrated how the influence of ratios on quality cannot be separated from other structural variables, the most important of which appear to be staff education and training, and staff salaries.

4.4 Staff:child ratios and adult:child interactions

4.4.1 Children's development is influenced by the quality of their interactions with adults. Children who are in the care of adults who are responsive, sensitive and positive are likely to be more advanced developmentally than children whose carers are less responsive (McGurk et al., 1995). The consensus from the research covered in the previous review was that higher staff:child ratios resulted in more sensitive, responsive and positive adult:child interactions. Findings from studies conducted since 1994 are entirely consistent with this conclusion.

4.4.2 Studies of infant and toddler care have consistently concluded that adults looking after fewer children are more sensitive and positive in their caregiving (NICHD, 1996; Phillips et al., unpublished; Phillipsen et al, 1997). The NICHD study found that sensitive, positive interactions were more likely the closer the ratio was to 1:1. Thirty eight per cent of carers were rated as offering 'highly sensitive care' when the ratio was 1:1 compared with only 8% when the ratio was 1:4.

- 4.4.3 A study conducted in New Zealand (Smith, 1995) found staff:child ratios had a significant and positive influence on the quality of infant environments. However, findings were more mixed for the effect of staff:child ratios on adult:child interactions. With higher ratios, infants vocalised more and adults tended to respond more positively towards children. However, adult responses were found to be most positive in a medium sized group (15-25 children) with a lower staff:child ratio (1:6 or more). This study looked at the frequency of so-called *joint attention episodes*, i.e. episodes in which both infant and adult attend to the same activity or object. Although joint attention episodes were related to higher scores on overall quality, they were not related to staff:child ratios (Smith, 1999). However, the study assessed ratio and group size on the basis of report, not observation. Reported ratios might not reflect accurately the numbers of staff and children observed during joint attention episodes.
- 4.4.4 Research has reported similar associations between higher ratios for pre-school children (aged 3-5 years) and better quality adult:child interactions (Clawson, 1997a; Howes, 1997; Phillips et al, unpublished; Phillipsen, 1997; Wylie 1996). Wylie (1996) found that, as ratios became lower (fewer adults per group of children), the number of adult:child interactions tended to decrease. Of all the structural variables examined, ratio had the most significant effect on the quality of relations between children and staff. Clawson (1997b) also reported that in smaller classes with higher staff:child ratios, children were engaged in interactions with adults more frequently. These interactions were characterised by higher levels of instruction and conversation.
- 4.4.5 Evidence from empirical research consistently supports the view that higher staff:child ratios are more likely to facilitate positive adult:child interactions than low ratios. Of the studies reviewed, only one (Smith, 1995) failed to find a similar relationship between ratios and adult:child interactions. However, in this study, ratios were calculated on the basis of reported, not observed, numbers of children and adults in centres. As noted earlier, the two figures can be, and often are, very different.

4.5 Staff:child ratios and developmental outcomes

- 4.5.1 Three recent studies have examined the impact of structural variables, including staff:child ratios, on developmental outcomes (Burchinal, et al., 1995; Cost, Quality and Child Outcomes Study Team, 1999; Galinsky et al., 1998; Howes, 1997; Howes & Smith, 1995). One of the three, Burchinal et al., looked at outcomes for infants. Results suggested that infants in rooms with low ratios (fewer adults per group of infants) tended to have poorer communication skills. Adults with more infants to care for had fewer opportunities to interact with infants and help them with their communication skills. Conversely, infants had fewer opportunities to practice their skills with adults.
- 4.5.2 Howes (1997) used data from the Cost Quality and Outcomes Study (CQOS) to look at outcomes for children in the pre-school age group. Children had better pre-reading scores when they were in classrooms that complied with recommended ratios (1:8 for children aged 3 to 5 years, and 1:10 for children aged 5 to 6 years). Children in classrooms with more highly qualified staff had higher scores on measures of verbal ability than children in classrooms with less well qualified staff. Staff qualifications and staff:child ratios were both associated significantly with developmental outcomes. However, the study found no significant interaction between the two.
- 4.5.3 Howes (1997) looked at outcomes for pre-school children using data from the Florida Quality Improvement Study. Teacher education was correlated significantly with a measure of childrens' play with objects, used as a proxy for cognitive development. However, analysis showed no significant association between development and ratio compliance. No interaction between ratio and teacher education was found. On the basis of her evidence, Howes concluded: '*...it does not seem that advanced educational and training backgrounds permit teachers to be as effective with less stringent adult:child ratio as less-well-prepared teachers with more stringent ratios*' (p.422).

4.5.4 In an earlier analysis, Howes (1995) used data from the same study to look at outcomes for children in infant-toddler groups. Using a different definition of ratios (a mean averaged from four observations) yielded different results. Where staff were better trained, both infant-toddler groups and pre-school groups operated with higher ratios. The quality of care in these groups was also higher.

4.5.5 The Cost Quality and Outcomes Study (CQOS Team, 1999) monitored the progress of pre-school aged children from their last year in childcare centres through to the end of their third year in school. The study was designed to assess the influence of early childcare experiences on children's development to second grade. Children with experiences in good quality childcare were more advanced in terms of language, maths and cognitive skills. They had better concentration, fewer problem behaviours and better social skills. However, the impact of good quality childcare on children's development was modest after taking account of family and child characteristics. The study found quality of childcare related to higher staff:child ratios, staff education, and administrators' prior experience (CQOS Team, 1995).

4.5.6 Evidence from all studies reviewed in this section is entirely consistent with the view that higher staff:child ratios are associated with better quality childcare. The same studies also suggest that experiences in good quality childcare environments have a small, but positive impact on developmental outcomes for infants and pre-school aged children.

4.6 UK Studies

4.6.1 The Avon Longitudinal Study of Pregnancy and Childhood (ALSPAC) is following approximately 14,000 children from birth until their early school years. Information on day care and pre-school experiences has been collected by maternal questionnaire. More detailed information about day care and pre-school experiences has been collected by maternal interview and by questionnaires to providers for a sub-sample of approximately 1,000 children. Although information has been collected on the number of adults caring for

the study child and the number of other children present, this is based on reported rather than observational data. At the time of writing, the ALSPAC team has not looked at relationships between child outcomes and characteristics of the childcare setting as assessed by maternal and provider report. Consequently the project has not collected contemporaneous systematic, objective data on the quality of children's childcare experiences.

4.6.2 The Effective Early Learning (EEL) Project was set up to consider how pre-school settings could improve the quality of their provision through self-assessment. At the time of writing, the project has no data on staff:child ratios and their impact on quality of provision or child outcomes.

4.6.3 Unlike the ALSPAC or EEL projects, the Effective Provision of Pre-School Education (EPPE) Project was designed specifically to consider the impact of pre-school provision on young children's development. The project, currently due to finish in 2003, is following children from the age of three until they reach the age of seven. The research team have published preliminary data, but so far nothing on staff:child ratios (e.g. Sylva et al, 1999). The team have measured the quality of care using the Early Childhood Environment Rating Scale, Revised Edition (Harms, et al., 1998). Results show that nursery schools and centres combining care and education had the highest average scores, followed by nursery classes. Playgroups and private day care nurseries had the lowest average scores, with social services day care nurseries falling somewhere in between the 'education' and 'care' sector. The researchers pointed out that although playgroups and private day nurseries have higher staff:child ratios than nursery schools and classes, they differ significantly on other structural quality variables known to be important. For example, they tend to offer the lowest salaries, have less-well qualified staff, have limited access to training and higher staff turnover. Evidence from the EPPE project is consistent with the view that as a predictor of high quality childcare provision, staff:child ratios should be considered within the context of other structural variables.

4.7 Reviews of research reported in languages other than English

4.7.1 The research team commissioned colleagues in other countries to search for material published in languages other than English. Specifically:

- French language research (reviewed by Dr. Perrine Humblet, Free University of Brussels);
- German language research (reviewed by Dr. Norbert Huhn, Deutsches Jugendinstitut, München);
- Spanish language research (reviewed by Dr. Maria-José Lera, University of Seville);
- Research from the Nordic countries (reviewed by Dr. Björn Flissing, University of Gothenberg).

4.7.2 The review of French language reports covered material from Belgium, France, Quebec and Switzerland published from 1989. It included:

- Searches of computerised data-bases: Psyclit, Medline, Eric/AE, and Current Contents;
- Searches of internet web sites in French: Groupe de recherche en développement de l'enfant et de la famille (GREDEF-UQTR Département de psychologie de l'Université du Québec à Trois-Rivières, Québec); Centre de recherche sur les services communautaires (CRSC, Université Laval, Québec); Institut National de Recherche Pédagogique (France), Childcare Resource and Research Unit (University of Toronto); Ville de Genève, Délégation à la petite enfance.
- Personal communications and local research reports.

4.7.3 The author concluded that the most important result to mention was the virtual absence of publications mentioning adult:child ratios in research on day care centres. This question does not appear in research in Belgium, France, Switzerland and Quebec. A recent review concerning child care effect on child development (Pacacio-Quintin & Coderre, 1999) came to the same conclusion about staff:child ratios in day care centres for children under the age of six in Belgium, France and Québec. Other reviews on French research on day care (Balleyguier, 1991; Plaisance & Rayna, 1997) have concurred.

- 4.7.4 The reviewer suggested the absence of research on staff:child ratios might be linked to the fact that, in these countries, very few day care services are provided by the private, for-profit sector. In France, 99% of the places for children under 3 and from 3 to 6 are publicly-funded with rules of funding based on staff:child ratios. In Belgium, the figure is 63%. To use ratios as basic quality indicators may be more pertinent in the UK and the US to monitor quality in day care centers. In these countries, the cost issues are very important, given that they affect competition in a private market – and especially in for profit services where staff numbers influence levels of profit. Government policy in France and Belgium tends to focus more on strategies to increase the supply of child care for children under the age of three rather than to improve ratios (Howes & Marx, 1992). Furthermore, childcare research traditions in mainland Europe are less experimental, far less oriented by program evaluation and less quantitative. In the French-language literature, reflections are found about continuous and basic training and about issues such as caring, relationships, specificity of non-maternal care, and more recently, emotions.
- 4.7.5 The author of the German language review began by noting that national research on the impact of adult:child ratios is made difficult in Germany because of local variations. Germany is a federal state, divided into *Bundeslaends*, each of which enforce different regulations concerning ratios. Provision of early years services is the responsibility of youth welfare services, not education services.
- 4.7.6 The reviewer concluded that in Germany, the issue of staff:child ratios and their impact on quality had not been given much attention in recent years (Preissing & Prott, 1988). The exception was a study by Tietze (1998) that compared quality in kindergartens in the former countries of East and West Germany. Conducted in four regions of Germany, the study involved a sample of 422 children from 103 kindergarten groups. The results suggested quality of provision was higher when adults had fewer children in their care.

- 4.7.7 A search of the Spanish literature was conducted using computerised databases including ERIC and ISOC. Searches were also made of databases, listed PhD. theses submitted to Spanish Universities, and a database of policy reports produced for the Spanish government. An additional search of the Latin American literature was made using a database known as REDUC.
- 4.7.8 The author concluded that very little research is conducted in Spanish speaking countries into the issue of ratios and quality of early years provision. Only one paper was identified in the Latin American literature (Myers, 1995), but was subsequently discounted as too general. The remaining searches produced only three papers that reported empirical investigation of relationships between ratios and quality. All three described work that had involved the reviewer (Lera, 1994, 1996; Lera & Palacios, 2000). The two papers from Lera describe the same study of 59 pre-school classes. In each class, quality was assessed using the ECERS. No significant relationship was found between adult:child ratios and ECERS scores. In the other study, although data concerning quality and ratios were collected, no attempt to examine potential associations between the two was reported.
- 4.7.9 The final review of research published in languages other than English looked for material published in Finland, Norway, Sweden and Iceland. The reviewer found no evidence of research into staff:child ratios in either Iceland, Finland or Norway.
- 4.7.10 As far as Sweden was concerned, the reviewer concluded that very few systematic studies of staff:child ratios had been conducted in pre-school settings. The exception was a study conducted at the University of Gothenburg in the early 1990s.
- 4.7.11 The study from Gothenburg (Bjurek, Kjulin & Gustafsson, 1992) looked at the efficiency and quality of publicly funded childcare services in Sweden. Using ECERS, the study looked at a number of factors related to the quality of provision. Staff:child ratios were found to be less important in settings located

in wealthy areas of Sweden where staff were generally better trained. In areas characterised by lower socio-economic status, ratios were found to be a more important factor in quality.

4.8 Conclusions

4.8.1 The national and international reviews on staffing ratios in pre-school settings found very little empirical research. No UK empirical studies were found, although the Effective Provision of Pre-School Education (EPPE) project has reported that quality in nursery schools, combined nursery centres and nursery classes is higher than that in playgroups and private day nurseries.

4.8.2 What little empirical work that has been done is largely confined to English speaking countries, particularly the US. As discussed in Chapter Two, several reasons account for the lack of international research in early years provision, not least the methodological and ethical problems in designing studies looking at the effects of varying staff ratios.

4.8.3 From the evidence reviewed in this chapter, several conclusions can be drawn from the research:

- higher staff:child ratios are associated with better quality childcare;
- good quality childcare has a small, but positive impact on children's cognitive, language and social development;
- higher ratios tend to facilitate positive adult:child interactions;
- the impact of ratios on quality cannot be divorced from other features of the pre-school setting, the most important of which appear to be staff education and training, staff salaries and group size.

Chapter

5 Research on staffing ratios in out-of-school services

5.1 Scope of the review

5.1.1 The previous review of staff:child ratios conducted by TCRU (McGurk et al, 1995) did not include literature concerning out-of-school provision. For that reason, the current review searched for relevant material published since 1985. The team searched the same databases listed in the previous chapter (see paragraph 4.2.1).

5.1.2 The search identified thirteen published articles that included references to staff:child ratios in out-of-school provision. Of the thirteen publications, three described empirical research. The remaining ten were either review articles or handbooks. Reviews concluded consistently that very little empirical research into out-of-school provision has been carried out.

5.1.3 Of the three empirical studies we identified, one came from Australia, one from the UK and the third from the US:

- The Out of School Hours Quality Assurance Project;
- After School and in the Holidays: A Survey of Provision;
- Quality of Care at School-Aged Child-Care Programs.

The rest of this section will describe each study in detail.

5.2 The Out of School Hours Quality Assurance Project

5.2.1 This Australian project was commissioned by the National Out of School Hours Services Association in June 1998. The work was conducted by a commercial survey organisation, Community Services Management Limited, who published a final report in February 1999.

5.2.2 As in the UK, out-of-school provision in Australia has expanded in recent years to meet growing demand from working parents. Most services have been established in primary schools. The aim is to provide children with a place to

play rather than an extension of school activities. The children of working parents are the biggest single group of users.

5.2.3 The study aimed to establish the views of staff, parents and children on the quality of out-of-school services. Staff attitudes were surveyed using a questionnaire consisting of 16 items *'usually considered important in providing good quality OSHC [out of school hours care] services'*. Staff were asked to rate each item as either 'very important', 'important', or 'not so important'. Questionnaires were posted to a random sample of 500 services. Two hundred and ninety-seven (59.4%) of the 500 services returned completed forms. Parental views were elicited through 13 focus groups. Discussions involved parents from 35 different services. A further 12 focus groups were conducted with children from 22 different services. Children came from a mixture of urban and rural areas, and were between 5 and 12 years of age. The project did not collect data concerning actual staff:child ratios in any of the services represented by staff, parents or children.

5.2.4 The majority of staff (87%) felt staff:child ratios of 1:15 or higher were 'very important' in contributing to quality in OSHC services. A further 11% of staff rated this item 'important'. Staff felt it was either 'very important' (75%) or 'important' (18%) to have a minimum of two staff present at all times. According to staff, the three most important elements of good quality OSHC provision were:

- a safe, healthy environment;
- positive interactions between staff and children;
- positive guidance and behaviour management for children.

5.2.5 Parents expected staff to be skilled, mature, qualified and committed. The final report noted that parents felt staff:child ratios should be appropriate. However, no mention was made of what parents might consider appropriate ratios to be.

5.2.6 Children were concerned about the extent to which they were able to take part in outdoor activities. Some felt low staff:child ratios restricted the range of

activities they were offered.

- 5.2.7 The report concluded that staff, parents and children all identified staff:child ratios as an important element of good quality OSHC provision. However, the only mention of a specific ratio, 1:15 or less, appeared in a questionnaire completed by staff. The report provided no information as to why this particular staff:child ratio was chosen.

5.3 After School and in the Holidays: A Survey of Provision

- 5.3.1 This was a national survey of out-of-school provision, funded by the Department of Health, and conducted at TCRU by Petrie and Poland in 1992. The Institute of Education published the final report in 1995.

- 5.3.2 The study was commissioned against a backdrop of increasing demand for out-of-school provision, and the introduction of government regulation outlined in the 1989 Children Act.

- 5.3.3 The study aimed to establish the aims, organisational structure and childcare practices in a range of out-of-school provision. It also sought to establish what providers thought of the registration regime implemented under the 1989 Children Act. Services were selected from a stratified random sample of 18 local authorities in England, and two in Wales. Researchers contacted all relevant services in each authority. From each authority, the team recruited two after school clubs, two holiday play schemes and two open-door services, a total of 120 different services for children of school age. The local authority ran 43% of the provision sampled, the voluntary sector another 43%, and the private sector 14%. In each service, a member of management, the senior play worker and another, randomly selected play worker were interviewed using 'pre-coded schedules'. The team conducted systematic observations in each service over a two-hour period. The services provided for children between three and 19 years of age. Four providers offered services exclusively for children with special needs. Sixty per cent of senior managers said that

children with disabilities had attended their service in the three months prior to their interview.

5.3.4 The study defined staff:child ratios on the basis of the numbers of staff and children attending the service as reported by managers. For after school clubs, the average staff:child ratio was 1:8.6, and for holiday play schemes 1:9.1. In open door services, those open only during holiday periods had an average ratio of 1:11.8 while, in those open all year round, the average ratio was 1:12.5. Around one in ten managers questioned did not know what staff:ratio they operated at. Of the after school clubs in the survey, 74.3% operated at staff:child ratios of less than 1:9. The research team found several examples of provision with very low staff:child ratios. One out-of-school club ran with a ratio of 1:25. Seventeen per cent of the sample operated on ratios lower than 1:15. Managers felt that achieving and maintaining adequate ratios would be a significant problem when it came to meeting registration requirements.

5.3.5 Most staff (63%) in out-of-school provision were employed on a temporary basis. Few had formal childcare qualifications. Ten per cent of senior managers, and 7% of other staff, had either an NNEB or BTEC. Fourteen per cent of senior managers had a play work qualification, and 13% a youth work qualification.

5.4 **Quality of Care at School-Aged Child-Care Programs**

5.4.1 This US study looked at the experiences of children in 30 school-aged child-care (SACC) providers. As described in the previous chapter, research into pre-school provision has established relationships between service quality and impact on child development. In this study, Rosenthal and Vandell (1996) set out to establish the extent to which the same relationships were evident in school-aged provision.

5.4.2 The study had three key aims:

- To examine associations between features of provision controllable through regulation and children's observed experiences;

- To examine relationships between quality of the service and children's perceptions;
- To determine if parental perceptions were related to other assessments of the service.

5.4.3 The study focussed on services providing for children of school age, from grades three to five. Thirty providers from Madison, Wisconsin were invited to participate in the study. Researchers visited each provider twice, for a total of two and a half hours. They observed staff:child interactions, recorded actual staff:child ratios, and interviewed senior managers. Interviewers spoke to children and parents to elicit their views on the quality of the service. A total of 180 children provided their views on their after-school provision.

5.4.4 The authors found several features of provision, controllable through regulation, to be associated with observations of children's experiences:

- staff:child ratio;
- centre size;
- staff education.

Results showed that negative interactions between staff and children were more likely when staff:child ratios were lower (i.e. there were fewer adults per group of children). Interestingly, negative interactions were less likely in provision that enrolled fewer young children.

5.4.5 Children's perceptions of their care environments were associated with the same features of provision. Children were less satisfied with the provision when groups were larger. Lower staff:child ratios were associated with children's perceptions that staff were less emotionally supportive. Older children generally found staff less supportive.

5.4.6 Parental perceptions were associated with two features of provision:

- children's satisfaction with the provision;
- observed staff:child ratios.

When staff:child ratios were higher (i.e. more staff per group of children)

parents rated the provision more positively.

- 5.4.7 Evidence from this study suggests that regulation of staff:child ratios can have a positive impact on the quality of provision as perceived by both parents and children. It also suggests that, given the reported data concerning the extent to which staff were seen as supportive, different staff:child ratios may be applicable depending on the age of children provided for.

5.5 Conclusions

- 5.5.1 Very little empirical research has looked at the impact of out-of-school provision on child development. Surveys conducted in the UK and Australia suggest that staff:child ratios in provision of this kind are variable.

- 5.5.2 What little empirical evidence there is suggests that relationships between service quality and outcomes for pre-school children may be the same in services for older children. Similarly, staff:child ratios may well be a significant predictor of quality in out-of-school care. Certainly it would seem that parental perceptions of quality in provision for older children are influenced by staff:child ratios. Parents are happier with out-of-school services that operate with higher ratios.

- 5.5.3 Finally, it may be the case that in out-of-school services, older children, at least for some activities, are happier with a degree of privacy and autonomy they would get when fewer adults are supervising them.

Section B

**Research on group size,
and staff qualifications and training in
early years settings**

Chapter

6 **Staff training and qualifications: The international context**

6.1 **Introduction**

6.1.1 The types and levels of qualification found among early years workers in different countries vary considerably. Differences are related to a wide range of issues, in particular how the workforce and the services themselves are structured; and how early childhood work, and therefore the role of early childhood worker, is understood. In this chapter, we develop these points, and consider what they may mean for the interpretation of research findings on issues concerning staff qualifications.

6.1.2 Chapter 2 of this report considered research on adult:child ratios within an international context, and the issues that international comparisons raised for interpretation of research findings. They included considering variations in how ratios are calculated, international differences in the numbers of children within different age bands likely to be in early years services, and variations in local philosophies of childcare. Because many of the same issues apply to interpretation of research concerning group size, we have not revisited them here.

6.2 **The structure of the early childhood workforce**

6.2.1 Early childhood workers in centre-based services⁶ can be categorised into three broad types (for an extended discussion of early childhood worker categories based on case studies of six countries, see Moss, 2000):

⁶This discussion excludes an important group of early childhood workers, family day carers or childminders, for whom issues of training and qualification are also relevant.

1. *The pedagogue*: trained to work with children from 0 to 6 years or older in non-school settings within the welfare system, with a role of equal importance but different from the school-based teacher;
2. *The early childhood teacher*: trained to work with children from 0 to 6 years in school and non-school settings within the education system, and viewed as one of many specialists within the teaching profession;
3. *Early years workers in the 'split system'*: consisting of teachers working with older children (usually 3 years and over) in early childhood services within the education system, and various types of 'child care' workers employed in early childhood services within the welfare system.

6.2.2 *The pedagogue and the early childhood teacher*. This categorisation of the early childhood workforce corresponds largely, but not entirely, to the structuring of early childhood education and care services. The important feature of services concerns the extent to which they are integrated across the early years age range within one system (education or welfare) or split between the two. The first two types - the pedagogue and the early childhood teacher - have been adopted by most countries that have either established, or are in the process of establishing, an integrated early childhood service. The pedagogue model has been adopted by the Nordic countries, which have located their integrated early childhood services within the welfare system. Integration is long-established in these countries, and virtually all aspects of services are completely integrated - not only administrative responsibility but also legislation, funding and costs to parents, regulations/standards (and usually curriculum), and staffing.

In other countries, integration has been more recent and is not yet fully achieved. This is the case in New Zealand and Spain. Each country is about a decade into the process of moving from a split system to an integrated system based in education. Both have developed a new type of early childhood worker: an early childhood teacher.

A key feature of the workforce in the Nordic countries, Spain and New Zealand is that pedagogues and early childhood teachers are 'core' workers, operating across different types of early childhood services and across the whole early childhood age range. Working alongside the 'core' worker - whether pedagogue or teacher - are early childhood workers with lower levels of training. However, workers with less training constitute a diminishing proportion of the total workforce. In all of these countries, at least half of early childhood workers are now either pedagogues or early childhood teachers. In countries like Denmark and Sweden, the proportion is higher; pedagogues constitute well over half of the total workforce.

One recent development within countries with integrated services is of particular importance to the question of training. In 1997 Sweden transferred responsibility for early childhood services (as well as free time services for school-age children) from the welfare to the education system. This was followed by a major reform of staff training for the workforce in early childhood services.

Previously, this workforce consisted of a number of distinct groups with separate training and qualifications: pre-school teachers or pedagogues, free-time pedagogues, and various groups of school teachers. From 2001, all will be trained as teachers within a new, integrated system of teacher training, with a minimum period of three and a half years at higher education (degree) level. The new degree will replace 8 of the 11 existing teaching degrees. It will include 18 months of training undertaken by all students irrespective of whether they plan to work with young children or school-age children, in early childhood services, free-time services or in compulsory or upper secondary schooling. This shared part of the training, '*a general field of education*', will include '*areas of knowledge that are central to the teaching profession, such as teaching, special needs education, child and youth development*'. The remainder of the training will be more specialised, depending on the type of teaching students wish to undertake (Swedish Ministry of Education and Science, 2000).

In Sweden therefore, the model of the pedagogue as the main early childhood worker is being changed to that of the teacher with specialist training in early childhood. The training and qualifications for early childhood work is being set at the same level as school teaching. But, equally important, this reform is part of a complete rethink of education. The realignment of early years services is intended, among other things, to open schools and school teachers to influences from early years practice and to encourage and support more team working among pre-school teachers, school teachers and free-time teachers and pedagogues, especially those working with six to nine year olds.

6.2.3 *Early years workers in the split system: teachers and childcare workers.* The split workforce model is found in Brazil and Britain. Both have decided, in principle, to integrate early childhood services. However, so far, neither has integrated their divided workforce. More commonly, the distinction between teachers and childcare workers is found in countries where the system remains split between the welfare and education systems: France and the United States are prime examples. The staffing distinctions described may therefore be indicative of an incomplete integration or the existence of a split system.

The United States, from which most research in the subsequent review originates, illustrates how a workforce operates in a split system. Overall, most early childhood services consist of nurseries working within the welfare system. However, the split system also includes kindergarten and pre-kindergarten services within the education system, usually classes in schools. The two elements partly overlap with respect to the age of children catered for: welfare system nurseries may take children from birth to compulsory school age, while kindergartens and pre-kindergartens take children aged four and five.

Staffing in kindergartens, as in nursery classes in Britain, typically consists of teachers and assistants, normally one of each type per class. Teachers are trained and licensed to work with children from pre-kindergarten age through to eight, or in some cases older. In centres in the welfare system, normally two

types of staff are recognised, the ‘teacher’ (not to be confused with the school teacher found in kindergartens) and the ‘assistant’. These staff may hold degrees (4 year courses), or lower level qualifications from college (e.g. 2 years courses), or a credential based on a competency-based programme, or they may have no qualifications at all.

6.2.4 *Training, pay and status.* The categorisation of early childhood work as described has major implications for training, pay and status. Broadly speaking, pedagogues and teachers (including teachers in split systems) have relatively high levels of training and consequently relatively good pay and conditions of employment. Training in all cases is for at least three years at a post-18 level, often in universities or similar higher education institutions, and similar to or only slightly below the level for primary school teachers. The same applies to pay and other conditions of employment. In Sweden, for example, the average salary of pedagogues is 84% of the salary of a teacher in grade 1-9 of compulsory school (Gunarrson, Korpi & Nordemstam, 1999).

Overall, where early childhood services across all ages have been fully integrated by removing the welfare/education split (e.g. the Nordic countries), work with children under the age of three is considered equal to work with children aged over three with respect to training, qualifications, and pay etc. However, in split systems (or systems like the UK where full integration has not yet been achieved) employing both teachers and child care workers, the workforce is divided into two groups. Each group enjoys substantially different levels of training, qualification, pay, conditions and status. Moreover, workers with lower levels of training, pay and status are often employed to care for younger children.

For example, in the UK, teachers working with children aged under five have a four year, post-18 university level training. Child care workers, often employed in day nurseries, often have a 2 year post-16 training below university level. Teachers generally earn far more than child care workers; an analysis of data from the Labour Force Survey has suggested nursery

education teachers earn a mean annual salary of £19,788, compared with a figure of £7,508 for child care workers (Simon et al., in preparation at the time of writing). A similar situation exists in France: teachers in nursery schools (*école maternelle*), working with children aged two and a half to six years, have a five year training at university level, compared to a one year post-16 training for the *auxiliaire* working in nurseries with children aged under three. The *auxiliaire* is unlikely to be able to progress professionally since most nurseries are managed by nurses who have specialised in paediatric work (*puéricultrice*). The *éducatrice de jeunes enfants* employed in nurseries with more than 40 places has a two and a half years of post-18 training.

We can also compare the *auxiliaire* in France with her equivalent in Denmark working with children under three years. The Danish pedagogue has three and a half years of post-18 training, qualifying her to work with children under and over three. The Danish pedagogue earns twice as much as the French *auxiliaire*. In 1995, using the Purchasing Power Standard (PPS), an international unit of cost which takes account of national differences in price levels, the starting salary for a Danish pedagogue was nearly twice that for a French *auxiliaire*, PPS18,410 compared to PPS9,540 (EC Childcare Network, 1995).

6.3 Understandings of early childhood work and workers

6.3.1 Issues around the training and qualifications of early childhood workers, and the structuring of the workforce itself, are inextricably linked to fundamental questions about early childhood services. What are the purposes of early childhood institutions and the work they undertake? How do we conceptualise or construct the young child and the early childhood worker? How do we understand concepts such as care, knowledge and learning? What pedagogical theories and practices underpin services? Different countries (or even groups within countries) do, and will, come up with different answers to these questions.

6.3.2

Oberhuemer and Ulich (1997), in their review of staff training in the European Union, proposed a number of different roles for, or understandings of, early childhood workers, related to the purposes attached to early childhood institutions:

- as *schoolteachers*, in those countries (such as France) that train teachers to work with children from three years or so through into primary school, where particular emphasis is placed on close relationships between nursery and primary school, with nursery school viewed very much in terms of preparing children for compulsory schooling;
- as *early childhood specialists*, in those countries (such as Spain) that train teachers or other workers to work with and across the whole early childhood age range; and
- as *social network experts*, especially in those countries (such as Denmark) whose training schemes reflect early childhood services that provide education for children and social support for families. In such countries, institutions for children of pre-school age often have a multiple role, are viewed as an integral part of the community infrastructure, liaise where necessary with local organisations and services, and provide for the needs of both children and parents.

This notion of the early childhood institution as multipurpose, with its major implications for understandings of the work and the training needed for such work, can also be found in recent discussions of early childhood institutions as public spaces. For example, Dahlberg, Moss & Pence, (1999) have described them as *'forums in civil society where adults and children may participate together in projects of social, cultural, political and economic significance'* (p.75).

6.3.3

Dahlberg, Moss & Pence (ibid.) have also proposed different understandings of the early childhood worker, particularly in relation to learning. They contrasted the idea of the *worker as a technician* with the idea of the *worker*

as a co-constructor of knowledge and culture. The former is a transmitter of predetermined knowledge and culture to the child, and a facilitator of the child's development. They ensure that each milestone is reached and that the child's activities are appropriate to his or her stage of development. The latter constructs knowledge and culture, both the children's and their own, in a pedagogy that *'denies the teacher as neutral transmitter, the student as passive, and knowledge as immutable material to impart'* (Lather, 1991:15).

This latter understanding of the teacher has been influential in the recent Swedish educational reforms, and is linked to a particular understanding of the young child:

'..as an active and creative actor, as a subject and citizen with potentials, rights and responsibility, a child worth listening to and having a dialogue with, and who has the courage to think and act by himself ...the child as an active actor, a constructor, in the construction of his own knowledge and his fellow beings' common culture . . . a child with his own inclination and power to learn, investigate and develop as a human being in an active relation to other people . . . a child who wants to take an active part in the knowledge-creating process, a child who in interaction with the world around is also active in the construction, in the creation of himself, his personality and his talents. This child is seen as having 'power over his own learning processes' and having the right to interpret the world.' (Dahlberg, 1997: p.22) .

This understanding of the child as co-constructor implies an understanding of the teacher as co-constructor of culture and knowledge.

'This view means a twofold professional responsibility, which partly is about going into a dialogue and communicative action with the child, the group of children and colleagues, partly about a reflecting and researching attitude in which the starting point is the work and learning process of both the children and the teacher...The teacher can have many different roles. Sometimes....to direct: to present a problem

and initiate work around pre-planned material, or to introduce a new field of knowledge, to progress work further. Sometimes you are reduced to being a prompter and an assistant in a process which the children, by their own power, have initiated and direct by themselves...The work of the teacher is mainly to be able to listen, see and let oneself be inspired by and learn from what the children say and do.' (ibid.: p. 23).

6.3.4 Other understandings or constructions proposed by Dahlberg et al (1999) include the early childhood worker as:

- a substitute parent, providing a close, intimate 'homelike' relationship with the children in her charge;
- an entrepreneur, marketing and selling her product and managing the institution to ensure high productivity and conformity to standards, in short an efficient production process;
- a researcher and learner seeking to deepen understanding of what is going on and how children learn, through documentation, dialogue, critical reflection and deconstruction, a concept very strong in the early childhood services in Reggio Emilia.

6.3.5 These understandings are not mutually exclusive. For example, the understanding of the early childhood worker as researcher and learner can be closely related to the idea of early childhood worker as co-constructor of knowledge.

6.4 Training beyond the basic

6.4.1 The discussion so far has focused on variations in the structure and understanding of the early childhood workforce, and in differences in basic or initial training. However, training need not be confined to basic or initial training. Indeed, the 1992 Council Recommendation on Child Care, adopted by all EU member state governments including the UK, refers to the need for '*training, both initial and continuous, of workers in child care services [that]*

is appropriate to the importance and the social and educative value of their work' (Article 3: emphasis added).

6.4.2 In its proposals for *'Quality Targets in Services for Young Children'*, the European Commission Childcare Network (1995) proposed both a target for basic training within an integrated early childhood system ('a minimum of 60% of staff...[with a] basic training of at least 3 years at a post-18 level') and a target for continuous training ('*at least one tenth of the working week should be non-contact time allocated to preparation and continuous training*'). Many Italian nursery workers have rather low levels of basic training, but are allocated six hours per week for continuous training. This provides an important means of supporting and developing pedagogical work in many nurseries and nursery schools. One notable example is the project work and pedagogical documentation that are such important pedagogical tools in the early childhood services in Reggio Emilia (for a fuller discussion of continuous training in Northern Italy, see Penn, 1997; for a discussion of pedagogical documentation, see Dahlberg et al., 1999).

6.4.3 Given the complexity of work with young children, the absence of dedicated time for continuous training is a highly significant omission. It raises questions about the understanding of early childhood work in a service that provides no opportunity for workers to reflect on their practice, whatever the level and quality of their initial training. It suggests an understanding of the early childhood worker as technician, whose task is simply to apply certain procedures, rather than as reflective practitioner and researcher.

6.5 Some implications for interpreting research

6.5.1 The amount and type of training, both basic and continuous, varies between and within countries. The range varies from the 'childcare worker' with a two-year, post-16 training to the early childhood pedagogue or teacher with a three or three and a half year post-18 training, from no continuous training to a regular weekly allocation of time for this purpose. Differences in training and qualification reflect not only different ways of structuring services, and

therefore the workforce. They also reflect different understandings of early childhood work, and therefore of the early childhood worker, including the range of roles they are expected to perform (and the purposes of the institution within which they perform these roles) and what it means to be a carer and teacher or pedagogue.

6.5.2 The specificity of context inevitably places limits on what lessons can be drawn from research which is conducted within particular national contexts, as well as within particular disciplinary and policy contexts. Findings always relate to particular conditions, understandings and values. They tell us about particular perspectives in particular countries (and within particular disciplines and policy domains). Cumulatively, they may suggest some broad conclusions, for example perhaps that generally better training produces better results, and these may well be of value.

6.5.3 More specific conclusions are harder to draw. The circumstances of one country may be very different to another. Countries may have different values and understandings of what learning is, or the purposes are of early childhood institutions or, most fundamentally, about young children. A study from Country A may show that Condition B is related to Outcome C: but even if that relationship can be shown to hold in a different context, we still have to decide how much we value Outcome C, and whether we consider it appropriate to our understanding of the purposes of early childhood services and to our image of young children.

6.5.4 On the other hand, cross-national studies or reviews, and these inherent issues of context and particularity, can be turned to our advantage. Viewing Britain from an American, French or Swedish perspective, researchers and policy makers may see things in their own country that were previously invisible to them because taken for granted. Recognising difference can facilitate critical thinking, make assumptions more visible, and therefore contestable, and generate questions. Rather than asking if the Swedish system of training is better than the British system, we can ask why the systems differ so much. We

can ask how early childhood work is understood in each country, what characterises the relationship between early childhood services and compulsory school and between early childhood workers and school teachers, and so on.

6.5.5 Two other issues concerning interpretation of research need bearing in mind.

First, any attempt to compare the effects of different levels of training and qualification assume a system where significant variations exist between individual services. Where provision, and thus levels of training and qualification are uniform, due to regulations or other factors, such studies are impossible to conduct. Consequently, studies of the effects of training and qualification (or staff ratios or group size) are more likely to be conducted in countries whose early years service are characterised by diversity. A prime example of such a country is the United States, from which most research on staff qualifications emanates. A recent review emphasises the variability of required qualifications, as well as the rather low level of standards in many instances:

'Many practitioners are not required to have any particular training, because the service in which they work is exempt from regulation, because regulatory authorities set no training requirements, or because training requirements may be waived. Most state regulations require no pre-service training...Where training is required, it can vary considerably, for example from 6 credit hours in child development (Illinois) to a college degree (Hawaii). The same is true concerning requirements for continuous training; 44 states require some annual training for teachers in [child care] centers, but this varies from 3 hours (Maryland) to 24 hours (Maine, New Jersey)'
(Moss, 2000; p.31-53)

Second, studies of the effects of training should ideally take account of both basic *and* initial training, and how these types of training might intersect and interact. A focus on basic training can detract attention from the importance of

continuous training, and from the issue of the relationship between these two areas. The extent and nature of continuous training needs to be made clear. What is its role in relation to basic training (e.g. does it compensate for inadequate basic training, does it build on and complement a strong basic training), and who should be responsible for undertaking basic and continuous training?

Chapter

7 Research on training and group size in early childhood settings

7.1 Scope of the current review

7.1.1 The following databases were searched for English language papers, concerning qualifications, training and group size in pre-school services, published since 1994:

- British Educational Index (BEI);
- Australian Education Index;
- Canadian Education Index;
- ERIC, the major US indexing service for education;
- International Bibliography of the Social Sciences (IBSS);
- British Library of Political and Economic Sciences;
- Social Sciences Citation Index.

7.1.2 The search identified 48 publications mentioning staff qualifications and/or group size. As with previous reviews, most publications we found were published in the US. Fifteen of the papers identified reported findings from empirical research. The remaining publications were either review or discussion papers.

7.1.3 *Research design.* As noted in our previous review of research into adult:child ratios, designing studies to examine the impact of specific characteristics of childcare settings can be very difficult. No study to date has employed an experimental design to consider group size or staff qualifications. For example, we do not know whether staff who are qualified differ in other ways from those that are not qualified which may have implications for the children in their care.

7.1.4 To be confident that observed effects result from variations in the factors of interest rather than any other features of a setting requires studies to employ a

particular type of experimental design. Structural characteristics of childcare environments are rarely independent of one another. Thus, centres that organize children into smaller groups and have better adult:child ratios, also tend to have more qualified staff. To create a situation where all variables, other than staff qualifications or group size are held equal, is virtually impossible. Consequently, findings from studies that use regression techniques to predict the relative importance of these dimensions of structural quality must be interpreted with care.

7.1.5 Interpreting what empirical research there is on the structural characteristics of childcare and their relationship to quality is not always straightforward (Howes, 1997). With few exceptions, researchers report categorical rather than linear relationships between regulated variables and outcomes. For example, results often suggest that more education or training or smaller groups are associated with positive outcomes, without specifying what level of education or how many children.

7.1.6 For these reasons, the authors of a systematic review of research evidence concluded that in the field of day care, as with other social interventions >...*finding methodologically sound studies has been described as akin to the metaphorical search for a needle in a haystack.*= (Zoritch, Roberts and Oakley, 1998, p.323). We have provided a summary of the main issues concerning the conduct and design of research and how those issues influence the degree of confidence one can have in research findings in Appendix A.

7.1.7 All of the empirical studies summarised below were designed to consider a range of structural variables (e.g. ratios, group size, staff education and training, working conditions) known to affect quality of care and child outcomes, and their impact on: (a) childcare quality, (b) staff:child interactions or (c) developmental outcomes. All but six of the studies were conducted in the USA. Of the remainder, two were conducted in New Zealand, two in Canada, one was conducted in the Netherlands, and another one was a cross-national study involving Germany, Portugal, Spain and the USA.

7.1.8

Results from empirical studies have been divided into three sections:

7.2 Staff qualifications, group size and developmental outcomes;

7.3 Staff qualifications, group size and adult:child interactions;

7.4 Staff qualifications, group size and childcare quality;

Section 7.5 summarises findings from four recent reviews of evidence concerning the impact of group size and staff training on child care quality. Finally, section 7.6 describes three papers that have addressed child care policy in the US.

7.2

Staff qualifications, training and group size, and developmental outcomes

7.2.1

In a study conducted in the US, Blau (1999) looked at the effects of group size, adult:child ratios, staff training and other characteristics of child care on child development using data from the National Longitudinal Survey of Youth (NLSY). The original sample in the NLSY included 12,652 people aged 14-21 in 1979. The data used in Blau's study came from the children of mothers included in the original sample.

Children were assessed using standardised child development tests at the age of four or five, and subsequently tested every two years. The average age of children on the date of their final assessment was eight years. Child care variables included in data analyses were group size, staff:child ratio, and staff training. Training was classified as a dichotomous variable indicating whether the members of staff had '*received any education or training specifically related to children such as early childhood education, special education or childhood psychology.*'

Results were mixed. Straightforward correlations between child development outcomes and child care characteristics were significant. Children performed better on tests where their child care experiences were characterised by low ratios, small groups and trained staff. However, the results from more complex analyses that included a battery of family, social and other childcare centre characteristics were equivocal. Statistical estimates led the author to conclude that child care inputs experienced in the first three years of life had little

impact on child development as measured in the study. However, for children aged three to six years of age, group size did have a significant and positive impact. Children cared for in smaller groups did better on developmental tests.

The author drew two conclusions from the study. First, the nature of the data and methods used to analyse them can strongly influence the results of studies into the impact of child care on development. Second, the possibility that observable characteristics such as ratios, group size and staff training might not influence child development should alert governments to the possibility that regulation might not be a simple solution to ensuring quality. However, as with most empirical studies, the data here need to be interpreted with caution. Child care data in the NLSY were collected at irregular intervals, and are recognised by the author as being susceptible to measurement error. In particular, the measure of staff training is, at best, rudimentary. In that context, results from this study appear to be consistent with other longitudinal investigations. Childcare characteristics can have a positive impact for some children, although the size of the effects is likely to be small compared with the influence of family characteristics and home environment.

7.2.2 Burchinal et al (1996) investigated the relationship between childcare centre quality and cognitive and language development among a sample of 79 African-American one year olds. The infants attended one of nine childcare centres. Group size varied from three to 16 children. Of 21 staff members, 16 had a high school education, two had a CDA (Child Development Associate) credential, and three had a bachelor's degree. Having controlled for child and family characteristics, neither staff education nor group size was significantly related to infant developmental scores. However, a significant but modest correlation was found between global measures of childcare quality and infant development. Because the study involved only a small sample of centres and staff, and there was little variability in education of staff, the extent to which one might generalise from the results is limited.

- 7.2.3 Howes (1997) investigated the relationship between adult:child ratios and the background of the lead teacher (i.e. formal education and early childhood education training) with teacher behaviour, children's activities and outcomes. Teachers with higher levels of education were most effective. Children in classrooms with teachers who had at least a BA degree in Early Childhood Education or who had a CDA credential engaged in more complex play with peers, and more creative activities. However, they were no more effective with less stringent ratios (i.e. more children) than teachers who were less highly educated but had fewer children in their care.
- 7.2.4 In their sample of 150 two and three year-olds, Clarke-Stewart and Gruber (1994) found no independent effect of caregiver education on children's development. Links between caregiver's background and children's development were weak and indirect. Although more qualified family day care providers gave children more of their attention and were more positive in their interactions, caregiver's educational background did not have an independent effect on developmental outcomes.
- 7.2.5 Wylie et al (1996) conducted a study considering the impact of early childhood education experiences on developmental outcomes for 307 four year-old children in New Zealand. They found that children in early childhood services (including pre-schools, centres, family day care homes) with low quality ratings had poorer developmental outcomes than those attending services rated higher on quality. The quality of early childhood services was related to whether the staff held an early childhood education qualification, staff salaries, adult:child ratios, group size and type of service. The authors concluded that key aspects of good quality are having staff who are appropriately trained, qualified, and reasonably paid, in conjunction with group sizes and ratios that allow adults to interact effectively with children.
- 7.3 Staff qualifications, group size and adult:child interactions**
- 7.3.1 Mills and Romano-White (1999) looked at the correlates of affection and angry behaviour in early childhood educators of pre-school children in

Canada. Their study involved 78 female members of staff working with children aged between three and five years old in 37 different centres. Members of the research team observed members of staff for two hours, and then collected social and biographical details using a self-report questionnaire. Observers kept records of four types of affectionate and four types of negative behaviour. Questionnaires provided information including income, years of work experience, and education. In addition, the team collected data on what they termed 'personal resources', workplace characteristics and job perceptions.

Results suggested that staff behaviour was related more strongly to characteristics of the work environment than to individual qualities including education and training. Staff who displayed more affection towards children had their needs better met in the workplace, had more materials to work with, and were less likely to leave their jobs. Staff scoring high on measures of anger reported fewer job rewards, more job related concerns, and less supportive relationships with their supervisors. The best single predictor of staff behaviour was the quality of their relationship with their supervisor. Staff training was not, on its own, a predictor of staff behaviour. However, the authors did report a significant and positive correlation between staff training and overall quality of care provided by centres in the study. In support of their findings, the authors quoted from Hoffeth and Chaplin (1994): *'research that teases out the independent effects of child-adult ratios, group size, training and education, wages and turnover, suggests that the importance of any individual factor, particularly low ratios, may have been over-emphasized.'*

Summarising their findings, Mills and Romano-White suggested that staff training may have an indirect impact on emotional behaviour. They interpreted their results as indicating that better trained staff may be less likely to lose emotional control when faced with other negative factors in the childcare environment. Furthermore, work place characteristics may interact with staff qualifications as a self-selection factor i.e. it may be that only better trained staff work in nurseries with good work environments.

7.3.2

Honig and Hirallal (1998) looked for predictors of excellence in childcare staff, comparing years in service, educational level, and extent of specialist child development training. The study involved 81 caregivers working in 24 day care centres in the US. Twenty-seven had a high school degree, 22 had an AA degree, 26 had a BA degree and five had graduate degrees. All had attended at least one specialist workshop on child development, (mean = 6, range = 1-17). In terms of experience, the range was from zero to eighteen years. The researchers carried out classroom observations of all staff over a two-day period. They collected data on classroom interactions relating to social, emotional, language, physical and concept development.

Results showed that overall, staff with greater experience, better formal education and more specialist child development provided better quality care for children. In terms of specific domains, specialist child development training was the best predictor of teacher competence in facilitating children's language development. Similarly, staff with specialist training were better at developing children's social and physical skills, scored higher on promoting concept development, and were more likely to engage in positive emotional behaviour with children.

The authors concluded that compared with years of experience and formal education, training in early childhood education and child development was crucially implicated in positive interaction between staff and children. Ensuring high quality childcare staff, they claimed, depended on providing specialist training.

7.3.3

The NICHD Study of Early Childcare (NICHD Early Child Care Research Network, 1996) observed 576 six month-old infants in non-maternal childcare (centres, family day care homes, nannies/au-pairs, grandparents and fathers). They looked for potential relationships between positive care giving, structural characteristics of childcare settings (group size, ratio, physical environment), and caregiver characteristics (formal education, specialised training, experience and child rearing beliefs). Results indicated significant, though

moderate relationships between positive caregiver ratings and childcare arrangements where there were fewer children and caregivers had more formal education. For nanny/au-pair care and family day care, positive care giving was associated with smaller group sizes, lower ratios, non-authoritarian child-rearing attitudes, and specialised training in child development. In centre care, smaller group sizes and caregivers with more formal education were associated with a higher frequency of positive care giving. The research team summarised their findings thus: '*Consistently, then, across types of care, when more infants were being cared for, observed positive caregiving was lower*' (p300). However, taken together, structural and caregiver characteristics measured in this study accounted for only about one quarter of the variance in observed positive care giving. This led the researchers to suggest that standards for infant care should address the numbers of children in settings, both in terms of adult:child ratios and group size.

7.3.4 Clawson (1997) considered the effect of variables including group size and teacher education on adult:child interactions using a sample of 12 classrooms serving 194 pre-school children. Group size varied from five to 46 children. A measure of teacher education was based on an average of all teachers in a room and included years of experience in day care, specialised training in child development and care, and level of educational attainment. In smaller classes with more favourable teacher-child ratios, there were more frequent adult:child interactions. Social interaction was more likely to occur in classes with fewer children. Highly qualified staff were more likely to have more positive interactions with children.

7.3.5 Smith (1995) examined staff and childcare centre characteristics and the quality of care provided for infants and toddlers in New Zealand. Her sample included 100 childcare centres, 200 children aged under two years, 200 staff and 100 supervisors. About a third of staff had no school leaving qualifications and a third had no early childhood training qualification. Smith found that centres employing more staff without school qualifications were more poorly managed, had poorer resources, and offered care that was less

responsive and stimulating for children. Staff with no school qualifications were more likely to be controlling, negative and restrictive in their interactions with children and less warm and positive. The study found training had an impact on quality. Centres with more staff with three years of training had better planned, resourced and managed programmes, and interactions between staff and children were likely to be more warm and responsive. In a further analysis (Smith, 1999), the presence of staff with three years of training made a difference to the number of joint attention episodes observed in a setting. A joint attention episode was defined as an interaction involving an adult and child jointly attending to some object, activity or ideas. According to theories of child development, joint attention episodes are important for children's learning. There were significantly more joint attention episodes in centres where some staff had diploma levels of training. Although in-service training showed no relationship with management quality, there was evidence that such training led to more positive and warm interactions with children. Not only did the study find a relationship between staff qualifications, training and quality, but a strong relationship was also found between better staff wages, conditions of employment and measures of quality. The author concluded '*Caregivers are able to provide a more favourable environment for children if their own needs are taken into consideration and they work in a centre which is professionally run*' (p39). The study found no significant association between group size and measures of quality. The findings related to adult:child interactions and group size were inconsistent and not strongly supportive of positive effects. In attempting to explain their findings, the author questioned the accuracy of figures on group size which were provided by the centre supervisor rather than through direct observation.

- 7.3.6 The Florida Childcare Quality Improvement Study assessed the impact of changing state regulations regarding staff training and qualifications in 150 childcare centres (Howes, Smith and Galinsky, 1995). Training in child development for less well-educated teachers was found to encourage more constructive teacher-child interaction. Teachers with higher levels of specialised training in early childhood education were found to be more

sensitive and responsive to children, and their classrooms were rated significantly higher on global measures of quality. The evidence from this study led the researchers to suggest that *'a BA degree and advanced training encourage more fine-tuned teacher-child interaction – the type of interaction in which teachers respond to teachable moments'* (p24).

7.4 Staff qualifications, group size and childcare quality

7.4.1 Mocan (1997) looked at three features of day care centres in the US: the cost functions, efficiency and quality of provision. One hundred state licensed day care centres in California took part, including 50 for profit centres and 50 non-profit centres. The question the study sought to answer was whether any differences in quality and efficiency between non-profit and for profit day care centres could be detected. Variables measured were:

- total variable cost (wages & salaries, benefits, staff education costs subcontracting costs, food costs and donations);
- staff qualifications;
- space used by the centre;
- classroom process quality.

Staff qualifications were classified into one of three categories: staff with less than or equal to 12 years of formal education, staff with 13-15 years of education, and staff with 16 or more years of education. Workers who had specialist training were promoted to the next category. For example, workers with 12 or fewer years of education who had a child development qualification were promoted to the second category.

Results showed that staff education was a significant predictor of childcare quality. Changes in quality were most marked when comparisons were made between staff in the least well-qualified group and the other two groups. The findings suggest that staff education, up to certain levels, makes a difference to the quality of provision; beyond that level, better staff education makes little difference to the quality of provision. Group size did not influence quality significantly.

7.4.2

Blau and Hagy (1998) developed a model of demand for quality-related attributes of child care: group size, staff/child ratio, and provider training. They used data from the National Child Care Survey (NCCS) and the Profile of Childcare Settings (PCS) survey. The NCCS involved a telephone survey of 4,392 households with at least one child under 13 years of age. It collected data on childcare arrangements, employment, and the demographic profile of households. The PCS was a telephone survey of 2,089 childcare centres and 583 regulated family day care homes. It provided data on fees and attributes of care including group size, ratios and staff qualifications. For the purposes of constructing their model, Blau and Hagy looked at data from 2,660 households with a child aged under seven years.

Their results suggested that parents view quality and quantity of care as substitutes. According to their model, as the quality adjusted price of nursery care decreases, parental demand for hours of care increases, but demand for quality attributes of care such as staff qualifications and group size decreases. Similarly, as parental income increases, demand for hours of care increases, but demand for quality attributes decreases. The authors suggested three possible explanations for their findings:

- (1) parents place little value on quality as defined by early years experts;
- (2) parents value quality but do not believe it is related to staff qualifications, group size or ratios; and
- (3) lack of supply means that parents are unable to exercise real choice when it comes to quality.

Of course these three are not mutually exclusive. However, Blau and Hagy suggest that, at least in the US, available evidence does not support the third explanation.

This analysis of parental attitudes towards quality in relation to cost has implications for child care subsidies. If it is correct, the model as described suggests that tax subsidies such as Working Families Tax Credit are likely to have a positive impact on the quantity, but a negative impact on the quality of child care. As parents get subsidies, they will demand more hours of childcare,

but be less concerned about quality. Blau and Hagy suggested that an effective approach to improving quality lies in educating parents concerning the benefits and characteristics of high quality care.

7.4.3 The relationship between childcare quality and the characteristics of centre and staff, including group size and staff qualifications was the focus of a study involving a sample of 228 infant/toddler classrooms (Phillipsen et al, 1997). The study found that in infant/toddler classrooms, process quality was higher in classrooms with teachers who were moderately experienced and better paid, and in settings with more experienced directors. The results were somewhat different for pre-school classrooms. Here, process quality was higher in classrooms with teachers with more education (a degree or some college education), a moderate amount of experience (i.e. if the staff had less than 37 months of experience) and higher wages.

7.4.4 Lyon and Canning (1997) considered the association between quality, as measured by the ECERS, and selected structural variables, including staff education and experience, in 48 Canadian centres catering for children aged between 2 and 5 years. The level of general education was divided into three categories, high school, college and university, whilst the level of specific early childhood education was categorised as none, some courses, college level and early childhood degree. Although centres with staff with high levels of general and specific education tended to have higher ECERS scores, the relationship was not significant. However, the study did find a significant relationship between quality, as measured by ECERS, and the level of specific early childhood education of the centre director. Those centres with directors who had higher levels of early childhood education had significantly higher quality ratings. Staff in centres with higher quality ratings had significantly more experience and tended to earn higher salaries compared with staff in centres with lower ratings.

7.4.5 The Cost Quality and Outcomes Study looked at the association between quality and the structural characteristics of the environment in 100 childcare centres (Cost Quality and Outcomes Study Team, 1995). As the percentage of

staff with a high level of education increased so did the quality rating of the centres. In analysis aimed at identifying characteristics that differentiated between poor, mediocre and high quality centres, the most important discriminators were average teacher salaries, staff education and specialised training. Analyses were more successful in identifying poor quality centres and only moderately successful in discriminating between mediocre and high quality care.

7.4.6 Renwick and McCauley (1995) examined teachers' perceptions of increases in the size of groups in 54 kindergartens in New Zealand. Teachers in larger groups (45 children compared to 30) were of the opinion that the larger group had negative consequences for both teachers and children. They believed that children were overwhelmed in larger groups, and had to compete more for equipment, space and teacher time. Teachers said they found it difficult to do individual or small-group work with children, and that their interactions with children were less positive.

7.4.7 A study conducted in four countries (USA, Portugal, Spain and Germany) looked at the structural characteristics of childcare environments and their relationship to process quality. Researchers reported no significant differences in process quality even though structural characteristics differed significantly (Cryer et al., 1999). In Germany, for example, higher levels of education were found among staff and centre directors compared with the United States, but also lower adult:child ratios (more children to adults). The research team suggested that structural characteristics could be manipulated in different ways to obtain similar levels of process quality. They cautioned that it is, as yet, impossible to identify which variations in structural characteristics are likely to be most cost effective when it comes to raising standards.

7.5 **Reviews of evidence concerning the impact of group size and staff training on child care quality**

7.5.1 An editorial that appeared in the journal *Young Children* in 1993 reviewed evidence concerning group size, ratios and staff training in the light of

proposed changes in licensing standards in several US states. In relation to group size, the review cited data from the National Day Care Study (NDCS; Ruopp, Travers, Glantz and Coelen, 1979) that showed that in smaller groups, adults spent more time interacting with children and less time simply watching them. Consequently, children cared for in smaller groups were more verbal, more engaged in activities, less aggressive and performed better on tests of language and learning. In addition, health and safety recommendations from the American Public Health Association and the American Academy of Pediatrics were in line with National Association for the Education of Young Children (NAEYC) guidelines on group sizes and staff:child ratios (see Table 7.1).

Table 7.1 *NAEYC-recommended child-staff ratios and group sizes*

Group size											
Age of child	6	8	10	12	14	16	18	20	22	24	28
Birth to 12 months	3:1	4:1									
12 to 24 months	3:1	4:1	5:1	4:1							
24 to 30 months			5:1	6:1							
30 to 36 months			5:1	6:1	7:1						
Three year olds					7:1	8:1	9:1	10:1			
Four year olds						8:1	9:1	10:1			
Five year olds						8:1	9:1	10:1			
Six to eight year olds								10:1	11:1	12:1	
Nine to 12 year olds										12:1	14:1

Source: *Accreditation criteria and procedures of the National Academy of Early Childhood Programs* (rev. ed.). (1991). Washington, DC: NAEYC.

In relation to staff qualifications, the review cited the same NDCS study as supporting the view that training was linked to more social interaction between adults and children, more co-operation and task persistence among children,

and less time spent by children uninvolved in activities (Ruopp, Travers, Glantz and Coelen, 1979). Also cited was evidence that:

- children scored higher on tests of cognitive and social competence when their caregivers had higher levels of child-related training and formal education (Clarke-Stewart and Gruber, 1984);
- teacher training, both pre-service and in-service, was linked to more positive child outcomes, especially in terms of language and representational skills (Epstein, 1993);
- the number of years staff have spent in formal education has a positive impact on outcomes for children (Berk, 1985; Whitebook, Howes, & Phillips, 1989);
- Staff with more training are less authoritarian in their interactions with children (Arnett, 1989);
- Experience is no substitute for formal, specialist training (Howes, 1983; Kontos & Fiene, 1987).

7.5.2

In a second, more recent review from the US, Kontos and Wilcox-Herzog (1997) looked at why teachers' interactions with children are so important, and what features of child care environments predicted effective interactions. They cited a study based on two large data sets (Howes, 1997) that looks at the impact of different types of training on classroom behaviour. Results showed that teachers with more education were more sensitive and responsive in their interactions with children. The review also cited findings from the Florida Child Care Quality Improvement Study (Howes, Smith and Galinsky, 1995) that demonstrated how changes in state regulations concerning the training of childcare workers improved the quality of adult child interactions in classrooms. Teachers with specialist training in child development were more sensitive, but not more involved than teachers without specialist training. Helburn (1995) was cited as providing further evidence that teachers with better training were more sensitive and responsive in their dealings with children.

The review cited evidence for the same relationships between training and

quality interactions in family day care settings (Kontos, Howes, Shin and Galinsky, 1994). Family day carers (childminders) with more training tended to be more sensitive and less detached than providers with less training.

7.5.3 In 1991, Gillian Doherty conducted a review of research concerning factors related to quality in child care for the Child Care Branch of the Ontario Ministry of Community and Social Services. In relation to group size, the review concluded that, despite a couple of studies that contradicted the general trend in research findings, it was safe to conclude that smaller groups facilitated caregiver behaviour which in turn encouraged positive child development. Doherty also concluded that, on the basis of her review, quality was associated with staff trained beyond secondary school. Specialist training in early childhood education was a crucial factor. The evidence concerning the impact of experience was equivocal. Some studies reported more positive caregiver behaviour among those with more experience, but others reported evidence of an association between experience and caregiver detachment.

7.5.4 In an updated review, Doherty (1996) concluded that larger group sizes (without specifying numbers) were associated with caregivers that tended to be overly restrictive and controlling, detached and uninvolved. Similarly, children in smaller groups tended to cry less frequently, do better on measures of social competence, and exhibit more highly developed styles of play.

Doherty cited thirteen studies purporting to show that caregivers are more likely to behave positively when they have post-secondary education in child development. Training in child development, she claimed:

- Enables staff to understand a child's developmental needs, making it more likely they will provide stimulating and appropriate activities;
- Makes it easier for staff to estimate what might be appropriate for children with whom they are unfamiliar;
- Helps staff understand and manage more complex group dynamics.

Doherty concluded that children cared for by staff with specialist training were

likely to score higher on measure of development than children whose caregivers did not have this educational background.

7.6 Child care policy in the US

7.6.1 Fiene (1995) described a training system developed for childcare workers by the Pennsylvania Department of Public Welfare. The system grew out of several initiatives designed to increase training opportunities for child care providers. These initiatives were implemented for several reasons:

- to ensure high quality training would be available;
- state regulations mandated that all child care workers should receive a minimum of six hours of training per year;
- the state subsidised training to make it affordable for all providers.

Training courses, provided through contractors, were provided in the following seven categories:

1. developmentally appropriate practices;
2. emergent literacy;
3. child development;
4. discipline, growth producing relationships and interpersonal skill development ;
5. health and safety;
6. programme administration;
7. collaboration with community resources and parents.

In the space of one year, training contractors provided workshops, subsidised college courses, on-site mentoring and subsidised conference attendance for 25,000 nursery employees, 4,500 staff from out of school services, and 2,500 childminders.

Independent evaluation of the system found that six hours in-service training per year was not enough to produce significant program improvements in nursery provision. Staff members who had received 20 or more hours training did show improvements in classroom implementation of developmentally

appropriate practices. Staff members who had fewer than 20 hours of this kind of training did not demonstrate the same level of change in their classroom implementation skills.

Evaluators suggested that the requirement for in-service training be set at a minimum of 24 hours per year as recommended by the National Association for the Education of Young Children (NAEYC), or preferably the 40 hours per year recommended by the Child Welfare League of America.

The evaluation also suggested that the provision of training should be linked with the ongoing monitoring of standards through statutory inspections. Using inspection data to identify the strengths and weaknesses of providers could help target training needs more effectively.

7.6.2 Kinch & Schweinhart (1999) reported on a US initiative, the Program Recognition Project. This initiative was borne out by the observation that: *most parents do not pay high enough fees to adequately compensate teachers and finance the materials and training required to provide high quality care* (p. 69). However, some providers do succeed in balancing the need to keep care affordable with the absolute need to keep standards high. These programmes pay staff well without increasing charges to the point where many parents cannot afford to use the service.

The Program Recognition Project was established by the High/Scope Educational Research Foundation and the NAEYC, and jointly funded by two charitable foundations. It aimed to identify programmes across the US that offered high quality services and above average staff salaries while maintaining affordable fees for parents.

One hundred and four programmes either applied or were nominated for consideration by the Project. High/Scope staff conducted on-site assessments in 23 programmes. Assessors finally chose ten exemplary programmes as providing higher than average quality, compensation and affordability. Almost

all the programmes shared common features; a key one was encouraging staff to see themselves as professional educators. This encouragement came in many forms, including the provision of in-service training opportunities and facilitating attendance at professional conferences. All the exemplary programmes paid at least some of the costs of attending professional conferences, and all offered paid leave for professional development activities. Forty-four per cent paid the full cost of continuing educational courses taken by their staff.

7.6.3 Queralt and Witte (1999) looked at the impact that child care regulations in the US had on the quality of service provision. They focussed initially on regulations concerning adult : child ratios, and the unintentional impact they had on other features of child care environments. Their review included two studies relevant to regulations concerning group size and training requirements. The first was conducted by Love, Ryer and Faddis (1992) for the California Department of Education. The study examined the possible impact on program quality of changes in required adult:child ratios for three to five year olds from 1: to 1:9 or 1:10. Researchers found that classrooms operating with lower ratios were more likely to conduct small group activities. Classrooms operating with experimentally higher ratios conducted more large group activities and fewer concrete and manipulative activities. The authors concluded that although proposed changes in ratios would be unlikely to have a significant impact on service quality, it would possibly result in larger group sizes unless regulations limited class sizes at the same time as relaxing ratios.

The second study used data from the 1990 National Child Care Survey (NCCS), as well as state level regulatory data and county level information (Chipty & Witte, 1994, 1995). It found that as group size regulations became more strict, adult:child ratios increased (i.e. adults caring for greater numbers of children). Similarly, as training requirements became more rigorous, adult:child ratios increased. Finally, where stricter adult:child ratios were proscribed, the cost of care rose and parents reduced the hours of care they purchased.

Queralt and Witte concluded that legislation concerning ratios rarely achieved its intended purpose. They found no evidence that regulations on adult:child ratios had any significant relationship to actual adult:child ratios observed in care settings. Furthermore, they suggested that regulation often had unpredictable effects on other elements of the care environment. Providers in their study adjusted group sizes and the prices they charged in response to legislation enforcing stricter ratios. The authors advised that regulation should not address issues of ratios and group size separately.

Section C

Conclusions and Recommendations

8.1 The application of international research evidence to UK childcare policy

8.1.1 The aim of the reviews reported here was to identify research evidence concerning possible relationships between ratios, group size, staff training and qualifications, and the quality of day care. However, before considering how research might throw light on these issues, it is worth noting two key points drawn from the review of international practices concerning the regulation of early years services:

- discussion of ratios, group size and staff training across different countries must take account of the different philosophies that underpin local early years service provision;
- when considering their impact on quality, the effects of ratios, group size and staff training must be considered in conjunction with other influential factors including the pay and working conditions of the early years workforce.

8.1.2 In England, the dominant philosophy that has influenced attitudes towards the issue of ratios in early years services is what Singer (1993) has called '*attachment pedagogy*'. It is based on the assumption that children need exclusive maternal care to develop successfully. Should mothers be unable to care exclusively for their children, non-maternal care should provide an environment that replicates the mother-child relationship as closely as possible. Attachment pedagogy has promoted the view that women are best suited to working with young children, and that high staff:child ratios, especially for young children, are best. It is also linked to individualistic approaches to childcare typical of early years settings in the UK. Research evidence has failed to support the view that successful development is contingent on exclusive maternal care. Consistent with the views contained in the National Childcare Strategy, the weight of evidence suggests that while home environments are still the greatest influence on development, children

can benefit from time spent in good quality early years provision (Mooney & Munton, 1997).

- 8.1.3 Staff:child ratios are more likely to be an issue for government regulation in countries where the private sector contributes significantly to the provision of early years services. The level at which staff:child ratios are set is a key determinant of staff costs, and so influences the ability of the private sector to provide affordable childcare places. In countries where the private sector does not provide childcare places, staff:child ratios seem to be less of an issue.
- 8.1.4 The commitment to integrate early years services is likely to have a major impact on thinking about staff training and qualifications in England. Under the previous split system, early years provision was provided by both welfare and education departments. Such split systems (or systems like England where full integration has not yet been achieved) employ both teachers and child care workers. The workforce is divided into two groups. Each group enjoys substantially different levels of training, qualification, pay, conditions and status. Moreover, workers with lower levels of training, pay and status are often employed to care for younger children. For example, in England, teachers working with children aged under five have a four year, post-18, university level training. Child care workers, often employed in day nurseries, often have a 2 year post-16 training below university level. Teachers generally earn far more than child care workers.
- 8.1.5 Most of the relevant childcare research we have reviewed has been conducted in the US. Although differences exist between the early years sectors in US and the UK, there are important similarities. Early years services in the US and the UK are both underpinned by the same philosophy of attachment pedagogy. Also, the private sector is a significant provider of early years services in both countries. Consequently, the findings from US research are often relevant to the current situation facing the UK. In contrast, early years research and practice in mainland Europe is quite different. It is often based on

different philosophies, and is more policy relevant to countries with little or no private provision.

8.1.6 The answers to the research questions in the sections that follow are more often than not specific to countries like the US and the UK. Research cannot offer universally applicable answers. To do so would be to ignore the many important differences that exist between early years provision in different countries and cultures.

8.2 **Questions about ratios**

Information from this review was intended to address seven research questions specific to the ratios issue:

1. What impact do adult:child ratios have on outcomes and progress, how are outcomes/progress defined, and how does this impact vary by age of child and setting?
2. What impact do adult:child ratios have on process variables (e.g. the amount of physical and social interaction with children); and how does this impact vary by age of child and setting?
3. What impact do adult:child ratios have on service performance, and how does this impact vary by age of child and setting?
4. What is the relationship of other variables (e.g. staff training) with service quality and how do these interact with ratios?
5. What different definitions of adult:child ratios are used by stakeholders and how do these varying definitions impact on quality?
6. What impact do adult:child ratios have on child safety?
7. What are the methodological and ethical issues and challenges surrounding research on ratios?

This section addresses each of these questions in turn.

8.2.1 **What impact do adult:child ratios have on outcomes and progress, how are outcomes/progress defined, and how does this impact vary by age of child and setting?**

Evidence suggests that child outcomes, defined in terms of intellectual, social and emotional development, are best served by adults who are sensitive to children's needs, and who respond to those needs in a warm and consistent manner. The evidence further suggests that adults are better able to respond in the manner described when they have fewer children in their care. However, the impact of staff:child ratios on outcomes and progress is clearly mediated by other important variables including:

- staff education and training;
- the size of the group into which children are organised;
- organisational characteristics of settings.

The impact of ratios on child outcomes continues to be important as children get older. This is certainly true in settings for children of pre-school age. The evidence concerning the impact of ratios in out-of-school services for older children is, as yet, inconclusive.

8.2.2 **What impact do adult:child ratios have on process variables (e.g. the amount of physical and social interaction with children); and how does this impact vary by age of child and setting?**

The positive impact of higher staff:child ratios on child outcomes described in the previous section is clearly a function of both quality and quantity of staff:child interaction. Higher ratios make it more likely that staff will have time to spend in constructive interaction with the children in their care. However, once again, the impact of staff:child ratios will be mediated by other important characteristics of the staff, the children and their environment.

Initial evidence from research with children of school age suggests that in some settings, older children may benefit from greater privacy and autonomy. Some older children may develop better relationships with their peers when they less closely supervised by adults.

8.2.3

What impact do adult:child ratios have on service performance, and how does this impact vary by age of child and setting?

The answer to this question depends entirely on how one defines ‘service performance’. From a research perspective, evidence shows quite clearly that across the range of early years services, good things go together. In provision with high staff:child ratios, staff are more likely to be well qualified, have access to training, be better paid, and be less likely to leave their jobs. In high quality settings, staff spend more time planning how to deliver the curriculum, keep more effective records on the children in their care, and communicate more effectively with parents.

Within pre-school settings, the relationships described apply across age groups. In provision for older children, what little research exists suggests the same relationships may well apply.

8.2.4

What is the relationship of other variables (e.g. staff training) with service quality and how do these interact with ratios?

Research suggests that service quality is the product of five key variables:

- staff:child ratios;
- staff training
- group size;
- staff salaries;
- management practices in early years settings.

Evidence shows that the first three of these variables have a direct impact on the ability of staff to provide sensitive, responsive care for children in the way described in earlier sections. They can also be regulated through government legislation. Staff salaries and management practices have an impact on staff turnover. In settings with high staff turnover, it is less likely that children will receive the consistency of care that is frequently associated with good quality. Salaries and management practices also have a direct impact on staff well-being and job satisfaction. High ratios, because they enable staff to provide better quality care, are also associated with job satisfaction and lower staff

turnover.

8.2.5 **What different definitions of adult:child ratios are used by stakeholders, and how do these varying definitions impact on quality?**

Stakeholders, and researchers for that matter, do use different definitions of ratios. One crucial difference is between definitions based on observed ratios, and definitions based on the numbers of children enrolled and staff employed in a facility. Definitions based on observations provide a more accurate assessment of the impact staff:child ratios have on the quality of experiences for children. For example, a staff:child ratio of 1:8 would be an accurate description of a situation in which a group of sixteen children are in the care of two adults. However, one of the adults may work continuously with small groups of two or three children for short periods. In this example, the 1:8 description of staff:child ratios fails to capture the reality of the experience for the children in the group.

A second important difference concerns which adults are included in calculations of ratios. The options are whether to include students, parents or other members of staff who have duties other than childcare. Where calculations include adults who are not members of childcare staff, there may be implications for quality of care. The Scottish Executive, in the paper *Regulation of Early Education and Childcare: The Way Ahead*, reported that in their consultation exercise:

There was unanimous support for the proposition that only adults in contact with children for the majority of the session should count towards ratios.

8.2.6 **What impact do adult:child ratios have on child safety?**

Our searches of the available literature have not identified any empirical research that has examined systematically the relationship between staff:child ratios and child safety. Facilities with high staff:child ratios tend to employ better qualified staff who are more likely to create safer environments for children. Because these positive features of early years settings tend to be associated, it would be difficult to establish an exclusive link between ratios

and child safety.

8.2.7 **What are the methodological and ethical issues and challenges surrounding research on ratios?**

Three key methodological issues make it difficult to identify what might be considered 'ideal ratios' from research:

- optimum staff:child ratios will vary according to the objectives of the service, the needs of children, and the characteristics of staff;
- the impact of staff:child ratios on the quality of service provision is inextricably linked to issues of staff training, group size and working conditions;
- observable staff:child ratios typically vary across the day within individual facilities.

The challenge facing research on ratios is how to address these key methodological issues. A study designed to examine the exclusive effects of staff:child ratios on outcomes would need to observe the behaviour of the same children, in the same setting, with the same adult carers, at different ratios. Such a design creates two practical difficulties. First, lowering ratios means either adding children or removing adults from the group. That would make it difficult to establish whether any impact on outcomes was due to changes in ratios or changes in personnel. Second, observed staff:child ratios in early years settings vary both within and between days. Maintaining target ratios during observations would be extremely difficult.

A more likely solution rests in employing research methods that allow combinations of variables to be considered systematically. Research will never be able to identify universally appropriate staff:child ratios. However, it might be able to specify different upper and lower limits appropriate under a range of different conditions.

The key ethical issue facing research into ratios concerns the possible impact lower ratios may have on outcomes for children. Evidently the literature

supports the general conclusion that, given other conditions that exist in the US and UK, children do best under higher ratios. Survey data suggests that most parents and providers endorse such a view. What research has not been able to ascertain are optimum ratios. Thus we simply do not know whether varying ratios from 1:8 to 1:10, for example, would have any measurable impact on outcomes for children. To establish whether children were disadvantaged under such conditions means potentially putting them at risk, albeit temporarily. Herein lies the ethical dilemma.

8.3 Questions about staff training and qualifications, and group size.

Information from this review was intended to address four specific research questions:

1. What impact do staff qualifications and group size have on children's outcomes and progress; and how are outcomes/progress defined; and how does this impact vary by age of child and setting?;
2. What impact do staff training and group size have on process variables (e.g. the amount of physical and social interaction with children); and how does this impact vary by age of child and setting?;
3. What impact do staff training and group size have on service performance, and how does this impact vary by age of child and setting?;
4. How have issues of staff qualifications and group size influenced the development of regulatory frameworks for early years provision in countries other than England and Wales?

This section addresses each of these questions in turn.

8.3.1 What impact do staff qualifications and group size have on children's outcomes and progress; and how are outcomes/progress defined; and how does this impact vary by age of child and setting?

Research evidence is equivocal concerning the impact of staff qualifications on outcomes and progress for children. Outcomes are commonly assessed via some form of standardised developmental test administered when children reach the age of four or five. Tests usually assess language and cognitive

abilities. Results suggest that staff qualifications and group size are two key features of effective early years environments. Some, but by no means all, studies have reported statistically significant relationships between outcomes for children and measures of staff qualifications and group size. The weight of evidence suggests that the sheer complexity of early years environments makes it difficult for research to identify independent effects of individual elements including qualifications and group size. The same conclusions apply across settings and age groups.

8.3.2 **What impact do staff training and group size have on process variables (e.g. the amount of physical and social interaction with children); and how does this impact vary by age of child and setting?**

Again, research findings are equivocal. Some studies report no independent effects for staff training and group size, but nevertheless point out that both are important elements in a constellation of factors that contribute to effective adult child interactions. Other studies have identified significant and positive differences in the quality of adult interactions in settings employing staff with specialist training in child development. Differences were generally more marked when training was more specialised. A similar pattern of findings emerges from research into group size. Some studies report significant associations between the numbers of children staff care for and positive caregiver behaviour. Where studies fail to find independent associations, group size is usually identified as one of several key elements predictive of positive adult child interactions. Again, similar relationships hold across settings and age groups.

8.3.3 **What impact do staff training and group size have on service performance, and how does this impact vary by age of child and setting?**

Service performance, as assessed by global measures of quality, was found by some but not all studies to vary as a function of staff qualifications. More robust was the relationship between service quality and the training and experience of centre directors. At least one study found specialist training in child development to be more influential in the quality of care provided for

older, pre-school children rather than infants. The available evidence suggests that group size is not strongly associated with more global measures of service performance.

At this point, we would summarise research findings concerning staff qualifications and group size thus:

- The weight of evidence suggests some degree of association between staff qualifications, group size and positive caregiver behaviour;
- Positive caregiver behaviour is linked with better developmental outcomes for children. It is likely that this link underlies reported associations between staff qualifications, group size and child outcomes;
- Links between staff qualifications, group size and global measures of service performance are more tenuous. Staff qualifications and group size are only two of many factors that influence service performance. Consequently it is difficult for research to identify the independent effects of either. However, the qualifications of centre directors or nursery managers may exert more influence on broader assessments of service quality.

8.3.4 **How have issues of staff qualifications and group size influenced the development of regulatory frameworks for early years provision in countries other than England and Wales?**

Comparisons between regulatory frameworks in different countries must take into account differences in strategic functions and aims. One key difference concerns the extent to which early years services are split between welfare and education services. Countries that have integrated services across both functions have created specialist early years workers, characterised as either pedagogues or early years teachers. These specialist workers are usually trained to a level broadly equivalent to primary school teachers. In countries without integrated services, the early years workforce is often split between teachers and child care workers. Regulations in these later countries are more often than not aimed at specifying minimum requirements for the education and training of less well qualified care workers.

Regulatory frameworks in countries like England, where a split between welfare and education is still evident, reflect research findings implicating both staff qualifications and group size in favourable outcomes for children.

9.1 The relevance of the review for National Care Standards

9.1.1 These reviews of research into staff:child ratios, staff qualifications and training, and group size have been commissioned by the DfEE⁷ in the context of the Care Standards Act 2000, and the consequent introduction of National Care Standards in the regulation of early years provision from September 2001. They build on an earlier review undertaken by TCRU (McGurk et al, 1995). Taken together, evidence from the reviews supports the following eight recommendations.

9.1.2 **(1) National Care Standards should include clear regulations concerning staff:child ratios in services for pre-school and school-aged children.**

Research has shown conclusively that staff:child ratios, in conjunction with other variables, influence the quality of outcomes for children. Evidence from the US suggests that better quality provision is more likely where ratios are enforced through legislation. The major US National Child Care Staffing Study (Whitebook et al., 1990) concluded that the quality of care was better where centres met Federal Interagency Day Care Requirements on ratios, group size and training. In a report to the House of Representatives, the United States General Accounting Office (1998) identified staff:child ratios as one of the key standards critical to ensuring high quality childcare. Gazan (1998) concluded that quality could be improved through regulating staff:child ratios: *‘I am convinced we need not more licensing rules. What we really need are better rules – rules that are supported by research. We already have the research to support the ‘iron triangle’: group size, staff qualifications and staff:child ratio.’* (p.11).

(2) National Care Standards should not relax, unconditionally, staff:child ratios recommended in guidance to the 1989 Children Act.

We cannot predict, on the basis of available research, the likely impact of small variations in current staff:child ratios on outcomes for children. However, available survey data suggest that the majority of parents and providers see ratios as a key indicator of quality. It is likely that any unconditional relaxing of ratios would be seen as potentially compromising quality. At a time when the National Childcare Strategy is pledged to improve the quality of available childcare, relaxing ratios unconditionally might be perceived as counterproductive by many stakeholders. In a recent survey of parental demand for childcare (La Valle et. al., 2000), only six per cent of parents listed staff:child ratios as a factor when rating the quality of the childcare provision they used. However, just over a third of parents with a child in reception or nursery classes felt that the provision of good learning opportunities was contingent on appropriate staff:child ratios.

(3) National Care Standards might usefully make recommended staff:child ratios contingent on staff qualifications.

Given the weight of available evidence, few people dispute the connection between high staff:child ratios and good quality early years services. However, the impact of legislation concerning ratios on quality of provision has not been researched systematically. Between 70-80% of the costs of providing childcare are determined by staff salaries. Legislation enforcing higher ratios is likely to raise childcare costs, which could price parents out of the market and into unregulated provision. Alternatively it could encourage providers in the private and voluntary sectors to cut costs by employing less well-qualified staff, reducing salaries or cutting training budgets. The net effect for children could be to lower the quality of care they receive. Some economists have argued that one solution to this problem is to introduce different

⁷ Now the Department for Education and Skills (DfES).

combinations of ratios contingent on staff qualifications (e.g. Mulligan and Hoffman, 1998). They point to evidence linking quality to a combination of ratios and staff qualifications. For example, in France, the publically funded '*écoles maternelle*' offer high quality care for pre-school children, but operate at ratios of around 1:22. However, staff are typically trained to post-graduate level (Richardson & Marx, 1990).

Relaxing ratios has the effect of creating more childcare places. For example, moving from a ratio of 1:8 to 1:10 creates an additional 25% of childcare places. However, if quality is not to be compromised, legislation needs to link ratios to staff qualifications. Making ratios contingent on staff qualifications can provide a real incentive to providers to employ better qualified staff, and to offer staff greater opportunities for training and professional development. Better staff training has positive effects on not only the quality of staff:child interactions in early years settings, but also on salaries and thus staff turnover. Reducing staff turnover is a vital step towards creating greater stability and continuity for children in early years environments.

Some local authorities in England have already enforced ratios contingent on staff qualifications. For example in our survey, we found one authority that enforced a ratio of 1:5 for 3-5 year old children in nurseries where some staff were unqualified. Where nurseries employ only qualified staff, they were allowed to operate at ratios of 1:8.

(4) National Care Standards should include clear recommendations concerning group size.

The weight of research evidence suggests at least some degree of association between group size and positive caregiver behaviour (NICHD Early Child Care Research Network, 1996). Research has also provided some evidence of a link between positive caregiver behaviour and better developmental outcomes for children (Blau, 1999). It is reasonable to conclude that, broadly speaking, caregivers provide better

care when children are organised into smaller groups. However, it is likely that the impact of group size on the quality of caregiver behaviour varies as a consequence of other features of the care environment, particularly adult:child ratios, and staff qualifications and training. For this reason, it is difficult to identify optimum group sizes purely on the basis of research evidence.

(5) National Care Standards should link specific adult:child ratios with recommended group sizes.

Evidence suggests that regulations concerning adult:child ratios can influence the size of groups into which children are organised (Chipty & Witte, 1994, 1995). Potential benefits for children that might arise from regulations concerning ratios can be compromised if children are cared for in larger groups as a consequence. For that reason, researchers have recommended that regulation should not address issues of ratios and group size separately (Queralt & Witte, 1999).

(6) National Care Standards should include clear regulations concerning staff education and training.

Research evidence supports the view that staff qualifications and training are one of several features of child care environments that are positively correlated with better quality caregiver behaviour (Wylie et al, 1996). More specifically, the available evidence suggests that staff with specialist training in child development provide the most effective care (Howes, 1997). Broadly speaking, the more training staff have had, the better quality of care they are likely to provide (Clawson, 1997). However, the complexity of care environments can make it difficult to identify the specific contribution of staff education and training above and beyond the impact of other key features of care environments (Hoffeth & Chaplin, 1994).

(7) National Care Standards should address the issue of in-service training for child care workers.

Evidence has linked quality of caregiver behaviour with continuing in-service training (Smith, 1999). Staff with a minimum of 20 hours training per year have been shown to improve developmentally appropriate practices (Fiene, 1995).

(8) National Care Standards concerning training should distinguish between care staff and managers.

The qualifications of centre directors or nursery managers may exert more influence on broader assessments of service quality (Lyon and Canning, 1997). Staff who work in settings that are managed effectively seem more capable of providing effective environments for children (Smith, 1999). It therefore seems appropriate to distinguish between care staff and managers when specifying minimum requirements for staff education and training. Poorly qualified and ill-trained managers may be in a position to effectively undermine the efforts of the most effective and able members of child care staff.

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Appendix

A International comparison of staff:child ratios recommended or required for children below compulsory school age: full day care in group settings⁸

Country

Australia No national standards: ratios vary between states and territories

Children 0-23 months: from 1:4 to 1:5

Children 24-35 months: from 1.5 to 1.8

Children 36-71 months: from 1:8 to 1:15

Austria No national recommendations: ratios vary between states

Children 0-35 months: from 1.5:4-6 to 1:15

Children 36-71 months*: 1:14 to 1:26

Belgium No national standards: ratios set by three community governments

Children 0-35 months (French-speaking Community): 1:7 in *publicly funded centres* (plus 1 nursing trained worker for every 48 places); 2:9 in *centres that are not publicly funded*

Children 0-35 months (Flemish-speaking Community): 1:7 in *publicly funded centres* (plus 1 nursing trained worker for every 48 places); approximately similar ratios for centres that are not publicly funded, although the way children are counted is slightly different

Children 30-71 months (French-speaking Community)*: 1 (teacher):19, or 1.5 (teachers): 20-25, or 2 (teachers): 26-38 (plus some additional less qualified staff for children aged 30-36 months)

Children 30-71 months (Flemish-speaking Community) *: 1 (teacher) : 21

⁸ At the time of writing.

Canada

No national standards: ratios set by provinces and territories. Considerable variation, not only of ratios but in age groups used to determine ratios; in most cases ratios are related to group size. One province sets no standards.

Children 0-35 months: from 1:4 for all children up to 30 months to 1:5 for children under 18 months and 1:8 for children from 18-47 months. Another way of representing the variation is the variation in ratios for 2 year olds, from 1:4 to 1:8. One province does not allow children under 24 months.

Children 36-71 months: from 1: 8 for all children, to 1: 7 for 3 year olds, 1:10 for 4 year olds and 1:12 for 5 year olds. The variation in ratios for 4 year olds is from 1:7 to 1:10.

In addition there is kindergarten for children over 3, usually on a part-time basis (except Quebec and New Brunswick), but it is unclear if there are ratio standards for these services*

Denmark

No national standards: ratios set by 200+ local authorities.

Children 0-35 months: generally 1: 3

Children 36-71 months: generally around 1:6

France

Children 0-35 months: 1: 5 for children not yet walking; 1:8 for other children.

Children 30-71 months*: no national standards; regional directors of education organise ratios according to the number of teachers allocated. The average ratio was 1 teacher : 27 children in 1993/94; in addition, classes usually include (at least for a half day) an assistant.

Germany

No national standards: ratios set by states. One state sets no standards.

Children aged 0-36 months: from 2:8-10 to 2:15 (in some cases, varies according to age of children).

Children aged 36-71 months* : from 2:20 to 1:20-25.

Greece **Children 0-43 months:** 1:5
Children 44-56 months: 1: 20

Hungary **Children 0-35 months:** 2:12
Children 36-71 months: 2:25

Ireland **Children 0-11 months:** 1:3 (full day care)
Children 12-35 months: 1:6 (full day care)
Children aged 35-71 months: 1:8 (full-day care)
Children aged 0-71 months*: 1:10 (sessional care)
Children aged 48-71 months*: no standards for children admitted early to primary school (from 4 upwards), but average of 1 teacher for 35 children

Italy National standards set in national labour agreements, but regions may apply higher standards
Children 0-35 months: 1:6 in national labour agreement. But, for example, new legislation in the Emilia Romagna region specifies a maximum of 1: 5 for children aged 3-11 months; 1: 7 for children aged 12-36 months; or 1:10 for groups only with children aged 24-35 months. Ratio increases to 1:8 for part-time nursery provision for children aged 12-35 months, or 1:9 if only attended by children aged 18-35 months.
Children aged 36-71 months*: 2:5 (for local authority nursery schools); 2:28 (For State nursery schools); and 2:30 (for private nursery schools)

Japan National standards, but local authorities may apply higher standards

Children 0-11 months: 1:3

Children 11-35 months: 1:6

Children 35 -47 months: 1:20

Children 48-71 months: 1:30

Children 36-71 months*: 1:35

Netherlands There are no national standards, but the Association for Dutch Municipalities (VNG) offers guidelines on regulation, and these are usually followed by local authorities

Children 0-11 months: 1:4

Children 12-23 months: 1:5

Children 24-35 months: 1:6

Children 36-47 months: 1: 8

New Zealand

Children 0-23 months: 1:5

Children 24-59 months: 1:10 (full day care)

Children 24-59 months*: 1:15 (sessional care)

Mixed age groups: 1:4

Portugal

Children from birth to walking age: 1:4

Children from walking age to 24 months: 1:5

Children 24-35 months: 1:7.5 (2:15)

Children 36-71 months: 1:12.5 (2:25)

Children 36-47 months*: 1:7.5 (2:15)

Children 36-71 months*: 1:12.5 (2:25)

Spain National standards, but regions or local authorities may apply higher standards

Children 0-11 months: 1:8

Children 12-23 months: 1: 13

Children 24-35 months: 1:20

Children 36-71 months*: 1:25

Sweden No national standards: ratios set by 400+ local authorities.

Children 0-35 months: generally varies from 1:3 to 1: 5

Children 36-71 months: generally varies from 2 to 3.5:18-20

Children 72- 83 months varies from 1: 7.8 – 1: 22.2

Switzerland **Children 0-12 months:** 1:4

(Geneva) **Children 12-23 months:** 1:5

Children 24-35 months: 1:8

Children 36-47 months: 1:10

Children 36-71 months*: 1: 10-12

United Kingdom National standards, but local authorities may apply higher standards

Children 0-23 months: 1:3

Children 24-35 months: 1:4

Children 36-59 months: 1:8

Children 36-59 months*: 1:13

United States No national recommendations: ratios vary between states

Children aged 9 months: 1:3 to 1:6

Children aged 18 months: 1:4 to 1:9

Children aged 27 months: 1:4 to 1:13

Children aged 3 years: 1:7 to 1:15

Children aged 4 years: 1:8 to 1:20

Children aged 5 years: 1:9 to 1:25

* indicates ratios in nursery schooling or kindergartens operating less than full day care

Appendix

B International comparison of staff:child ratios recommended or required for children of compulsory school age: out-of-school settings⁹

Country

Australia National recommendations which may or may not be implemented at State level are for:

Children over 6 years: 1:15; 8:1 for outings, 5:1 for swimming

Austria No national recommendations: ratios vary between states

Children over 6 years: 1:20 to 1:28

Mixed groups (under and over 6 years): 1:12 to 1:20

Belgium No national standards: ratios set by three community governments

Children 3-12 years (French-speaking Community): no standards for school-based services; other publicly-funded services funded on basis of 2:16 + 1 coordinator per 30 children. New legislation planned for September 2000.

For holiday centres, the ratios are 1:8 if one child or more children are under 6 years, otherwise 1:12

Children 3-12 years (Flemish-speaking Community): 1:14

Canada No national standards: ratios set by provinces and territories.

Mainly set for **children aged 6-12 years** (or in a few cases, 5-11 or 6-10): generally 1:15, but from 1:10-15 in one province depending on age of children in group, and 1: 10 and 1:12 in two provinces. No regulation in one province

⁹ At the time of writing.

Denmark	No national standards: ratios set by 200+ local authorities. Children 6-10 years: generally 1:10
France	Children aged 30 months upwards: no national standards except for children under 6 years (at <i>école maternelle</i>), where 1:10; other publicly-funded services - 1:8 for children under 7 years; 1:12 for older children
Germany	No national standards: ratios set by states Children aged 6-10 years : 2:20 to 1:22
Greece	No national standards
Hungary	No national standards
Ireland	No national standards
Italy	No national standards
Japan	No national standards
Netherlands	There are no national standards, but the Association for Dutch Municipalities (VNG) offers guidelines on regulation, and these are usually followed by local authorities Children 4-12 years: 1:10

New Zealand No national standards

Portugal **Children 6-12 years:** 1:20

Spain No national standards

Sweden No national standards: ratios agreed by 400+ local authorities.
Children 6-10 years: on average 1: 17.8
Children 10-12 years: not known

United Kingdom National standards, but local authorities may apply higher standards
Children 5-7 years: 1:8

United States No national recommendations: ratios vary between states
Children aged 7 years: 1:10 to 1:26
Children aged 8/9 years: 1: 10 to 1:26
Children aged 10 or older: 1: 13 to 1:26

Appendix

C Staffing requirements for children with disabilities and other special needs¹⁰

Country

Australia No information

Austria Several provinces have 'integration groups' for kindergarten age children (i.e age 3-6): group size and ratios vary. These are smaller groups, with a maximum number of children with disabilities and more staff, e.g. Vienna has groups of 16 with a maximum of 4 children with disabilities, 2 kindergarten teaches (one with special training) + 2 helpers.

Belgium No information

Canada Little in the way of further requirements except for Ontario province, where an additional 'resource teacher' should be employed for every 4 children with special needs in centres designated 'integrated'.

France No information

Greece No additional requirements specified

Hungary The group size for children aged 0-35 months is reduced from 0 to 8 if two or more children have disabilities or other special needs, and to 6

¹⁰ At the time of writing.

if all children have disabilities or special needs. In kindergartens for children aged from 3 to 6, there is a special needs assistant for each group having children with a disability or special needs, and a special needs educator should visit weekly.

Ireland	No additional requirements specified
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Italy	No information
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Japan	An additional staff member joins the staff group if a child is disabled or has other special needs, but the decision depends on the level of disability and the local authority.
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New Zealand	No information
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Portugal	The group size for a nursery school is reduced from 25 to 20 if one of the children has special needs.
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Spain	The law says that in classes with a child with special needs, the number of children per teacher should be considered; but no specific standards or recommendations.
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United Kingdom	No additional requirements specified for children under five. For children aged 5 to 7 years, 'a higher ratio may be necessary when children with disabilities attend'.
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Appendix

D Issues concerning the design and conduct of research in early years

- D.1 To take account of possible bias inherent in certain research designs, reviews often refer to experimental designs used in research. Some reviews use an explicit hierarchy of research designs. Most hierarchies follow the same principles. The first distinction is between experimental and observational studies. In experimental studies, researchers have control over who is allocated to which comparison groups. In observational studies, the fact that participants are in one group rather than another is often due to some element of self-selection. For example, children in day care have parents who choose to place them in such settings. As already noted, such parents may be very different from those whose children stay at home for reasons that may have a direct influence on the outcomes being measured. Consequently, one might be less confident that differences between participants in an observational study are due to the specific condition under investigation and not some bias of self-selection.
- D.2 Within experimental studies, a hierarchy also exists based on the methods used to allocate participants to so-called treatment groups. The best method is purely random allocation. These randomized controlled trials (RCTs) are often called the ‘gold standard’ of research design. Other, so-called pseudo-random methods can include alternate allocation, allocation by birth date, or allocation by case number. In each of the latter, the investigator has an opportunity to influence, even if unconsciously, the allocation process.
- D.3 A similar hierarchy exists within observational studies. Cohort studies make comparisons between two or more groups at the same time. They are considered better than studies that compare treatment groups with historical controls. Studies that collect data prospectively are deemed better than studies that use data already collected (retrospective studies). Finally, within observational designs, case-control studies compare a group who have experienced some adverse outcome with a group who have not. The research will often look for the presence or absence of hypothesized risk factors.

- D.4 A third group of studies are known as before and after studies. One group of participants are examined before and after a specific treatment or intervention. No control groups are used as comparisons. Consequently it can be very difficult to decide whether changes between pre and post treatment conditions are due to the treatment specifically, or an unmeasured factor.
- D.5 Research design has a direct influence on study validity in the ways described above. Consequently, one can develop a hierarchy of research designs that reflect, if crudely, the confidence one can have in research evidence. The example below is taken from guidelines issued by the NHS Centre for Reviews and Dissemination (CRD) at the University of York (1996).

Table D.1 An example of a hierarchy of evidence

Category	Research design
I	Well-designed randomized controlled trials
II-1a	Well-designed controlled trial with pseudo-randomization
II-1b	Well-designed controlled trial with no randomization
II-2a	Well-designed cohort (prospective study) with concurrent controls
II-2b	Well-designed cohort (prospective study) with historical controls
II-2c	Well-designed cohort (retrospective study) with concurrent controls
II-3	Well-designed case-control (retrospective) study
III	Large differences from comparisons between times and/or places with and without intervention. (In some cases these may be equivalent to level I or II)
IV	Opinions of respected authorities based on clinical experience; descriptive studies and reports of expert committees

**Adult : child ratios for early years
settings in the private/ independent
sector: A report of empirical research**

**Dr. Tony Munton, Linda Barclay, Maria Rosa Mallardo
and Dr. Sofka Barreau**

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Executive Summary

ES1 Introduction

ES1.1 This report describes a project which explores the quality of provision in 50 nursery settings in the private/independent sector, operating under different adult:child ratios. All the settings employed a qualified teacher and nursery assistant. The intention was to use data from this research study to address five specific research questions:

1. What impact do adult:child ratios have on the amount of physical and social interaction with children?
2. What impact do adult:child ratios have on the overall quality of the service provided?
3. What is the relationship of other variables (e.g. staff training) with service quality, and how do these interact with ratios?
4. What impact do adult:child ratios have on child protection and safety?
5. What other factors impact on the development of children in settings with relaxed adult:child ratios?

However, the intended research design could not be implemented in full. This report therefore presents some preliminary data addressing these five research questions, and it also looks at issues such as the relationship of actual ratios to official ratios, and factors to consider when examining adult:child ratios.

ES1.2 The original intention was to recruit two groups of nurseries:

- Group 1 (approximately 20 settings) employing a fully qualified teacher and nursery assistant and already operating relaxed ratios of 1:13;
- Group 2 (approximately 30 settings) employing a fully qualified teacher and nursery assistant, but still operating a ratio of 1:8.

In Phase 1, the research team planned to compare the quality of care provided by nurseries operating relaxed adult:child ratios of 1:13 (Group 1) with nurseries operating adult:child ratios of 1:8 (Group 2). In Phase 2, the

research team planned to examine the impact of relaxing ratios on the quality of care i.e. for Group 2 nurseries that moved from operating adult:child ratios of 1:8 to relaxed adult:child ratios of 1:13.

ES2 Design modifications and sample

ES2.1 The research team conducted extensive enquiries in an effort to recruit the sample as described above. Enquiries failed to identify any private or voluntary sector nurseries providing sessional care which were operating relaxed adult:child ratios of 1:13 and employing a qualified teacher and nursery assistant. In addition, the research team identified very few nurseries providing sessional care employing a qualified teacher and nursery assistant and operating an adult:child ratio of 1:8. Following discussions with the Department for Education and Employment (DfEE) (now the Department for Education and Skills (DfES)), the research team modified the study design; and the team recruited 50 private/independent sector nurseries (including day nurseries, nursery schools, and sessional nurseries) employing a qualified teacher and nursery assistant and operating an adult:child ratio of 1:8. Nurseries were selected to represent a mixture of inner city, suburban and rural areas. Phase 2 of the project was to examine the impact of these nurseries relaxing their ratios from 1:8 to 1:13. However, discussions with managers and staff from private/independent sector nurseries indicated there was very little support for relaxing ratios to 1:13. A decision was made by DfEE (now the DfES) to revise relaxed ratios to 1:10.

ES2.2 The final sample participating in phase 1 of the project (June-July, 2000) consisted of 7 sessional nurseries (operating for morning sessions only), 7 private nursery schools (operating school hours during term time) and 36 day nurseries (generally operating from 8am to 6pm, 50 weeks a year). No voluntary nurseries were included in the sample. Nurseries were invited to participate in phase 2 of the project on condition they relaxed their adult:child ratios to 1:10 for four weeks prior to a follow-up visit in February 2001. Four nurseries reported operating adult:child ratios more relaxed than 1:8 during phase 1; these nurseries were not asked to relax ratios and were

revisited during phase 2 of the project (February 2001). Negotiations were completed with the remaining 46 nurseries; only four relaxed their adult:child ratios, of which two relaxed ratios for the complete 4-week period prior to the team's follow-up visit.

ES2.3 The final sample was not randomly selected; nor is it necessarily representative of private/independent sector nurseries across England. There was a considerable element of self-selection; often nurseries were nominated by their local authority and subsequently chose whether to participate in the project or not.

ES3 Methodology

ES3.1 Phase 1 of the project involved a researcher visiting each of the 50 nurseries for a day and completing a set of observations, including the Thomas Coram Research Unit (TCRU) observation checklist, joint attention observations and collecting adult:child ratio data throughout the course of the day. A researcher also interviewed nursery managers and staff using a semi-structured interview approach. Researcher visits in phase 2 followed the same format as phase 1 with the addition of a semi-structured interview with staff regarding the relaxing of ratios.

ES4 Results

ES4.1 The data during phase 1 of the project was collected on the assumption that we would be able to make statistical comparisons between both Group 1 and Group 2 nurseries during phase 1 of the study, and Group 2 nurseries that moved from operating adult:child ratios of 1:8 (phase 1) to relaxed adult:child ratios of 1:13 (phase 2). However the lack of Group 1 nurseries during phase 1 and the very small number of nurseries participating during phase 2 made statistical comparisons unjustified. There was however some variety in observed ratios recorded during phase 1 of the project, and some analyses of quantitative data have been reported. It is important to stress that the conclusions drawn from these quantitative comparisons are made very tentatively.

ES4.2 *Providers' response to relaxing adult:child ratios:* Providers in the private/independent sector were generally not enthusiastic about relaxing adult:child ratios. In most situations, providers said they would prefer to operate at adult:child ratios of 1:8 and in some cases 1:10. There was very little support for adult:child ratios of 1:13. In some situations, staff expressed the view that they would prefer to operate ratios more strict than 1:8; however at the same time, they expressed a desire to maintain legislation at 1:8 to provide then with some flexibility. In particular, staff voiced the following concerns about relaxing ratios:

- There would be less time for staff to devote to children's learning; more time would be taken for discipline and general control.
- Dealing with the unexpected would cause greater disruption to the whole group.
- Relaxed ratios may reduce the choice and variety of activities, especially time consuming activities such as cooking and messy activities such as art and craft, water and sand play.
- Relaxed ratios would reduce the frequency of outdoor play and field trips.
- Larger groups may mean a more disciplined approach.
- Children may miss out on important one-to-one attention from adults.
- Relaxed ratios may result in parental dissatisfaction with the provision.

ES4.3 *Variability within private/independent provision:* The group of nurseries visited by the research team varied on several parameters despite all being members of the private/independent sector employing a qualified teacher and nursery assistant.

- Adult:child ratio requirements stipulated by different local authorities varied between 1:5 and 1:13.
- The observed adult:child ratio experienced by children varied considerably both within and between nurseries. The range was from 1:2 to 1:12 with an average of 1:6.

- The adult:child ratios experienced by children often differed from that stipulated by local authorities. In some nurseries, the average adult:child ratio over a day was more relaxed than that stipulated by local authorities; in three quarters of the nurseries in this study, the ratio was more strict.
- Patterns of hours operated per day and weeks per year varied.
- The role taken by qualified teachers differed between nurseries, influencing the time teachers spent interacting with the children. In some cases, qualified teachers spent the majority of their time fulfilling administrative duties; in others, teachers spent the majority of their time interacting with children on a one-to-one basis; in a third variation, teachers interacted with the children as all other members of staff were doing.
- Nurseries varied in the number and types of auxiliary staff employed, which had an impact on the duties required of qualified staff.
- Nurseries occupied a variety of different buildings, raising issues regarding the link between total floor area and adult:child ratios.

ES4.4 *Impact of adult:child ratios on the amount of adult interaction with children:* Findings suggest that adult:child ratios may influence the amount of time adults interact with children. Staff expressed the view that relaxed ratios would result in fewer interactions between staff and children. Observations of the number of joint attention interactions occurring between children and adults indicated that there may be a statistically significant relationship between more strict observed ratios (i.e., the ratio experienced by children) and greater numbers of joint attention episodes experienced by children. In addition to adult:child ratios, it appears that the time staff spend with children may also be influenced by such things as the number of additional duties required of qualified staff. The number of auxiliary staff may play a mediating role.

ES4.5 *Impact of adult:child ratios on the overall quality of the service:* Findings suggest that adult:child ratios may have an impact on the overall quality of service provided. Staff generally expressed the view that relaxing ratios

would result in a change to the structure of activities on offer. Specifically, one-to-one time between adults and children would be replaced with group activities, and staff would spend more time in supervisory roles rather than interacting with the children. Statistical comparisons between quality (as measured by the TCRU observation checklist) suggest a non-linear statistically significant relationship may exist between observed adult:child ratios and service quality. Once the average number of children per adult in the room fell below seven, the observed quality of adult child interactions did not change as a result of ratios of adults to children becoming more strict. Given the small sample, and the existence of outlying scores, the data are not sufficiently robust to support a claim that a ratio of 1:7 is a critical cut-off point. The data simply suggest that the likely impact of ratios on quality will be more significant where ratios exceed around 1:7.

- ES4.6 *Relationship of other variables (e.g. staff training) with service quality:* During an introductory phone call, all the nurseries participating in phase 1 of the project were reported by management to employ a qualified teacher *and* qualified nursery assistant. However the recording of staff qualifications did highlight the variety of qualifications held by staff working in early years day care provision. In addition to staff qualifications and training, group size may influence quality and interact with ratios. Both the total number of children in a room and the number of children in each small group activity may influence the quality and quantity of adult:child interactions. The physical layout of nursery premises, room size and room organization may all play a part in determining ideal group size and hence the impact of adult:child ratios. The total number of staff (influenced by the overall size of the nursery) can allow flexibility in staffing numbers working with any one group of children. Duties performed by auxiliary staff may influence the time teaching staff spend interacting with children.
- ES4.7 *Impact of adult:child ratios on child protection and safety:* Although mentioned by staff, child protection and safety was not a significant concern when relaxing ratios from 1:8 to 1:10 or 1:13. Child safety during some outdoor activities was raised as a possible concern. We found no evidence

of any significant relationship between the adult:child ratios observed during phase 1 and questions on the TCRU Observations Checklist which relate to child protection and safety. Regulations imposed by Social Services may outweigh the influence of adult:child ratios observed during this project on children's protection and safety.

ES4.8 *Other factors that may have an impact on the development of children in settings with relaxed adult:child ratios:* The deployment of staff seemed to be a key factor influencing the quality of care environments in nursery settings. Whether the qualified teacher predominately provides one-to-one help to individual children, or takes a more general role, influences the adult:child ratio that children experience. In situations where the teacher takes a predominately one-to-one approach, relaxing ratios will have a greater influence on the adult:child ratios experienced by the children not working directly with the teacher.

ES4.9 *Factors to consider when examining adult:child ratios:* The following factors have been identified from this project that we believe need to be considered when examining legislation on adult:child ratios:

1. The adult:child ratio a provision is registered to operate at, and observed adult:child ratios (i.e. the ratio experienced by the children) may often differ. Regular checks are needed to ensure that operating ratios correspond to registered ratios.
2. In addition to making recommended staff:child ratios contingent on staff qualifications, it is important to consider the proportion of time that qualified teachers and staff spend working directly with the children; and the number and role of non-teaching staff.
3. The physical layout of nursery premises, room size and room organisation all interact with group size and ratios to influence quality. Consequently, adult:child ratios appropriate in one situation may be impractical in another.

4. Type of outdoor provision may also influence the level of supervision required. For example when public parks are used for outdoor activities, a higher level of adult supervision is needed in comparison to enclosed playgrounds attached to nursery premises.

ES5 Conclusion

ES5.1 Findings from this study are consistent with research suggesting that adult child ratios do have an impact on interactions between adults and children, a key indicator of quality (McGurk, Mooney, Moss & Poland, 1995). However as suggested in the literature review in the first half of this research report, the relationship between adult:child ratios and quality of education and care is a complex issue and there are numerous additional factors that need to be considered. Our observations suggest caution when it comes to assuming a level playing field exists between private, voluntary and maintained sector settings that employ a qualified teacher and a nursery assistant. Variability has been a common feature of the nurseries we have worked in. It appears that the term 'level playing field' is not an accurate description when applied to the private sector. To provide all children with comparable experiences of quality nursery care and education, the regulation of adult:child ratios needs to be considered in conjunction with group size, staff qualifications and the time staff work directly with the children.

Section

1 Introduction

1.1 Background

1.1.1 This project explored the quality of provision in 50 nursery settings in the private/independent sector, operating under different adult:child ratios. Settings included day nurseries (normally open from 8am to 6pm, 50 weeks a year), nursery schools (open for schools hours during term time) and sessional nurseries (open for morning sessions only). All the settings employed a qualified teacher and nursery assistant.

1.1.2 The intention was to use data from this research study to address five specific research questions.

1. What impact do adult:child ratios have on the amount of physical and social interaction with children?
2. What impact do adult:child ratios have on the overall quality of the service provided?
3. What is the relationship of other variables (e.g. staff training) with service quality, and how do these interact with ratios?
4. What impact do adult:child ratios have on child protection and safety?
5. What other factors impact on the development of children in settings with relaxed adult:child ratios?

However, as outlined in Section 2, the intended research design could not be implemented in full. This report therefore presents some preliminary data addressing these five research questions, and it also covers issues such as the relationship of actual ratios to official ratios, factors to consider when examining ratios, and staff and manager's views on relaxing ratios.

1.1.3 The project was commissioned by the Department for Education and Employment (DfEE), now the Department for Education and Skills (DfES),

as part of a small programme of work on adult:child ratios. There is currently a range of different regulations concerning adult:child ratios for early years providers. At present, maintained nursery schools operate a ratio of 2:20 (or 2:26 where the head teacher is not counted). However, private and voluntary settings employing a qualified teacher and nursery assistant are normally required to operate an adult:child ratio of 2:16. At the time of the research, *The Children Act 1989* provided guidance that allowed local authorities to be flexible and allow private and voluntary providers (employing a qualified teacher and nursery assistant) to operate staffing ratios of 2:20 (or 2:26 when the head teacher/manager is not included). However it appeared that local authorities rarely implemented this flexibility. This has resulted in an apparent ‘uneven playing field’ between the maintained and the private/voluntary sectors. This project was designed to consider issues relevant to ‘moving towards a level playing field across all early years settings’. The first strand of this work, *Review of international research on the relationship between ratios, staff qualifications and training, group size and the quality of provision in early years and childcare settings*, is presented in the first half of this research report. Details of the second strand of this work are reported here.

1.2 The Children Act 1989: Regulations at the time of the research concerning adult:child ratios in childcare and nursery education provision

At the time of the research, childcare provision for children under 8 years was regulated by local authorities (commonly Registration and Inspection Units). Nursery schools and classes in the maintained sector were inspected by OFSTED.

1.2.1 Full day care

The *Children Act 1989 Guidance and Regulations (Vol. 2)* recommend an adult:child ratio of 1:8 for 3- to- 5-year-old children, in centres providing full day care. These centres are normally open long hours each day (typically 8am to 6pm) and operate for around 50 weeks of the year, for the most part providing a service for working parents. Full day care includes

extended-day playgroups and crèches, training establishments as well as day nurseries run by local authorities, voluntary bodies, private companies or community groups. Guidelines state that where the day nursery provides places for more than 20 children, the manager or officer in charge should be excluded from staffing ratios. Managers or officers in charge should hold a relevant qualification in childcare or early years education and at least half the staff should also hold a relevant qualification. In addition, each facility should have adequate support staff (e.g., cooks, cleaners and clerical staff). It is recommended that 3- to- 5-year-old children have a space allowance of 2.3m² per child and no room should have to accommodate more than 26 children except for special occasions.

1.2.2 *Sessional day care*

The *Children Act 1989 Guidance and Regulations (Vol. 2)* recommend an adult:child ratio of 1:8 for 3- to- 5-year-old children in centres providing sessional day care with the childcare staff being in direct contact with the children throughout the session. These centres are normally open for mornings or afternoons only where no main meals are provided. As with full day care facilities, it is recommended that at least half the staff should hold a relevant qualification in childcare or early years education and 3- to- 5-year-old children have a space allowance of 2.3m² per child. Unlike full day care, for sessional day care there are no regulations regarding the qualifications held by the manager or officer in charge.

1.2.3 *Nursery schools and classes (private, voluntary and maintained)*

The *Children Act 1989 Guidance and Regulations (Vol. 2)* recommend that *any* setting, which has a qualified teacher (a person who has satisfied the requirements of the Secretary of State for Education and Science for qualified teacher status) *and* a qualified nursery assistant (a person with the certificate of the National Nursery Examination Board or comparable qualification), is for 3- to- 5-year-olds *and* is open for the period of a school day during term-time, can operate an adult:child ratio of 2:26 if the head teacher or manager is *excluded* from the ratio. In instances where the head teacher or manager combines teaching with administrative duties then the

recommended adult:child ratio is 2:20. If a qualified teacher is not engaged in working directly with the children then the recommended adult:child ratio is 1:8.

1.2.4 *Combined centres*

Combined centres provide nursery education and day care and in the same centre. These centres are usually jointly run by Social Services and the Education Departments. The *Children Act 1989 Guidance and Regulations (Vol. 2)* recommend that local authorities should decide what structure is appropriate in these situations. Local authorities should follow the recommendations for staffing nursery schools (private and maintained) so far as the educational provision is concerned. For the remaining provision or the 'wrap around care', the recommendations for staffing full and sessional day care facilities should be followed.

1.3 Regulation of staffing ratios by local authorities at the time of this research

1.3.1 *Relaxing ratios in private and voluntary full and sessional day care facilities that employ a qualified teacher*

When a qualified teacher is involved in teaching children in full day care and sessional day care facilities, guidance provided by the Children Act 1989 allowed the local authority to relax ratios to 2:20 or 2:26, depending on whether the head teacher or manager combines teaching with administrative duties.

1.3.2 The conditions under which providers can operate different adult:child ratios were determined by individual local authorities. Many providers operate stricter ratios than recommended by the *Children Act 1989 Guidance and Regulations (Vol. 2)* and some local authorities may have required providers to meet more stringent ratios. Factors such as floor area and the total number of children also influenced ratio requirements.

1.4 Regulation by the Office for Standards in Education (OFSTED) from September 2001

1.4.1 From September 2001, the Office for Standards in Education (OFSTED) has been responsible for the regulation of all providers of early childcare and education throughout England. OFSTED is now responsible for the regulation of a set of National Standards developed by the DfEE (now the DfES) as part of the National Childcare Strategy launched in 1998.

1.5 National Standards: Regulation of adult:child ratios

1.5.1 The DfEE (now the DfES) has developed a set of National Standards that apply to each of the five main types of childcare (full day care, sessional day care, crèches, out-of-school care and childminders). The National Standards represent a baseline of quality for provision of childcare and education.

1.5.2 Full day care

Full day care facilities provide day care for children under eight years of age for a period of four or more hours in non-domestic premises. The National Standards for full day care require a minimum staffing ratio of 1:8 for children aged 3- to- 7-years. The adult:child ratios relate to staff available to work directly with the children. The person in charge must hold a NVQ level-3 qualification (appropriate for the care and development of children) and have at least two years experience working in a day care facility. At least half of the remaining staff should hold a NVQ level-2 qualification (appropriate for the care and development of children). The National Standards require a 2.3m² space allowance for each child.

1.5.3 Sessional day care

Sessional facilities provide day care for children under 8-years of age for a session that is less than 4 hours in any single day. Where two sessions are offered in the course of a single day, children must not attend both; there must also be a break between sessions during which no children are in the care of the provider. The National Standards require a minimum staffing ratio of 1:8 for children aged 3- to- 7-years. The National Standards do not state that this ratio relates to staff working directly with children. The

person in charge must hold a NVQ level-3 qualification (appropriate for the care and development of children) and have at least two years experience working in a day care facility. At least half of the staff should hold a NVQ level-2 qualification (appropriate for the care and development of children). The National Standards require a 2.3m² space allowance for each child.

1.5.4 *Nursery schools*

Details of the minimum staffing standards for nursery schools are provided in Annex C of the National Standards for full day care. A nursery school is a provision that caters for children less than 5 years of age and which is neither maintained by a local authority nor integrated as part of an independent school. A nursery school is distinguished from a day nursery in that it opens for the period of a school day during term time and children are under the supervision of a qualified teacher (a qualified teacher within the meaning of the Education (teachers' regulations) (Qualifications and Health Standards) (England) Regulations 1999) and support is provided by a qualified nursery assistant who holds a NVQ level-3 qualification. The National Standards require a minimum staffing ratio of 2:20 (2:26 if the head teacher/manager is not involved in teaching. The qualified teacher and nursery assistant must be working directly with the children.

1.5.5 The National Standards do not however include minimum staffing ratios for sessional or full day nurseries that employ a qualified teacher and a NVQ level-3 nursery assistant (i.e. over and above the minimum required for sessional or day nurseries but that required by a private nursery school) to work with 3- to- 5-year old children. In the case of day nurseries, there are often sessions of 'education' provided (normally during school hours for term-time) in addition to providing care facilities for children outside these hours (before and after school, and during school holidays) i.e. 'wrap around care'.

1.6 Research on adult:child ratios for early years settings

- 1.6.1 Research is consistent with the view that adult:child ratios can have an impact on the quality of care and education that children receive (McGurk, Mooney, Moss & Poland, 1995). Broadly speaking, the more strict the ratio (i.e. the fewer children per adult), the better the quality of care is likely to be. However, the influence of adult:child ratios is inextricably linked to other elements of the education and care environment such as group size and staff qualifications and training, as detailed in the literature review in the first half of this research report.
- 1.6.2 Research has consistently linked adult:child ratios and staff training with staff behaviour in early years settings. More strict adult:child ratios (i.e., fewer children per adult) are more likely to increase the number of interactions (Smith, 1999) and facilitate positive adult:child interactions (Howes & Rubenstein, 1985). The number and type of interactions between adults and children has in turn been linked to children's development. However, the influence of adult:child ratios cannot be considered independently of other factors including group size and staff qualifications and training. Because several factors are implicated in the quality of adult:child interactions, it is difficult to identify the unique influence of either ratios, group size or staff qualifications and training. However, this project gives us some insight into the role that adult:child ratios may take and other possible factors that play a role in influencing the quality of child care and education.
- 1.6.3 Results from a postal survey conducted by staff at the Thomas Coram Research Unit (see the literature review in this research report) indicated that nearly one third of English local authorities enforced ratios different to those recommended in guidance by the Children Act 1989. The introduction of the National Standards regulated by OFSTED from September 2001 may decrease these national variations in adult:child regulations.
- 1.6.4 Research from the US suggested that legislation concerning ratios rarely achieved its intended purpose. It appears that regulations on staff:child

ratios have little relationship to the actual adult:child ratios observed and experienced by children in early years settings. It is therefore important to ascertain and regulate the adult:child ratio actually experienced by children.

- 1.6.5 Historically in the UK, early years services have been distinctly split into ‘care’ (welfare) and ‘education’ services. Day care facilities have traditionally provided a ‘care’ service for children whereas nursery schools and classes have had a greater focus on ‘education’. This has been reflected in the qualifications of staff employed and recommended staffing ratios in each type of service. However there is a process of integration occurring in the UK; early years services that cater for both children’s educational and care needs are emerging, with an increasing variety of services provided by early years settings developing. There are, for example, early years providers that not only cater for children’s educational needs during school hours and term time but also provide ‘wrap around care’ for hours outside of the school day when parents are working. Legislation regarding adult:child ratios needs to take account of the increasing variety of early years provision available.

Section

2 Project design and modifications

2.1 Original design

2.1.1 The original aim of the project was to '*undertake an evaluation of 50 settings in the private and voluntary sector providing sessional care that are operating under relaxed ratios*'. More specifically, the intention was to recruit two groups of nurseries:

- Group 1 (approximately 20 settings) employing a fully qualified teacher and nursery assistant and already operating relaxed ratios of 1:13;
- Group 2 (approximately 30 settings) employing a fully qualified teacher and nursery assistant, but still operating a ratio of 1:8.

2.1.2 In Phase 1, the research team planned to compare the quality of care provided by nurseries operating relaxed adult:child ratios of 1:13 (Group 1) with nurseries operating adult:child ratios of 1:8 (Group 2). In Phase 2, the research team planned to examine the impact of relaxing ratios on the quality of care. This would be done by repeating observations in Group 2 nurseries that moved from operating adult:child ratios of 1:8 to relaxed adult:child ratios of 1:13.

2.2 Modifications

2.2.1 The research team conducted extensive enquiries in an effort to recruit the sample as described above. The team contacted 82 nursery settings whose details had been provided by 52 local authorities, five private for-profit nursery organisations and in response to an article in the widely read publication *Nursery World*. Enquiries failed to identify any private or voluntary sector nurseries providing sessional care that employed a qualified teacher and nursery assistant, operating relaxed adult:child ratios of 1:13. This suggests that group 1 nurseries, as specified above, are relatively rare.

In addition very few sessional nurseries were identified as employing a qualified teacher and operating a staffing ratio of 1:8.

2.2.2 Following discussion with the DfEE (now the DfES), the research design was modified and the team recruited 50 private/independent sector nurseries (including day nurseries, nursery schools and sessional nurseries) employing a fully qualified teacher and nursery assistant. No voluntary sector nurseries were identified. At the time of recruitment, all reported operating a adult:child ratio of 1:8 or stricter. At the time of recruitment, nurseries were not asked to commit to participating in phase 2 of the project since definite procedures for phase 2 had not been finalised.

2.2.3 The original intention was for the research team to negotiate with the DfEE (now the DfES) and representatives from participating local authorities, in advance of recruiting the sample of nurseries, the guidelines under which relaxed ratios could operate. However it was felt inappropriate for the DfEE (now the DfES) to issue guidelines as it was thought that local authorities would want to establish their own. Negotiations with local authorities were conducted after Phase 1 of the project was completed, and settings willing to operate under relaxed ratios had been identified.

2.2.4 The original proposal was for adult:child ratios in the nurseries participating in phase 1 of the project to be relaxed to the 2:26 ratio currently operating in maintained nursery schools where the head teacher does not teach. Discussions with managers and staff from the private/independent nurseries participating in phase 1 of the study indicated that there was little support for relaxing ratios to 1:13. A decision was made by DfEE (now the DfES) to revise the figure to an adult:child ratio of 1:10, i.e. the same as a maintained nursery school where the head combines teaching and administration duties.

2.2.5 The final sample consisted of 7 sessional nurseries (operating for morning sessions only), 7 private nursery schools (operating school hours during term-time) and 36 day nurseries (generally operating from 8am to 6pm, 50 weeks a year) all from the private/independent sector. At the time of

recruitment, all nurseries reported employing a qualified teacher and qualified nursery assistant and operating staffing ratios of 1:8.

2.2.6 All nurseries from phase 1 that were registered to operate an adult:child ratio of 1:8 or stricter were invited to participate in phase 2 of the project. Nurseries were asked to relax their adult:child ratios to 1:10 for 4 weeks prior to a follow-up visit. After negotiations were completed, only four nurseries relaxed ratios; of these four, only two relaxed ratios for the complete 4-week period.

2.3 Data analysis

2.3.1 The data during phase 1 of the project were collected on the assumption that we would be able to make statistical comparisons between both Group 1 and 2 nurseries during phase 1 and Group 2 nurseries that moved from operating adult:child ratios of 1:8 (phase 1) to relaxed adult:child ratios of 1:13 (phase 2). However the lack of Group 1 nurseries during phase 1 and the very small number of nurseries participating during phase 2 made statistical comparisons unjustified. There was however some variety in observed ratios recorded during phase 1 of the project, and limited quantitative results have been completed (see Appendix E for a summary of all quantitative comparisons made). It is important to stress that the results reported and conclusions drawn from these quantitative comparisons are made very tentatively.

Section

3 Methodology

Phase 1 (June - July 2000)

3.1 Recruitment and sample

- 3.1.1 Nurseries were recruited using the following criteria: the nurseries that participated in the project were to be a member of the private or voluntary sector, employ a qualified teacher, *and* have at least one qualified nursery assistant to work with 3- and 4-year-old children. During recruitment, the research team asked nursery management whether they employed a qualified teacher and nursery assistant. Nurseries from a variety of geographical areas were invited to participate, such that inner city, suburban and rural areas would be represented.
- 3.1.2 Nurseries were recruited via several means. The research team contacted 52 local authorities. Twenty-seven of these did not have any private nurseries registered that fitted the study criteria as outlined above. Of the 52, 11 local authorities provided details of private nurseries. The research team contacted 82 nursery settings to establish eligibility. Those that met the criteria for selection (as outlined above) were invited to participate. A total of 21 nurseries agreed to take part, and were subsequently recruited.
- 3.1.3 Five private, for-profit, organisations, that managed more than one nursery, provided details of settings that met the criteria for eligibility. Three organizations contacted the research team directly and requested to be included in the study. Twelve nurseries were recruited from these for-profit organisations. The research team approached two further nursery companies directly, and seven nurseries were recruited from these. In total, 19 nurseries from for-profit organisations agreed to participate in the project.

- 3.1.4 Two nurseries, housed in private independent schools, were contacted directly by the research team and were subsequently recruited.
- 3.1.5 The widely read publication, *Nursery World*, carried an article about the study. The project director also announced the project at the annual conference of the National Day Nurseries Association (NDNA). In both instances, interested nurseries were invited to contact the research team directly. Eight additional nurseries that met the criteria for eligibility were recruited.
- 3.1.6 The final sample included 50 nurseries from across England. The geographical areas covered included Leeds, Cheshire, Greater Manchester, Lancashire, Staffordshire, West Midlands, Peterborough, Norfolk, Suffolk, Cambridge, Greater and Central London, Oxford, Gloucestershire, Surrey, Kent and Southampton. Table 1 provides a summary of the source of recruitment and the geographical areas covered. The final sample consisted of 7 sessional nurseries (open for mornings only), 7 nursery schools and 36 full-day nurseries.

Table 1

Summary of nurseries recruited, their source and geographical location

Recruitment source	No. of nurseries	Geographical areas
<i>Individually owned</i>		
Local authorities	21	Leeds, Greater London, West Midlands, Central London, Norfolk, Kent
National Day Nurseries Association Conference and <i>Nursery World</i> magazine	8	Staffordshire, Kent, West Midlands, Surrey, Southampton, Norfolk, Cambridge, Peterborough,
<i>Collectively owned</i>		
Private for-profit organisations	19	Cheshire, Oxford, Cambridge, Greater London, Manchester, Lancashire, Central London, Gloucestershire, Surrey
Independent Schools	2	Norfolk, Suffolk

3.1.7 The final sample was by no means randomly selected or necessarily representative of private/independent sector nurseries across England. There were no voluntary sector nurseries included in the sample. There was a considerable element of self-selection. Often, nurseries were nominated by their local authority and subsequently chose whether to participate in the study or not.

3.2 Measures and procedure

3.2.1 An individual researcher spent a day visiting each of the 50 nurseries. Seven nurseries were open for morning sessions only, in these nurseries two researchers attended in order to complete all observations. The following measures were used (see Appendices A-D for details):

- Thomas Coram Research Unit (TCRU) Observation Checklist (Mooney, Munton, Rowland & McGurk, 1997).
- Joint attention checklist.
- Registered and observed ratios.
- Pre-School Behaviour Checklist (PSBC) (McGuire & Richman, 1988).
- Semi-structured interviews with staff.

Phase 2 (February 2001)

3.3 Recruitment and sample

3.3.1 From the sample of 50 nurseries that participated in phase 1 of the project, 45 were identified as being eligible to relax adult:child ratios to 1:10. The remaining five nurseries from phase 1 were not contacted in the first instance as they reported registered adult:child ratios that were more relaxed than 1:8 (i.e. 2 nurseries were registered to operate ratios of 1:10, 1 nursery was registered to operate at 2:21, 1 nursery was registered to operate at 1:12 and 1 nursery was registered to operate at 1:13).

- 3.3.2 A letter was sent to each of the 45 nurseries inviting them to participate in phase 2 of the study. The letters were followed by a phone call to the nursery manager. Out of the 45 nurseries, six reported no longer employing a qualified teacher. These nurseries were unable to participate in phase 2 of the project. Those nurseries that agreed to participate were asked to operate a relaxed ratio of 1:10 for a four-week period prior to a follow-up visit in February 2001. The nurseries were asked to contact their local authority to discuss conditions under which ratios could be relaxed for the duration of the study. In two instances, the nursery asked the Thomas Coram Research Unit to contact the local authority to outline the study. From the 45 nurseries invited to participate in phase 2 of the project, four agreed to and were able to participate in phase 2 and relax their adult:child ratio to 1:10.
- 3.3.3 The five nurseries that reported operating adult:child ratios that were more relaxed than 1:8 during phase 1 of the project were contacted and agreed to members of the research team visiting them for a second time. One of these nurseries no longer employed a qualified teacher and therefore was excluded from phase 2. The remaining four nurseries were not asked to alter their adult:child ratios.
- 3.3.4 In total, eight nurseries were revisited during phase 2 of the project, four of whom had been asked to relax ratios for the four-weeks prior to the visit, and four nurseries that during phase 1 reported operating adult:child ratios that were more relaxed than 1:8. Table 2 provides a summary of nursery participation in phase 2.

Table 2

Summary of nursery participation during phase 2 of the project

	No. of nurseries
<i>Nurseries re-visited during phase 2</i>	
Agreed to relax ratio to 1:10 for four-weeks prior to phase 2 visit.	4
During phase 1 reported operating adult:child ratios more relaxed than 1:8, and did not alter ratio for phase 2 visit.	4
<i>Nurseries not re-visited during phase 2</i>	
No longer had qualified teacher	7
Unwilling to participate in phase 2 of project	35
Total	50

- 3.3.5 Although four nurseries agreed to relax their adult:child ratio to 1:10 for the 4 weeks prior to a follow-up visit, only two of these relaxed ratios for the complete 4 weeks. One nursery relaxed their adult:child ratio for only the morning of the researchers visit, and the other had a regular absence of staff for one morning a week.
- 3.3.6 Forty-two nurseries did not participate in phase 2 of the project. Of these, seven no longer employed a qualified teacher and 35 turned down the invitation to participate in phase 2 of the project. The following is a summary of the reasons given. In some cases nurseries expressed multiple concerns; the main concern raised is noted in Table 3.

Table 3

Summary of the reasons given by nursery management and staff for not participating in phase 2 of the project

Concerns raised by nursery management & staff	No. of nurseries
Unwilling to relax ratio as believe this would compromise the quality of provision* e.g., the quality of interactions between staff & children, the attention children receive from staff ,and outdoor play provision.	9
Local authority was unwilling to allow ratios to be relaxed, or required nursery to re-register.	7
Limited to having less than 20 children in one room, due to small room size.	5
Teacher spends the majority of time working on a one-to-one basis; relaxing ratios would mean compromising the quality of care experienced by the children not working with the teacher.	5
Have mixed ages (including under 3-year-olds) all in one room; impractical to relax ratio for older age group only.	3
An insufficient number of 3 & 4-year-olds to operate a ratio of 1:10 as the 4-year-olds all tend to go into school reception classes.	2
Relaxed ratios would increase the teacher's workload.	2
Nurseries were unwilling to re-deploy staff for the duration of the study.	1
Difficult to administer relaxed ratios for the period when the teacher is working as the nursery opens from 8am to 6pm but the teacher works from 9am to 3pm.	1
No longer have a qualified teacher.	7
Total	42

*Proposed changes to minimum standards for staff qualifications announced at the time nurseries were being recruited for phase 2 of the project raised concerns over the additional impact on quality of relaxing ratios.

3.4 Measures and procedure

3.4.1 Follow-up visits to the eight nurseries participating in phase 2 of the project followed the same format as phase 1.

3.4.2 In addition to the semi-structured interview questions asked during phase 1,

staff from the four nurseries that operated at relaxed adult:child ratios were asked if and how things had changed as a result of working with relaxed ratios. Specifically they were asked about the planning and implementation of activities (see Appendix D).

Section

4 Findings and discussion

4.1 Introduction

4.1.1 The data during phase 1 of the project were collected on the assumption that we would be able to make statistical comparisons between both Group 1 and 2 nurseries during phase 1 and Group 2 nurseries that moved from operating adult:child ratios of 1:8 (phase 1) to relaxed adult:child ratios of 1:13 (phase 2). However, the lack of Group 1 nurseries during phase 1 and the very small number of nurseries participating during phase 2 made statistical comparisons unjustified. There was however some variety in observed ratios recorded during phase 1 of the project, and limited quantitative results have been completed (see Appendix E for a summary of all quantitative comparisons made). It is important to stress that the results reported and conclusions drawn from these quantitative comparisons are made very tentatively.

4.1.2 This section is divided into 4 sub-sections detailing the variability observed between settings; providers' responses to relaxing ratios; the short- and long-term effects of relaxing ratios; and the specific objectives as outlined in the project proposal.

4.2 Variability between settings during phase 1

4.2.1 The research team recorded a significant degree of variability between settings visited during phase 1 of the project, specifically:

- Registered adult:child ratios
- Observed adult:child ratios
- Deviation of observed ratios from registered ratios
- The service provided by the nursery facility, i.e., opening hours
- The deployment of qualified teachers
- The number of auxiliary staff

- The type of premises and provision for outdoor space

4.2.2 *Registered adult:child ratios*

A postal survey conducted by the TCRU (see the literature review in this research report) indicated that 30% of English local authorities enforced ratios different to that recommended by the Children Act 1989. During phase 1 of the project, nursery managers reported a range of adult:child ratios enforced by local authorities. Registered ratios varied from 1:5 to 1:13, as shown in Table 4. Of the 50 nurseries visited during phase 1 of the project, 10 (20%) operate under ratios different to the 1:8 recommendation provided by the Children Act 1989.

Table 4

Variation in registered adult:child ratios as required by local authorities

Registered adult:child ratio	Day nursery	Nursery School	Sessional (am only)	
1:5	2	1	0	3
1:7	1	1	0	2
1:8	28	5	7	40
1:10	2	0	0	2
1:11.5	1	0	0	1
1:12	1	0	0	1
1:13	1	0	0	1
Total	36	7	7	50

4.2.3 *Observed adult:child ratios*

The research team recorded a significant degree of variability in observed ratios of adults to children within and between participating nurseries. Across the 50 nurseries visited in phase 1, the mean observed adult:child ratio (across a total of 20 observations in each nursery) for each nursery ranged between 1:2.8 to 1:12, with an average of 1:6. In addition, single observations of ratios varied from 1:1 to 1:27, with an average of 1:6.7. More strict ratios (i.e. fewer children per adult) were observed on occasions

when it was nursery practice for an adult to take one or two children into a separate room for a specific activity. In some cases, this was to do education-based activities, and in other cases, it was for personal care routines such as toileting. Ratios of one adult to 25-27 children were most likely to occur during group activities such as 'story time'. In activities of this nature, one staff member was often responsible for all the children while the remaining adults prepared the next activity or snacks, or had a break. In many instances, staff not working with children left the room for a period of time.

4.2.4 *Deviation of observed adult:child ratios from registered adult:child ratios*

A great deal of difference was found to exist between the ratios under which a provision was registered to operate, and the ratios actually observed. As shown in Table 5, of the 50 nurseries visited during phase 1 of the project, three-quarters had an average observed ratio that was more strict than the ratio they were registered to operate at. This occurred for a number of reasons. First, some nurseries prided themselves on having fewer children per adult, and believed it was a selling point for their nursery. Secondly, due to restrictions on the total number of children allowed in a room, in some situations it was not practical to work to the adult:child ratio as stipulated in registration. Unless the number of children allowed in a single room was a multiple of 8 for example, any additional children required an extra member of staff thereby increasing the number of adults per children. Third, in some situations, nurseries were not full so in practice there were fewer children per adult, and fourth, in some situations, additional adults such as students were in the room interacting with the children. However, as shown in Table 5, there were six nurseries (out of a total 50 nurseries from phase 1) where the average observed ratio (i.e. the ratio experienced by the children) was more relaxed than that stipulated by their local authority. Four nurseries from phase 1 that had a registered ratio more relaxed than 1:8 were revisited during phase 2 of the project. The observed ratios from these nurseries during phase 2 ranged between 1:3.5 and 1:7. All four nurseries operated a ratio more strict than that stipulated by their local authority.

Table 5

Mean observed ratio compared to registered ratio

Mean observed ratio compared to registered ratio	Number of nurseries
More relaxed	6
Same	6
More strict	38
Total	50

4.2.5 *Variability in the type of service provided*

Although they were all private/independent sector nurseries employing a qualified teacher and nursery assistant, nurseries in the sample provided a range of services. For example, as shown in Table 6, a large degree of variability was found in the daily opening hours and the number of weeks open per year. The hours a nursery is open each day has important implications for the implementation of adult:child ratios. Firstly, short sessions where children only attend nursery for mornings or afternoons reduces the element of *care* required. Provisions such as lunch are not required. This reduces the additional duties required of staff, thereby allowing them to spend more time in direct contact with the children. Secondly, nursery opening hours impact on staff working hours and breaks. When nurseries are open for long hours each day, staff are more likely to work on a shift basis. In addition, qualified teachers often do not expect to work outside ‘school hours’ and school ‘term-time’ This leaves a period of time before and after school hours, during lunch breaks, and during school holidays where there is no qualified teacher present. In settings that are open for long periods each day, juggling numbers of staff and children to maintain adult:child ratios is a salient issue.

Table 6

Variability in the number of operating weeks per year and opening hours per day

Weeks open per year	Opening hours			Total
	Full day	School hours	Half day	
All year	34	0	0	34
School term	2	7	7	16
Total	36	7	7	50

4.2.6 *Deployment of qualified teachers*

Settings varied a great deal in terms of the way in which their qualified teacher was deployed. In some, teachers spent all their time in contact with the children. In others, teachers spend most of their time fulfilling managerial duties. In full day care (generally operating from 8am to 6pm, 50 weeks a year; 36 of the total sample of 50 nurseries), three different approaches to teacher deployment were observed. First, in some settings, teachers provided specific ‘education sessions’ during school hours of the school term. During the remainder of each day (i.e. during lunch, before and after school hours) and during the school holidays, the nursery provided day care or ‘wrap around care’ for the children. Second, whilst the teacher was in the room (generally for school hours during term time), they interacted with the children as all other members of staff with no specific ‘education sessions’. Third, in one setting, the teacher provided training and curriculum advice for nursery staff rather than interacting directly with the children.

4.2.7 *Auxiliary staff*

Another factor found to vary between nurseries was the number of auxiliary staff employed. In some situations, there were no auxiliary staff employed, Staff counted in adult:child ratios were required to perform duties such as meal preparation and answering the phone that took their attention away from children. In other situations, there were auxiliary staff employed that were not counted in adult:child ratio calculations. Auxiliary staff performed duties such as office management and the preparation of snacks and lunches.

This had an impact on the number and type of duties that teachers and nursery assistants were required to undertake which, in turn, influenced the amount of time that qualified staff spent with children. Table 7 provides a summary of the auxiliary staff employed in the nurseries visited during phase 1 of the project. Guidance given in the Children Act 1989 specifies that adequate support staff should be employed by full day care facilities, and the ratio of 1:8 for sessional care is based on the assumption that staff will be in direct contact with the children for the whole session. The new regulations for day care settings provided by the National Standards state that the adult:child ratio relates to staff working directly with the children. However, for sessional facilities, this is not stated. The National Standards state that additional auxiliary staff may be required.

Table 7

Auxiliary staff employed in nurseries visited during phase 1

	Auxiliary staff			Total
	None	Some (1-2)	Many (3 or more)	
Sessional nursery	7	0	0	7
Nursery school	1	3	3	7
Day nursery	5	21	10	36
Total	13	24	13	50

4.2.8 *Nursery premises and outdoor space*

The nurseries visited during phase 1 of the project varied widely in the type of building used and outdoor space available. Some nurseries shared premises with other community groups such as playgroups and sports groups. In many of these situations, the nursery was unable to leave activities or even chairs and tables set up overnight as the rooms were being used by other groups. Many of the nurseries visited were housed in converted premises, often houses, sometimes on the lower floor of a home, and in some cases, in churches. These nurseries often had several rooms

rather than one large space. This raised issues concerning adult:child ratios when total floor space in a room limited the number of children allowed. Often two members of staff were required for a limit of 12-16 children in any one room. Other nurseries had purpose built facilities providing fewer restrictions on the total number of children in any one room.

4.2.9 Nurseries also varied in the provision for outside space. Some nurseries had no outdoor space; in one situation, children were taken to a local public playground. Other nurseries provided a very small outdoor space, often only a concrete area. The majority of nurseries visited had either a garden-like outdoor area or a 'school-like' playground.

4.3 Providers' response to relaxing ratios

4.3.1 Providers were generally not enthusiastic about the prospect of operating relaxed ratios. Interviews with managers, teachers and nursery staff during phase 1 highlighted various concerns about relaxing ratios and the impact on children's development. In particular, staff voiced the following concerns.

- There would be less time for staff to devote to children's learning; more time would be taken for discipline and general control.
- Dealing with the unexpected would cause greater disruption to the whole group.
- May reduce the choice and variety of activities, especially time consuming activities such as cooking and messy activities such as art and craft, water and sand play.
- Would reduce outdoor play and field trips.
- Larger groups may mean a more disciplined approach.
- Children may miss out on important one-to-one attention from adults.
- Relaxed ratios may result in parental dissatisfaction with the provision.

4.3.2 During phase 1, staff were asked what their preferred adult:child ratio would be for 3- to 5-year-old children. Generally, staff expressed they would prefer adult:child ratios of 1:8 and in some situations 1:10; there was little

support for adult:child ratios of 1:13. In some situations, staff expressed the view that they would prefer to operate ratios more strict than 1:8 but would like to retain the 1:8 ratio in legislation, giving them the flexibility to operate between a ratio of about 1:6 and 1:8 depending on the number of children present and the type of activity.

4.3.3 *Comments made by staff during phase 1*

“Would be concerned because of the difficulties which would arise from staff cover. At present there are three staff for 21 children but the shifts operate in such a way that in fact for the majority of the time there are two staff with the children – if ratios are relaxed it would mean that one member of staff would more or less be out of the room due to breaks etc leaving one staff member with the children.”

Optimal ratio: “1:8 works – because the children are a bit more independent (than the under 3’s) so there’s room for one-to-one time plus independent play.”

Nursery Manager (of a day nursery run by a nursery chain)

“With stricter ratios, and smaller groups, you can provide a much better quality of teaching. The curriculum can be implemented in more creative ways. Certain teaching techniques that are taught in training courses can only be used in small groups.”

Optimal ratio: “No more than 1:8 for 3-to 4-year-olds; 1:10 for reception.”

Teacher (day nursery)

“It may be possible to operate more relaxed ratios with a more structured activity plan. However many 3-year-olds and some 4-year-olds are not yet ready for a fully structured day.”

“The staff have more roles to play in the nursery. They have to keep the hygiene, keep the place clean. There is a cleaner that does general cleaning but staff must maintain the hygiene in their rooms, for example cleaning tables and floor after dinner.”

“The only positive I can see for relaxing ratios is that it will enable better wages for nursery staff but they will be required to do more.”

Optimal ratio: *“1:8, if a level playing field is required then it should be 1:8.”*

Manager (day nursery)

“..because of their age, they are so young, wouldn't get personal attention if ratios were relaxed – kids do better with more attention.”

Optimal ratio: *“1:6 – 1:8 would be fine. They do need to discover their peers and own individuality as well as being safe and stimulated by adults.”*

Teacher (day nursery)

“I don't think they should be relaxed. Some children need more attention and some are independent, with the ratios as they are (1:8) we can take time out to support the children that need it.”

Nursery assistant (day nursery)

“Don't think it's (relaxing ratios) a good idea. At this age they need individual attention - there are several special needs children and they need more physical attention. Equally the non special needs children also need attention.”

Optimal ratio: *“1:5 – 1:6 is fairly good – there's a chance of being able to interact. It's our responsibility to listen to the children and more children per staff wouldn't enable us to do that.”*

Nursery assistant (sessional nursery open for morning only)

“It's (relaxing ratios) not going to work. We're able to talk and listen with the children. I have worked in the state sector and there's not enough time because there's so much organising to do. In this environment it's possible to prevent a lot of accidents happening.”

Optimal: ratio *“1:5 – gives time for each child and for every eventuality – accidents and the toilet etc. At this stage it's all about talking and listening with the children. At 1:13 it would be impossible.”*

Teacher (sessional nursery open for morning only)

“The physical setting is important. One large room allows one adult to be able to supervise more children but one large room is a bit boring. As soon as areas are divided off you need more adults, much like our setting which is spread over various rooms.”

“The higher number of staff allows us to cover one another for sickness which is more efficient than using agency staff.”

“More adults allow a broader curriculum to be implemented, this can have more variety and be richer. More adults allow spontaneity e.g., being able to take the children for walks safely on the spare of the moment.”

Optimum ratio: “1:8 to achieve a rich learning and caring environment for children. Could go to 1:10 but would be very dependent on individual factors as outlined above, definitely no higher (more relaxed) than 1:10. Any higher and the children start to miss out on important experiences.”

Teacher/manager (nursery school)

4.3.4 *Comments made by staff from nurseries that relaxed ratios for phase 2*

Nursery A - background

Normally this day nursery had 3 staff members working with 19-20, 3- to 4-year-olds (a ratio of 1:7). Rather than relax ratios for the purpose of this project, the nursery invited us to visit on a morning when one member of staff was absent to do the ‘nursery shopping’. This absence occurred one morning each week. On the morning of our visit, two members of staff (one teacher and one nursery assistant) were working with 19 children.

Have things changed since you relaxed your ratios?

“Yes – the atmosphere isn’t as nice, a lot more stressed. There’s more to get through with only two staff, don’t have as much time with the children. When accidents happen or little things need doing then there’s only one staff member in the room.”

Have you changed your planning and organisation?

“No – have kept the planning the same as to not disrupt the children. Have just increased the group size for language and letters when the 3rd member of staff is away.”

Have you changed the type of daily activities?

“No – have 2 groups instead of 3, but activities are the same.”

Do you think your planning and activities would change if you were to operate relaxed ratios indefinitely?

“Yes – would have to change group sizes. There would be fewer messy activities.”

What do you think about relaxing ratios now you have tried it?

“Having done 1:10 I don’t feel it works. For the age of the children the groups are too large. Staff are unable to give the level of support that the children need. Also if there’s an accident it only leaves one member of staff.”

What do you think is the optimum ratio?

“3:19 works well for us.”

Teacher

Nursery B - background

Normally this day nursery had three staff members working with 18-25, 3-to- 4-year-olds. However, the 3- to- 4-year-old room was part of a large nursery, and staff were sometimes moved between rooms to maintain ratios, so on occasions there were maybe four members of staff. For the purposes of our project, a ratio of 1:10 was operated for the 4 weeks prior to our visit. This was achieved by having 2 to 3 members of staff working with the 3- to-4-year-olds depending on the number of children in the room.

Have things changed since you relaxed your ratios?

“Yes – we also have three new children in the room who require extra attention. There has been a decrease in creative/messy/art work. It is much more difficult for the teacher to spend one-to-one time with each child.”

“There has been no increase in the number of accidents according to our accident records”

Have you changed your planning and organisation?

“Not really – but feel like I have to rush to get activities done – children have less time with an adult.”

Have you changed the type of daily activities?

“Not really but would have to in the long-term.”

Do you think your planning and activities would change if you were to operate relaxed ratios indefinitely?

“Yes. Would have one work table with one member of staff all day, each child would have to visit the table each day therefore there would be much less flexibility and ‘ad hoc’ teaching. There would be fewer creative and messy activities. More structure

would remove the FUN factor to learning which is very important for such young children.”

What do you think about relaxing ratios now you have tried it?

“Do not agree with it for a private setting such as this. This is very different to a state class where the teacher has time away from the children (during morning break and lunch) to set up activities, here activities have to be set up whilst occupying the children.”

What do you think is the optimum ratio?

“1:8”

Teacher

4.3.5 *Examples highlighting contrasting views to relaxing ratios*

The following two case-study examples illustrate two different responses to relaxing ratios. Both nurseries were open for school hours during term-time and participated in phase 2 of the project.

Nursery C

Premises: Nursery C was in a converted primary school classroom leased from a school. The large classroom had been partitioned with walls to provide three distinct work areas for the children, whilst still allowing children to move freely between the areas. The nursery had its own outdoor playground, toilet facilities and the use of the school indoor hall.

Opening hours: 8.30am to 4.00pm, school term only. Children could attend any number of hours per week.

Registered ratio as stipulated by local authority: 1:5

Staff: On a normal morning, two qualified teachers (who were also co-owners of the nursery) and one nursery assistant, (during busy times, the nursery also had an additional part-time teacher and nursery assistant) worked directly with 15, 3- to- 5-year-old children, a ratio of 1:5 as stipulated by their local authority. Staff jointly supervised all areas of the nursery. The nursery did not employ any auxiliary staff; the adjoining

school supplied a hot lunch.

Phase 2 - relaxing ratios: The nursery agreed to participate in phase 2 of the project. The nursery managers did not support relaxing ratios but believed it important to demonstrate why. The nursery did not relax ratios for the four-weeks prior to the researchers visit, but relaxed the ratios for the morning of the visit.

On the morning of the phase 2 visit, the nursery had two teachers (who were also co-owners/managers of the nursery) and 15 children (a ratio of 1:7.5). A small group of about four children worked directly with one teacher for short sessions throughout the day concentrating on letter or number games. The remaining children were encouraged to participate in the many other activities available, such as painting, books, blocks, home corner, water, sand, cut and paste, and drawing. The majority of management duties were completed outside nursery hours; however, at times, one of the managers was required to attend to management duties during nursery hours. This left one teacher in the room with 15 children.

Staff comments:

“In our case three staff members work better than two. For example, a ratio of 3:21 (1:7) would work much better than a ratio of 2:14 (1:7). This is primarily due to the layout of our space. The layout of our space has many advantages that we wouldn't change.”

With relaxed ratios - “As a staff member you start to take on a more ‘managerial/care role’ rather than a ‘doing’ role. You have less time to actually get involved with the children and participate and direct their play. You lose focus time with the children.”

“We sometimes use the school hall, one staff member would take a small group of children in there for indoor games – we couldn't do that this morning because it would have left one staff member to cover all three areas of the nursery.”

“If we were to have two members of staff indefinitely our planning would take on a more ‘supervision’ stance rather than a ‘doing’ stance. Over time we would probably lose the number of ‘messy’ activities on offer.”

“Would like to be able to work at a ratio of 3:24 (1:8) rather than the 1:5 we are required to at the moment. It would give us the flexibility to vary between a 3:15 and 3:24 ratio, depending on the time of the year (September term children need more adult support than May term). We do not support a ratio of 1:10 or 1:13.”

Nursery D

Premises: Nursery D was situated on the ground floor of a large Edwardian home. The nursery had its own large garden and a converted garage used as a gymnasium. The 3- to- 4-year-old children had the use of the two connecting rooms. Each room was relatively small.

Opening hours: 8.00am to 3.15pm, school term only. Children attended for ‘whole day sessions’ only, with a minimum of two-days per week.

Registered ratio as stipulated by the local authority: 3:20

Staffing: On a normal day, one qualified teacher and two nursery assistants worked directly with 20, 3- to- 5-year-old children. The local authority initially required the nursery to have a minimum of 2 staff in each room creating an adult:child ratio of 4:20 (1:5). In addition to the staff working directly with the children, the nursery had a manager/owner and a full-time nursery co-ordinator. In light of the additional staff employed and through negotiation with the local authority, the nursery was registered to operate with three staff (working directly with the 3- to- 5-year-old children) over the two rooms.

Phase 2 – relaxing ratios: The nursery agreed to participate in phase 2 of the project, and relaxed ratios to 1:10 for four-weeks prior to our visit. Due to the nursery’s small rooms, they were limited to having a maximum of 10 children in each room (a total of 20 children). For the purposes of our project, they reduced staff members to one teacher and one nursery assistant, i.e. a ratio of 1:10. Due to the support given by the additional staff, the teacher or nursery assistant did not leave the room. The additional staff

covered the teacher and nursery assistant during lunch breaks. The teacher did not feel that activities had changed at all and planning was still completed in the same manner.

Staff comments

“The ratio of 1:10 works very well for us, because:”

1. Children in the three- to five-year-old room all start at different times. If the teacher had to deal with all new three-year-olds at once 1:10 might not work.
2. Operate short opening times so no problems with staff working shifts.
3. Have highly qualified and efficient staff that work well together.
4. A great amount of additional support, from nursery co-ordinator (greet parents, answers the phone, prepares snacks and lunch, prepares resources, covers staff absences) and manager (completes management administration, covers lunch breaks, talks to parents).

“In our situation having two members of staff works better as staff are less likely to trip over one another in such small rooms.”

“We support ratios of 1:10 but not 1:13. However flexibility needs to be used when considering the regulation of ratios. There is a large variety of settings and what works for one may not work for another.”

4.4 Short and long term effects of relaxing ratios

- 4.4.1 Due to such small numbers of nurseries operating relaxed ratios during phase 1, and the small number of settings agreeing to relax ratios for phase 2 of the project, statistical comparisons of the groups were not justified. During discussions with nursery staff, staff generally made the comment that they would be able to cope and make-do with relaxed adult:child ratios for the short term. However, they expected that over time, there would be a reduction in the quality of care and education, especially the number and variety of activities on offer to children. It was suggested that large group activities might replace time spent in smaller groups and 1-to-1 interactions.

4.5 Specific objectives as outlined in original project proposal: A preliminary study of relationships between ratios and quality

4.5.1 The main original aim of the project was “*to undertake an evaluation of 50 settings in the private and voluntary sector providing sessional care that are operating under relaxed ratios*”.

4.5.2 As outlined in section 2 of this report, it appears that very few settings in the private/independent sector operate at relaxed adult:child ratios, and there was little support from providers in the private/independent sector to do so. Bearing in mind the unrepresentative nature of the sample, the lack of voluntary sector providers, the size of the sample and the lack of providers operating relaxed ratios, the following tentative conclusions in relation to the five specific research questions outlined in the project proposal can be drawn.

4.5.3 *What impact do adult:child ratios have on the amount of adult interaction with children?*

Research evidence suggests that children learn through effective social interactions (Bruner, 1995; Rogoff, 1990; Smith, 1993). An important feature of high quality early years settings is the extent to which adults participate with children in joint attention. It has been shown that settings in which more episodes of joint attention were observed scored higher on overall measures of quality (Smith, 1999).

4.5.4 Staff expressed the view that relaxed ratios would result in fewer interactions between children and staff. Some nursery staff mentioned that 3- to- 4-year-old children do need to develop relationships with peers and explore their own individuality; however they also require a high level of support from staff. It was generally thought that a staffing ratio of around 1:8 achieved this balance.

4.5.5 It appears that the time that qualified nursery staff spend with the children is dependant on factors in addition to adult:child ratios. The most salient factor appears to be the number of duties required of qualified staff that take their

attention away from the children. It appears that the number and the type of duties performed by auxiliary staff may mediate the relationship between adult:child ratios and the time that qualified staff spend interacting with the children. A couple of staff members remarked that having too many staff may be counter-productive, creating a situation where staff begin to interact amongst themselves at the expense of spending time with the children.

4.5.6 In total, 867 (N=50) episodes of joint attention were recorded across all nurseries (mean = 15.50; minimum = 5, maximum = 36, per nursery). Of the 867 episodes, 351 (40.5%) were with a teacher, 414 (47.5%) were with a nursery assistant, and 102 (12.0%) were with an adult other than a teacher or nursery assistant (e.g. a nursery manager or visiting parent). Of the 867 episodes, 381 (43.9%) were child initiated and 486 (56.1%) were adult initiated (teacher, nursery assistant or other adult, e.g., parent). At the time of observation, the duration of each joint attention episode was categorised into one of four duration bands. Of the 867 episodes, 542 (62.5%) were categorised as lasting less than one minute, 285 (32.9%) were categorised as lasting between one and two minutes, 30 (3.5%) were categorised as lasting between two and five minutes, and 10 (1.1%) were categorised as lasting more than five minutes.

4.5.7 The median observed ratio for each nursery was correlated (using Pearson's correlation co-efficient) with the total number of joint attention episodes observed in each nursery. As shown in Figure 1, a significant negative correlation was found, $r = -0.37$; $n = 50$; $p < .01$ (this remained significant when group size was controlled for, see Appendix E for details). As the observed ratio of adults to children became stricter (i.e. fewer children per adult), the number of joint attention episodes observed increased.

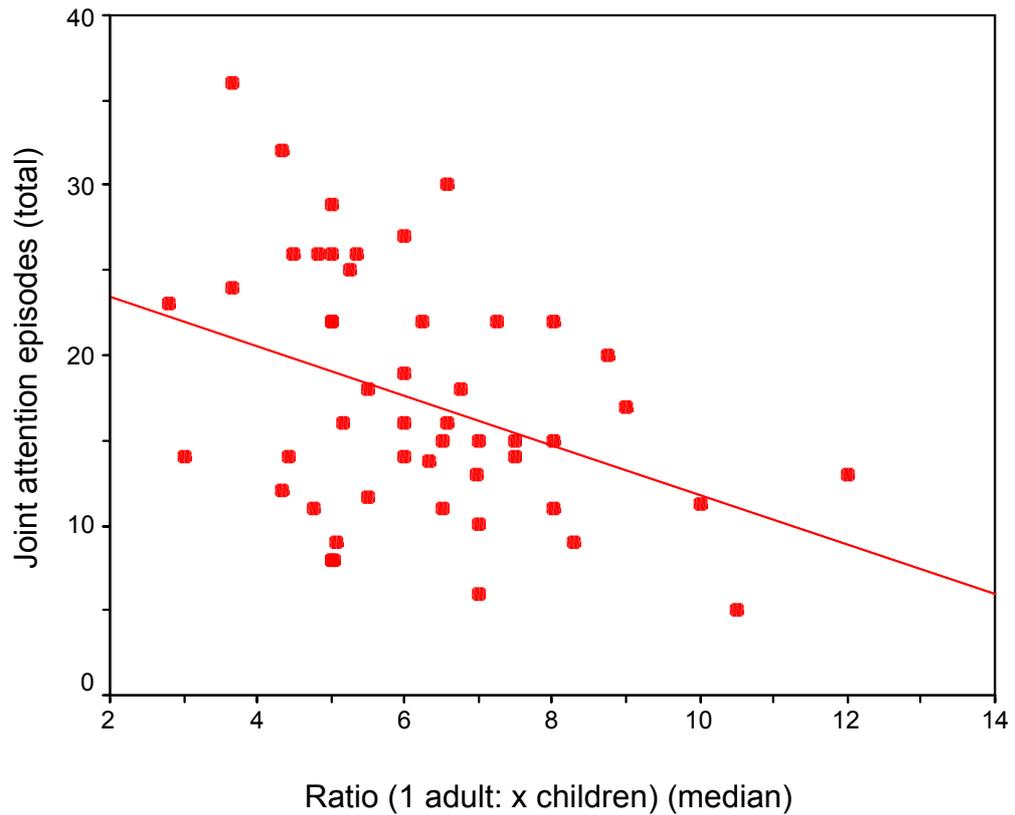


Figure 1. Total number of joint attention episodes and the median observed adult:child ratio.

4.5.8 It is important to emphasise that the relationship between adult:child ratios and joint attention episodes is not independent of other quality indicators such as staff qualifications and group size. The nurseries participating in this project were all selected as employing a qualified teacher and nursery assistant which went some way to controlling for the level of staff qualification. The relationship between observed ratios and joint attention episodes remained significant whilst controlling for group size. Although conclusions drawn here are made tentatively, it appears that joint attention episodes between adults and children may be one factor that plays a mediating role between adult:child ratios and quality of child care and education.

4.5.9 *What impact do adult:child ratios have on the overall quality of service provided?*

Adult:child interactions are a key indicator of quality in early years provision (Munton, Mooney, & Rowland, 1995). Research suggests that varying ratios can have a direct impact on the number and quality of adult:child interactions (Howes, Smith & Galinsky, 1995; Howes, 1997; Russell, 1990, Smith, 1999).

4.5.10 Nursery staff expressed the view that relaxing adult:child ratios may result in a change to the structure of activities. For example, one-to-one time may be replaced with large group activities; staff may spend more time in a supervisory role rather than interacting and participating in the children's activities. Relaxing adult:child ratios may also result in a change in the type and variety of activities available to children; there may be a reduction in spontaneous activities and fewer creative, art or messy activities.

4.5.11 The median observed ratio was correlated (using Spearman's correlation coefficient) with the median TCRU core-question checklist for each nursery. No significant correlation was found. There was therefore no evidence of a statistically significant linear relationship between these two measures.

4.5.12 To investigate the possibility of a non-linear relationship (see Sundell, 2000) between observed ratio and TCRU core-question checklist scores, the nurseries were divided into three groups of similar size based on the median observed adult:child ratio for each nursery. Separate correlations (using Spearman's correlation coefficient) between observed ratio and TCRU core-question checklist scores were performed. As shown in Figure 2, there was a significant negative correlation found for group 3, the nurseries with a median ratio of 1 adult to 7+ children, $r_s = -0.70$; $n = 16$; $p < .01$ (this remained significant when group size was controlled for, see Appendix E). Once the average number of children per adult in the room fell below seven, the observed quality of adult child interactions did not change as a result of ratios of adults to children becoming more strict. Given the small sample, and the existence of outlying scores, the data are not sufficiently robust to

support a claim that a ratio of 1:7 is a critical cut-off point. The data simply suggest that the likely impact of ratios on quality will be more significant where ratios exceed around 1:7. As suggested by Sundell (2000), a non-linear relationship may exist between adult:child ratios and quality.

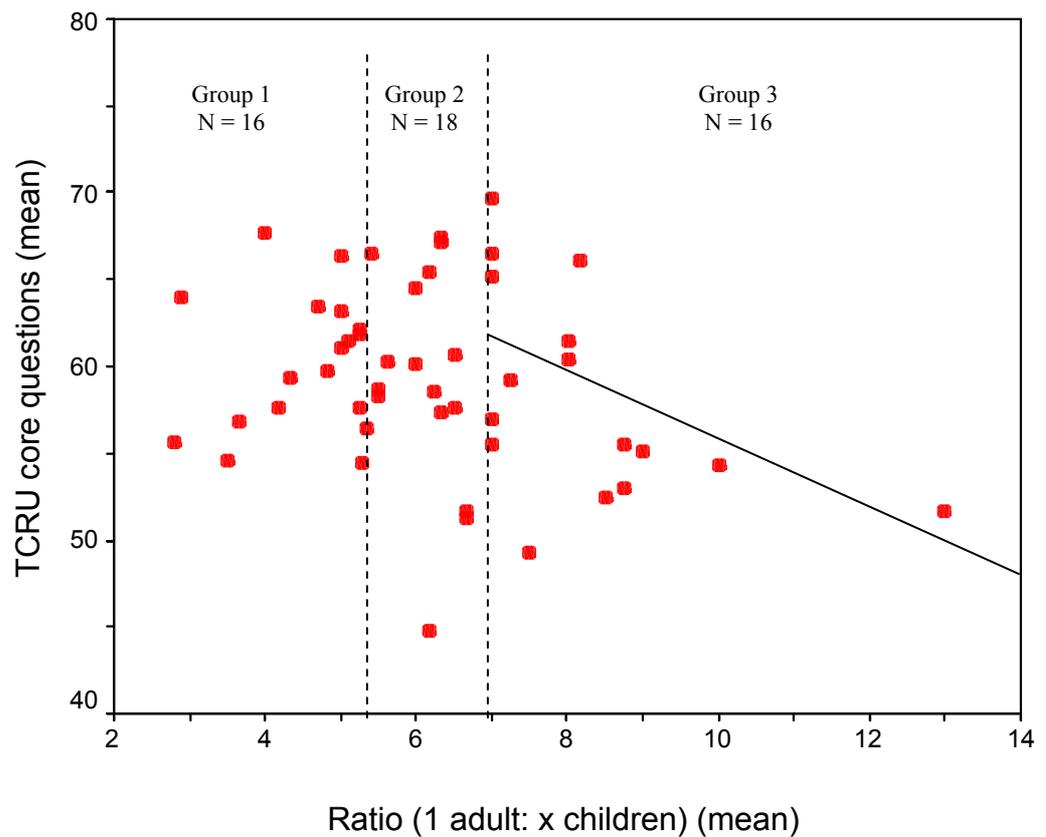


Figure 2. Median TCRU observation checklist scores (core questions only) and median observed adult:child ratio for each nursery.

4.5.13 Again, any conclusions drawn from this comparison need to be made tentatively, taking into consideration the small, self-selecting nature of the sample and the possibility of other mediating quality indicators. However, it is consistent with previous research suggesting that adult:child ratios

influence the quality of interactions between children and staff, and it suggests that this relationship may be non-linear in nature.

4.5.14 *What is the relationship of other variables (e.g., staff training) with service quality, and how do these interact with ratios?*

Research evidence suggests that adult:child ratios influence the quality of care and education provided by early years services (see the literature review in this research report). When staff work with fewer children, they are able to provide sensitive, responsive care. However the influence of adult:child ratios cannot be considered independently of other variables such as staff education and training and group size which are also indicators of service quality.

4.5.15 All the nurseries in this study were selected because they employed a qualified teacher *and* qualified nursery assistant, as reported by management during an introductory phone call. However, despite management reports, the recording of staff qualifications during nursery visits did highlight some variety of qualifications held by teaching staff and nursery assistants working in early years daycare provision.

4.5.16 Teaching qualifications across nurseries were all equivalent to NVQ Level 4. However, in two settings, the ‘qualified teacher’ was not in fact a qualified teacher but held a degree. There was some variety in the specific qualifications held by teachers as shown in Table 8.

Table 8

Variation in qualifications of teachers in nurseries visited during phase 1

Qualification	Number of teachers
Post Graduate Certificate in Education (PGCE)	16
Certificate of Education (Cert. Ed.)	14
Bachelor of Education with Honors (BEd (Hons))	5
Diploma of Education (Dip. Ed.)	5
Bachelor of Education (BEd)	4
Montessori teacher training	2
Bachelor degree other than BEd, e.g., BSc BA	2
Foreign Qualified teacher status	2
Total	50

- 4.5.17 In the 50 nurseries visited during phase 1, despite management reports during recruitment, two of the lead ‘nursery assistants’ were either not qualified or had a non-childcare qualification. In the remaining 48 nurseries, the lead nursery assistant was qualified to NVQ Level 2 or above (see Table 9).

Table 9

Variation in qualifications of lead nursery assistant in each nursery visited during phase 1

Qualification	Number of lead nursery assistants
NVQ3 or equivalent (e.g., NNEB)	33
NVQ2 or equivalent (e.g., Btech)	6
Other childcare qualification	2
Other non-childcare qualification	1
No qualification	1
Total	50

- 4.5.18 Group size may be another factor that influences quality and interacts with ratios. Both the total number of children in a room and the number of children in each small group activity may play a role in quality. In the 50 nurseries visited during phase 1, the mean number of children in a room was

16 and ranged between 8 and 23; the average small group size across all nurseries participating in phase 1 was 10 and ranged between 5 and 17. Total group size may be influenced by the nursery premises as highlighted by nursery D where two small rooms were limited to having only 10 children in each room.

4.5.19 In addition to staff qualifications and training, and group size, the total number of staff and auxiliary staff are other variables that may influence service quality and interact with adult:child ratios. The total number of staff (influenced by the overall size of the nursery) can allow flexibility in staffing numbers working with any one group of children. Duties performed by auxiliary staff will influence the time teaching staff spend interacting with children. The physical layout of the nursery premises, room size and room organization all play a part in determining ideal group size and hence adult:child ratios.

4.5.20 *What impact do adult:child ratios have on child protection and safety?*

Although mentioned by staff, child protection and safety was not expressed as a large concern when relaxing ratios to 1:10 or 1:13. Child safety during outdoor activities was raised as a possible concern. However, extreme ratios (more relaxed than 1:13) may very well have an impact on child protection and safety.

4.5.21 We found no evidence of any significant relationship between the adult:child ratios observed during phase 1 and questions on the TCRU Observations Checklist which relate to child protection and safety. However this is not to say that extreme ratios (ratios more relaxed than observed in this project) may not have an impact on child protection and safety. It is also important to note that nurseries visited during phase 1 of the project were subject to health and safety regulation and annual inspections by Social Services. The regulations imposed by Social Services may well outweigh the influences of adult:child ratios on children's protection and safety.

4.5.22 *What other factors impact on the development of children in settings with relaxed adult:child ratios?*

The deployment of staff seemed to be a key factor influencing the quality of care environments in nursery settings. Observations during phase 1 of the project indicated that qualified teachers might take various roles within a nursery setting. Whether the teacher predominately provides one-to-one help to individual children or provides a more general role influences the adult:child ratio that children experience. In addition, where settings employed specialist staff to undertake domestic duties, ratios were more likely to remain constant over the course of a day. Relaxing ratios may have an impact on the ability of private and voluntary settings to employ domestic and other auxiliary staff. One might speculate that were private settings able to operate with fewer trained childcare staff, the resulting reduction in total wage costs could encourage greater use of support staff. Because care staff would have more contact time with children, they would be more likely to provide a better quality environment for children. However, in the absence of hard evidence, this remains only speculation for the moment.

Section

5 Summary and conclusions

5.1 Private/independent provision operating relaxed ratios

5.1.1 The research team experienced difficulties recruiting any private/independent nurseries operating a adult:child ratio of 1:13. Despite the guidance given in the *Children Act 1989 Guidance and Regulation (Vol. 2)* allowing local authorities to vary adult:child ratios requirements for private and voluntary nurseries to that seen in maintained sector nurseries, it appears that very few do so. Local authorities that were approached with regard to nurseries relaxing adult:child ratios for the purpose of the project also showed reluctance.

5.2 Providers' response to relaxing adult:child ratios

5.2.1 Providers in the private/independent sector were generally not enthusiastic about relaxing adult:child ratios. In most situations, providers said they would prefer to operate at adult:child ratios of 1:8 and in some cases 1:10. There was very little support for adult:child ratios of 1:13. In some situations, staff expressed the view that they would prefer to operate ratios more strict than 1:8; however, at the same time, they expressed a desire to maintain legislation at 1:8 to provide them with some flexibility. Some providers did express concern about the disparity of regulation between local authorities. The implementation of the National Standards by OFSTED in September 2001 may reduce this disparity.

5.3 Variability within private/independent nursery provision

5.3.1 The group of nurseries visited by the research team varied on several parameters; although all nurseries were private/independent settings employing a qualified teacher and nursery assistant, a great variety and diversity of settings was encountered.

1. Adult:child ratios requirements stipulated by different local authorities varied between 1:5 and 1:13.

2. Adult:child ratios experienced by children varied considerably both within and between nurseries. Single observations varied between 1:1 and 1:27; mean ratios (across 20 observations) varied between 1:3 and 1:12.
3. Differences between the adult:child ratio at which a provision was registered to operate and the observed adult:child ratios (those experienced by the children) were observed. Out of the 50 nurseries participating in phase 1 of the project, six were observed to operate more relaxed ratios, 38 were observed to operate more strict ratios, and six were observed to operate the same adult:child ratios as those stipulated by the local authority.
4. A large degree of variability was found in the daily opening hours and the numbers of weeks the nurseries were open each year. Some providers were open for morning sessions only, others were open during school hours during school term-time, and others were open from 8am to 6pm for 50 weeks a year.
5. The role taken by the qualified teacher varied between nurseries. In some settings, teachers spent all their time in contact with the children. In others, teachers spend most of their time fulfilling managerial duties. There was also a variety of approaches to teaching taken by the qualified teachers. In some cases, the teacher spent a majority of their time providing one-to-one attention to children. In others, the teacher interacted with the children as all other members of staff were doing. In addition, the hours worked by teachers interacted with the hours a nursery was open. In some nurseries that were open all day, 50 weeks a year, the teacher was not always present. This presents difficulties for the administration of adult:child ratios.
6. Nurseries varied in the number and type of auxiliary staff employed. This had an impact on the number and type of duties that teachers and

nursery assistants were required to undertake which, in turn, influenced the amount of time that qualified staff spent with children.

7. Nurseries occupied a variety of different buildings, each with a different layout; some had multiple small rooms and others were open-plan and purpose built. This raised issues concerning adult:child ratios when total floor space in a room limited the total number of children allowed.

5.4 Ratios, adult child interactions and quality

5.4.1 Adult child interactions are a key indicator of quality in early years provision (Munton, et. al., 1995). An important feature of high quality early years settings is the extent to which adults participate with children in joint attention. Research suggests that varying adult:child ratios can have a direct impact on both the number (Smith, 1999) and the quality of adult child interactions (Howes, et. al., 1995; Howes, 1997; Russell, 1990).

5.4.2 This was supported by views expressed by private nursery staff. Staff expressed the view that more relaxed adult:child ratios would result in fewer interactions with children. It appears that the number and type of duties performed by auxiliary staff may be one factor that mediates the relationship between adult:child ratios and the time that qualified staff spend interacting with children.

5.4.3 Staff expressed the view that relaxed adult:child ratios would not only result in fewer adult:child interactions but also the type of activities on offer to the children would change. Staff predicted that long-term changes in adult:child ratios would result in one-to-one interactions between children and staff being replaced by group activities. Staff would spend more time on supervision and less time interacting with the children. Relaxed ratios would reduce the opportunities for spontaneous activities and fewer creative, messy, art type activities would be available to the children.

5.4.4 Through daylong observations in the 50 nurseries that participated in the first phase of our study, we found a significant linear relationship between

the observed ratio of adults to children and the number of adult child interactions. More strict adult:child ratios were significantly correlated with greater instances of joint attention episodes. Children were more likely to get individual attention from adults if there were fewer children to each adult in a setting. However it is important to stress that although staff qualifications were relatively consistent between the nurseries participating in phase 1 of the project, many other quality indicators were not. Therefore the conclusions drawn about the relationship between adult:child ratios and numbers of joint attention episodes are made tentatively. However they are consistent with the relationships expressed by staff and suggested by previous research (see the literature review in this research report).

5.4.5 A significant non-linear relationship was also found between adult:child ratios and the quality of the interactions seen between the children and staff as measured by the TCRU observation checklist. Once the average number of children per adult in the room fell below seven, the observed quality of adult child interactions did not change as a result of ratios of adults to children becoming more strict. Given the small sample, and the existence of outlying scores, the data are not sufficiently robust to support a claim that a ratio of 1:7 is a critical cut-off point. The data simply suggest that the likely impact of ratios on quality will be more significant where ratios exceed around 1:7. Although tentative, the observed relationship is supported by previous research suggesting that adult:child ratios influence the quality of interactions between children and staff.

5.5 Factors to consider when examining legislation on adult:child ratios

5.5.1 Research evidence does suggest that varying adult:child ratios may have a direct impact on the quality of childcare and education provided in pre-school settings (Howes, et. al., 1995; Howes, 1997; Russell, 1990, Smith, McMillan, Kennedy & Ratcliff, 1989). However the relationship between ratios and quality is complex. The influence of adult:child ratios is linked with many other predictors of good quality childcare. Below is a summary of the recommendations made as a result of our literature review, and also of some important factors we have identified from this project that we suggest

might be considered when examining legislation on adult:child ratios. These factors have been identified from preliminary statistical analyses and from the views of managers and staff. They would need to be substantiated by further research.

5.5.2 *Recommendations made as a result of our literature review*

1. National Care Standards should include clear regulations concerning staff:child ratios in services for pre-school and school-aged children.
2. National Care Standards should not relax, unconditionally, staff:child ratios recommended in guidance in the 1989 Children Act.
3. National Care Standards might usefully make recommended staff:child ratios contingent on staff qualifications.
4. National Care Standards should include clear recommendations concerning group size.
5. National Care Standards should link specific adult:child ratios with recommended group sizes.
6. National Care Standards should include clear regulations concerning staff education and training.
7. National Care Standards should address the issue of in-service training for childcare workers.
8. National Care Standards concerning training should distinguish between care staff and managers.

5.5.3 *Additional issues arising from this project*

In addition to the recommendations made as a result of our literature review, the following factors have been identified from this project that we suggest might be considered when examining legislation on adult:child ratios.

1. The adult:child ratio at which a provision is registered to operate and the observed adult:child ratio (i.e. the ratio experienced by the children) may often differ. Regular monitoring should ensure that operating ratios correspond to registered ratios.
2. In addition to making recommended staff:child ratios contingent on staff

qualifications, it is important to consider the proportion of time that qualified teachers and staff spend working directly with the children.

- With the increasing integration of ‘care’ and ‘education’ services, it is important to consider staffing levels when the working hours of the qualified teacher do not correspond directly to the opening hours of the nursery. For example, when a qualified teacher works during school hours for the school term and the nursery is open from 8am to 6pm 50 weeks a year. The level of staff qualification may vary throughout the period of a day.
 - The specific role taken by the qualified teacher has implications for the relationship of the teacher to adult:child ratios. For example, a teacher providing predominately one-to-one sessions has a different implication for adult:child ratios than a teacher that takes a more general role and interacts as all other members of staff do.
 - Additional duties and staff responsibilities outside of the classroom also influence the time that qualified staff spend in direct contact with children. This may be mediated by the support provided by auxiliary staff.
3. The physical layout of the nursery premises, room size and room organisation may all play a part in influencing possible effects of group size and ratios on quality. Adult:child ratios that are appropriate in one situation may be impractical in another.
 4. The type of outdoor provision may also influence the level of supervision required. For example when public parks are used for outdoor activities, a higher level of adult supervision is needed in comparison to enclosed playgrounds attached to nursery premises.

5.5.4 Although regulation of staffing ratios is essential, regulation needs to be flexible enough to recognise that there is great variability in provision of

early years education and care. Many of these factors are unique to different types of provisions and, to a certain extent, each type needs to be examined separately.

5.6 The level playing field

5.6.1 Our observations suggest caution when it comes to assuming a level playing field exists between private, voluntary and maintained sector settings that employ a qualified teacher and a nursery assistant. Variability on all of the parameters listed above has been a common feature of the nurseries we have worked in. It appears that the term ‘level playing field’ is an inaccurate description when applied to the private sector. To provide all children with comparable experiences of quality nursery care and education, the regulation of adult:child ratios needs to be considered in conjunction with group size, staff qualifications and the time staff work directly with the children, taking into consideration the unique variables characterising early years settings in England.

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Appendix A Measures

A1 Thomas Coram Research Unit (TCRU) Observation Checklist

A1.1 As an overall measure of quality, the *TCRU Observation Checklist* was used (Mooney, et. al., 1997) (see Appendix B). This measure was developed as part of an ongoing project to assess and improve quality in day care settings. It was designed specifically to monitor the quality of adult-child interactions. The *TCRU Observation Checklist* has been used in over one hundred nurseries. The measure has good face validity and provides scores that are consistent with an established measure of quality: the Early Childhood Environment Rating Scale (ECERS; Harms & Clifford, 1980).

A1.2 The *TCRU Observation Checklist* is comprised of 4 sections.

1. *Core questions*: a set of 16 core questions each relating to good quality childcare (e.g. Do adults verbally praise and reinforce children?). The core-question checklist is completed after a 5-minute observation period of a small group of children and a member of staff. Each question is scored on a 5-point scale (5 = happened for the whole 5-mins; 1 = never happened during the 5-mins). Throughout the period of the visit to each nursery, 10 core-question checklists were completed, including one during mealtimes, one during a personal care routine (e.g., visiting the toilet or washing hands before lunch) and, where possible, one during outdoor activities.
2. *General questions*: a set of 11 general questions about children's activities and interactions (e.g. Are some periods during the day provided for children to choose their own activities?). One set of general questions was completed at the end of each visit.
3. *Physical environment questions*: a set of 23 general questions about the physical environment of the nursery (e.g. Is there sufficient space for children to play freely?), and a set of 4 general questions about the

outside area. One set of physical environment questions was completed at the end of each visit.

4. *Dealing with distress and discipline questions*: a set of seven questions about the way adults deal with discipline and with upset children (e.g. Are children helped to understand why their behavior is undesirable?). One set of distress and discipline questions was completed at the end of each visit.

A2 Joint attention episodes

A2.1 Evidence suggests that children learn through effective social interactions with skilled, usually adult partners (Bruner, 1995; Rogoff, 1990; Smith, 1993). An important feature of high quality early years settings is the extent to which adults participate with children in joint attention.

A2.2 A joint attention episode was defined as “*when both the adult and child are attending to some activity, object, conversation or game*” (p.89, Smith, 1999). A joint attention episode was deemed to have begun when more than two turns were taken by the adult *and* direct engagement had been shown by the child, e.g. eye contact, nodding of the head or a verbal response. The joint attention episode was deemed to have ended when the adult or child disengaged from the interaction. A checklist was devised based on the criteria for Smith’s (1999) running records of observations (see Appendix C).

A2.3 In each nursery, the researcher chose ten children, at random, from the register at the beginning of the day. Where possible, five boys and five girls, and a mix of three- and four-year-old children were selected. Throughout the day each child was observed for a single 10-minute interval. During the 10-minute interval, the researcher took note of any joint attention interactions that took place between the child and an adult.

A3 Registered and observed ratios

A3.1 The adult:child ratio with which the nursery was registered to operate was obtained via management report. In addition, researchers recorded the number of staff and children present in the room at the beginning of each TCRU core-question checklist and at the beginning of each joint attention observation. All staff interacting with the children were counted. Any adults that were in the room observing and not interacting with the children were not counted. In this manner, the *observed* ratio of adults to children in the room was recorded 20 times throughout the period of the visit.

A4 Pre-School Behaviour Checklist (PSBC) (McGuire & Richman, 1988)

A4.1 The Pre-School Behaviour Checklist (PSBC) (McGuire & Richman, 1988) was used as a measure of child behaviour. The PSBC is a 22-item questionnaire that asks teachers to rate the frequency and severity of problem behaviour in young children, such as concentration, toileting, social skills and disobedience. From each nursery, six children (3 females and 3 males) were randomly selected from the register by the researcher. Teachers were asked to complete one PSBC for each of the six children and return them to the research centre. Seventy-four percent of teachers returned the six completed Pre-School Behaviour Checklists. PSBC checklists were coded according to the PSBC Handbook (McGuire & Richman, 1988).

A5 Staff interviews

A5.1 The manager, qualified teacher and the nursery assistant/s from each nursery were interviewed using a semi-structured interview procedure (see Appendix D). Interviews were conducted throughout the duration of the visit at the convenience of the staff. To minimise formality, interviews were not audio-taped, but researchers noted the answers and comments made by staff at the time of the interview.

- A5.2 The manager, qualified teacher and the nursery assistant/s were all asked for information concerning their qualifications, length of service in the field of early years, salary, and length of time at the current nursery. Staff were also asked for their views on relaxing ratios and what they believed the optimum adult:child ratio would be and why. The staff interviews were of a semi-structured nature, and the format of the interview was dependant on circumstances, such as staff availability at each nursery.
- A5.3 Nursery managers were asked additional questions concerning the day-to-day running of the nursery. These included questions concerning opening hours, the number of qualified and unqualified staff, numbers of full- and part-time children on the register, and the cost of a full-time place. Nursery managers were also questioned about eligibility for and management of the Nursery Education Grant.
- A5.4 In addition, qualified teachers were also asked questions concerning the planning and implementation of the curriculum, group sizes, and team meetings, and about their own time-management.

A6 Training and inter-rater reliability

- A6.1 *TCRU Observation Checklist*: Three researchers spent three, two-hour sessions watching the *TCRU Observation Checklist* training video. The video included ten, 5-minute video-clips of interactions between nursery staff and children. At the end of each 5-minute video-clip, researchers individually rated the interaction using the *TCRU Observation Checklist*. Reliability between the three researchers was calculated as [agreements / (agreements + disagreements)] giving an agreement rate of 0.68. Differences between researcher ratings were then discussed amongst the team, and ratings were modified through agreement.
- A6.2 *Joint attention observations*: Researchers spent one morning conducting a total of five observations at a local private nursery affiliated to the university. Researchers selected an individual child at random, and simultaneously observed that child for a ten-minute period. During the

observations, researchers recorded the occurrence of joint attention episodes. After each observation, the researchers discussed their ratings together and reached a consensus over any discrepancies. No formal reliability figures were calculated.

Appendix B

TCRU GROUP DAY CARE OBSERVATION CHECKLIST

1. Core Questions

THE GROUP OBSERVED

Number of Children _____

Number of Adults _____

Gender of Children (F) _____ (M) _____

Number of Children with Special Needs _____

ACTIVITY OBSERVED (Please tick or specify)

<input type="checkbox"/> Gross Motor (eg. bikes, climbing frame, push along toys, etc)	<input type="checkbox"/> Sand/Water	<input type="checkbox"/> Snack/juice time
<input type="checkbox"/> Fine Motor (eg. board games, beads, puzzles, shape sorters, etc)	<input type="checkbox"/> Music	<input type="checkbox"/> Tidy-up time
<input type="checkbox"/> Art Related (eg. paints, dough, crayons, cutting, etc)	<input type="checkbox"/> Group Story Time	
<input type="checkbox"/> Imaginative/Pretend (eg. puppets, home corner, etc)	<input type="checkbox"/> Books	
<input type="checkbox"/> Other (Please specify) _____		

Is the activity Indoor or Outdoor? (Please tick)

CHILDREN'S ACTIVITIES - CORE QUESTIONS	YES						NO					
	5	4	3	2	1	NA	5	4	3	2	1	NA
1 Do adults give appropriate help as and when needed? Score 5 if: Adults are consistently sensitive throughout the observation to children's needs. They can be seen watching children, and intervening when necessary. For example, they demonstrate the use of equipment, toys, puzzles etc, help children with their feeding as required, help infants sit, stand, etc.	5	4	3	2	1							
2 Do adults respond sensitively to children's verbal and non-verbal signals? Score 5 if: Adults can be seen listening to and responding to children's questions; adults respond to the gestures, facial expressions, and sounds that children make; adults approach children who are withdrawn, upset or need help/comforting;	5	4	3	2	1							
3 Are independence and self-help encouraged under proper supervision? Score 5 if: Children are encouraged to do things that challenge them to develop new skills, but adults monitor their progress and provide physical and/or verbal help as required; eg., toddlers are encouraged to walk with buggies etc.; children serve themselves at mealtimes; children are encouraged to get out/put away games and equipment on their own; children are encouraged to dress themselves.	5	4	3	2	1							
4 Do children appear to be engaged in activities? Score 5 if: None of the children being observed can be seen aimlessly wandering around or showing signs of being bored/frustrated by the activity. All children being observed are engaged in what they are doing. Adults do not simply ignore children who appear to be withdrawn.	5	4	3	2	1							
5 Do adults talk positively to children? Score 5 if: No shouting, criticising, sarcasm or threats are heard throughout the observation period. All adults being observed talk to children in positive, warm tones. Voices are not raised unless a child is in physical danger.	5	4	3	2	1							
6 Do adults label objects for children by naming and at the same time pointing to or holding the object? Score 5 if: Adults take every opportunity throughout the observation period to help children recognize objects by deliberately drawing attention to them, naming them and	5	4	3	2	1							

CHILDREN'S ACTIVITIES - CORE QUESTIONS	YES					NO
	5	4	3	2	1	NA
encouraging children to associate the name with the object.						
7 Do adults respond to what children say by encouraging them to develop their comments into a conversation? Score 5 if: Adults take every opportunity to encourage children to provide more detailed verbal responses. Adults elaborate on infant utterances. For example, when an infant says "tractor", the adult elaborates by saying "yes, that is a tractor you are riding"; an infant says "eaten peas", the adult elaborates by saying "yes, well done, you have eaten all your peas".	5	4	3	2	1	
8 Are children asked questions requiring more than yes/no answers? Score 5 if: Adults take every opportunity to ask children "how", "why", "what" and "where" questions to encourage children to think about their activities. Where children have language skills, adults ask children questions that encourage more than "yes" or "no" response.	5	4	3	2	1	
9 Do adults interact with children with positive non-verbal behaviour? Score 5 if: All adults being observed consistently smile, laugh with and listen to children throughout the period. Adults maintain eye contact when talking with children.	5	4	3	2	1	
10 Do adults interact with children at their own physical level? Score 5 if: Adults either crouch down, sit on the ground or on low level seating when talking with children.	5	4	3	2	1	
11 Do adults verbally praise and reinforce children? Score 5 if: Adults consistently make specific and deliberate comments during the observation period that verbally acknowledge and reinforce children's good behaviour and accomplishments.	5	4	3	2	1	
12 Do adults encourage children to listen and talk to other children? Score 5 if: Children are in no way restricted from talking to each other; adults promote turn taking in conversations; adults can be seen asking children to tell other children what they are/have been doing; adults create situations in which children learn from each other by listening and asking each other questions.	5	4	3	2	1	
13 Do adults encourage children to co-operate and share with one another? Score 5 if: Adults can be seen to use every opportunity to encourage children to take turns and share materials/equipment; games/activities are set up in such a way that promotes cooperation between children; children work in pairs or small groups on tasks such as getting out/putting away equipment.	5	4	3	2	1	
14 Do children appear unafraid? Score 5 if: All children being observed do not appear intimidated by either adults or other children, eg they may approach adults, ask for help, initiate conversations and appear relaxed in what they are doing.	5	4	3	2	1	
15 Do children appear to be generally content, happy and enjoying themselves? Score 5 if: All children being observed are for most of the time smiling, laughing and not showing any signs of distress.	5	4	3	2	1	
16 Do adults appear to be generally happy in what they are doing and seem to enjoy being with the children? Score 5 if: All adults being observed appear to be creating a positive, warm atmosphere with the children e.g. adults can be seen smiling, laughing, and being enthusiastic.	5	4	3	2	1	

TCRU GROUP DAY CARE OBSERVATION CHECKLIST

2. General questions

GENERAL QUESTIONS ABOUT CHILDREN'S ACTIVITIES AND INTERACTIONS	YES					NO
	5	4	3	2	1	NA
1. Are children involved in helping to plan activities? Score 5 if: older children are encouraged to talk about, in advance, what materials they may need for a project, encouraged to plan outings, etc.; adults encourage children to think ahead.	5	4	3	2	1	
2. Are some periods during the day provided for children to choose their own activities? Score 5 if: children can at least make a choice of what to do from a range of materials/activities provided by the nursery. Infants are seen to be given a range of toys to choose from.	5	4	3	2	1	
3. Is the learning child-paced? Score 5 if: ample time is given to complete tasks for those children who work slowly and children who complete the tasks quickly can move ahead.	5	4	3	2	1	
4. Do adults modify tasks/ activities to take account of a child's individual needs? Score 5 if: the child is able to achieve success on activities without feeling frustrated or angry.	5	4	3	2	1	
5. Do adults provide the child with repeated opportunities for learning and practising skills? Score 5 if: the child is given time to practise and grasp how to successfully complete tasks and activities set by the adult and the child her/himself.	5	4	3	2	1	
6. Are adults flexible in the activities they have planned for the child? Score 5 if: planned activities are not followed rigidly and the child, other children or the adults themselves are able to suggest new activities or extensions of old ones.	5	4	3	2	1	
7. Do children get an opportunity for individual attention from adults? Score 5 if: children and adults can be observed in one-to-one interaction.	5	4	3	2	1	
8. Are opportunities provided for all children in the nursery to spend time with one another? Score 5 if: during some periods of the day, eg., mealtimes, outdoor playtime, story time, children of different ages, different abilities, and with different needs are together. eg., children with special needs are integrated, toddlers have contact with pre-schoolers etc.	5	4	3	2	1	
9. Do adults encourage both girls and boys to participate in the activity and use available equipment without discriminating between the sexes? Score 5 if: girls and boys have equal chance to play with all gross motor equipment, dolls, cars, lego. Boys can play in the home corner, be nurses etc and girls can use the construction materials, be doctors, train drivers etc.	5	4	3	2	1	
10. Is adult contact with children sensitive at all times? Score 5 if: adults do not push, shove or pull children unless in an emergency; physical punishment is not used to control children.	5	4	3	2	1	
11. Are transitions between activities handled in such a way that children do not remain unoccupied? Score 5 if: e.g. adults use the change-over period between activities as times for conversation with children; and/or adults involve children in the preparations for the next activity.	5	4	3	2	1	

TCRU GROUP DAY CARE OBSERVATION CHECKLIST

3. Physical environment questions

THE NURSERY	YES						NO					
INSIDE AREAS	5	4	3	2	1	NA	5	4	3	2	1	NA
1 Is the nursery generally clean ? Score 5 if: all walls, floors and equipment are clean.	5	4	3	2	1							
2 Is the kitchen inaccessible to children unless supervised ? Score 5 if: children cannot go into the kitchen area unless an adult is present to supervise them. If the cook is present but otherwise engaged with his/her activities this would mean that the child is not being supervised.	5	4	3	2	1							
3 Are laundry facilities (washing machine, tumble dryers etc) inaccessible to children? Score 5 if: children cannot go into the laundry area unless an adult is present to supervise.	5	4	3	2	1							
4 Is all electrical equipment safe? Score 5 if: all electrical sockets within children's reach are covered, flexes on radios, TVs etc. cannot be pulled or tripped on and electrical fires have guards	5	4	3	2	1							
5 Are accessible radiators kept at a safe temperature or fitted with a guard? Score 5 if: none of the radiators are so hot as to be a danger to children, or all radiators are covered in a way that makes it impossible for children to touch them. Thermostatic radiator controls that can be tampered with by children DO NOT count as an adequate safety device.	5	4	3	2	1							
6 Are dangerous objects/items kept out of reach? Score 5 if: all objects such as pins, adult scissors, cleaning materials etc. are kept in locked cupboards or otherwise out of reach.	5	4	3	2	1							
7 Do artistic/creative activities take place in a clearly defined area/room? Score 5 if: there is a space set aside permanently or temporarily within the nursery which allows for activities such as painting, sand and water play to take place.	5	4	3	2	1							
8 Do quiet activities take place in a clearly defined separate area/room? Score 5 if: there is a space set aside either permanently or temporarily within the nursery for sitting quietly, reading and listening to story tapes etc.	5	4	3	2	1							
9 Are rooms/areas comfortably heated? Score 5 if: none of the children show obvious signs of being either too hot or too cold. All rooms are heated to temperatures suitable for activities observed. For example, areas designated for gross motor would not be heated to the same temperature as rooms used for more restful activities; rooms will also be heated differently according to age group, i.e. infants room warmer than toddler room.	5	4	3	2	1							
10 Is there sufficient space for children to play freely? Score 5 if: no obvious signs of overcrowding have been observed. Children have enough room at tables during fine motor activities, the indoor play space is large enough for children to move around without getting in each other's way. Sand and water play do not interfere with other activities.	5	4	3	2	1							
11 Is the child sized furniture in use sufficient for the number of children? Score 5 if: all children who want to, can have a chair and sit at a table during eg. play periods and mealtimes.	5	4	3	2	1							
12 Are there areas available at some time during the day in which children can be alone although adults are near by? Score 5 if: there is at least one area in the nursery such as a playhouse or home corner, which been blocked off (e.g. with low shelving) from the main activity areas, where children can be without feeling under constant observation by adults.	5	4	3	2	1							

THE NURSERY	YES						NO					
	5	4	3	2	1	NA	5	4	3	2	1	NA
13 Is general equipment stored so that it does not interfere with children's play space? Score 5 if: beds, mats, furniture, toys etc., when not in use, are kept in cupboards, on shelves or otherwise out of the way, so that they do not in any way restrict children's physical activities or represent a danger or hazard.	5	4	3	2	1							
14 Are materials and equipment stored in a well-organised fashion? Score 5 if: equipment of the same type is stored together and/or equipment containers are labelled with pictures or words so that children know where materials can be found.	5	4	3	2	1							
15 Are some materials and equipment arranged to allow easy access for children? Score 5 if: e.g. books are on low shelves, trays of fine motor equipment are within children's reach.	5	4	3	2	1							
16 Do children have the opportunity to use a variety of equipment/materials to develop their skills/knowledge in this activity? Score 5 if: children have access to more than one type of toy/material during activity periods. For example, equipment such as bikes, push-along toys, climbing frame, etc for gross motor play; beads, puzzles, lego, activity boxes, etc for fine motor skills; a range of books, cups, funnels, jugs, spoons etc in sand/water play.	5	4	3	2	1							
17 Is the equipment/material sufficient for the number of children? Score 5 if: all children who want to can have use of the equipment/materials at some time during the play period.	5	4	3	2	1							
18 Does the equipment/material in use reflect features of a variety of cultures? Score 5 if: books, picture puzzles, card and board games, pretend play props (clothes, dolls, puppets, home corner items), etc., show people and events from a range of cultures. Musical instruments include examples from other cultures, eg. maracas.												
19 Does the equipment/material in use portray adults and children in non-sexist roles? Score 5 if: books, games, work sheets, etc., include pictures or examples of people doing jobs or tasks not traditionally associated with their gender.	5	4	3	2	1							
20 Is the rest area favourable to resting ? Score 5 if: when the children are resting, the area is quiet, not brightly lit, and neither too warm nor too cold. Children have no difficulties getting off to sleep should they want to.	5	4	3	2	1							
21 Is there adequate space for children to rest during nap times? Score 5 if: beds/mats are spaced such that children are not crowded together for naps, ie. there is a space of at least two feet between each.	5	4	3	2	1							
22 Is rest time supervised by an adult? Score 5 if: an adult stays with the children while they nap.	5	4	3	2	1							
23 Do children take naps/rest according to their needs? Score 5 if: children are encouraged to take naps/rests any time they feel tired and not necessarily all at the same time each day.	5	4	3	2	1							

THE NURSERY	YES						NO					
	5	4	3	2	1	NA	5	4	3	2	1	NA
OUTSIDE AREAS	5	4	3	2	1	NA	5	4	3	2	1	NA
1 Is the play area checked for dangerous items before children go out? Score 5 if: staff look around for such things as broken glass and refuse that may have been thrown into the play area since last used.	5	4	3	2	1		5	4	3	2	1	
2 Are children allowed to stay indoors if they do not want to go outside? Score 5 if: adults allow children who say they do not want to go outside to remain indoors to play, read, etc.	5	4	3	2	1		5	4	3	2	1	
3 Is the sand pit covered when not in use? Score 5 if: a close fitting cover is placed around the sand pit that prevents cats etc. from entering it.	5	4	3	2	1		5	4	3	2	1	
4 Is the outdoor space large enough for the number of children? Score 5 if: there are no obvious signs of overcrowding. Children can play on equipment and run about without getting in each other's way because of lack of space.	5	4	3	2	1		5	4	3	2	1	

TCRU GROUP DAY CARE OBSERVATION CHECKLIST

4. Dealing with distress and discipline

DEALING WITH DISTRESS AND DISCIPLINE	YES						NO					
	5	4	3	2	1	NA	5	4	3	2	1	NA
1. Do adults respond straight away to a child who is upset or distressed?.	5	4	3	2	1	NA	5	4	3	2	1	NA
2. Do adults respond to a distressed child in an appropriate way? Score 5 if: adult talk calmly, explain, hold, cuddle and listen to a distressed child.	5	4	3	2	1		5	4	3	2	1	
3. Do adults respond in a positive way to children engaging in undesirable behaviour? Score 5 if: e.g., a child is never simply reprimanded, he/she is redirected, encouraged to develop a new interest. Rules appear to be clear and easily understood. Good behaviour is reinforced. Threats are not made, children are not humiliated when they misbehave.	5	4	3	2	1		5	4	3	2	1	
4 Are children helped to understand why their behaviour is undesirable? Score 5 if: children are not simply reprimanded; explanations and reasoning are also used, e.g., 'sit on your seat properly, because if you don't you may fall off and hurt yourself' 'keep the sand in the tub, if you pour it on the ground, you won't have any left in the tub to play with'.	5	4	3	2	1		5	4	3	2	1	
5. Do adults help children to negotiate solutions to problems with other children and model these skills appropriately? Score 5 if: adults help children to talk through situations and resolve problems/conflicts such as children arguing between themselves; and they do this in a rational and calm way.	5	4	3	2	1		5	4	3	2	1	
6. Do adults encourage children to talk about their feelings and frustrations? Score 5 if: when children show emotion such as anger, adult enquire and listen to explanations from the child as to why they feel like that.	5	4	3	2	1		5	4	3	2	1	
7. Are children encouraged to show empathy to one another in appropriate situations. Score 5 if: adults explain to children when and why others are e.g., upset, and give guidance on how to be supportive by e.g., giving cuddles, sharing toys, or respecting a child's wish to be left alone. Boys and girls are encouraged to be empathetic.	5	4	3	2	1		5	4	3	2	1	

Appendix C

Joint attention checklist (10 minute observation)

Childs age (months)..... Gender: M / F Room ratio.....

	Episode				
	1	2	3	4	5
Interaction with:					
Teacher	<input type="checkbox"/>				
Nursery assistant	<input type="checkbox"/>				
Other adult	<input type="checkbox"/>				
Initiated by:					
Child	<input type="checkbox"/>				
Adult	<input type="checkbox"/>				
Size:					
1-to-1	<input type="checkbox"/>				
Group	<input type="checkbox"/>				
Location of activity:					
Indoor	<input type="checkbox"/>				
Outdoor	<input type="checkbox"/>				
Type of activity:					
Gross motor	<input type="checkbox"/>				
Fine motor	<input type="checkbox"/>				
Talk	<input type="checkbox"/>				
Art related	<input type="checkbox"/>				
Imaginative/pretend	<input type="checkbox"/>				
Sand/water	<input type="checkbox"/>				
Music	<input type="checkbox"/>				
Books	<input type="checkbox"/>				
Care routines	<input type="checkbox"/>				
Meal/snack time	<input type="checkbox"/>				
Tidy-up time	<input type="checkbox"/>				
Other

Duration:

<1 minute	<input type="checkbox"/>				
1-2 minutes	<input type="checkbox"/>				
2-5 minutes	<input type="checkbox"/>				
>5 minutes	<input type="checkbox"/>				

Appendix D Staff interviews

A Semi Structured Interview for the Manager

Manager's background

(NOTE: Collect at phase 1 only unless new manager at phase 2)

Qualifications:

How many years experience in early years setting?

Length of employment with the present nursery:

Annual Salary?

Number of working hours per week:

General Information

(NOTE: Collect at phase 1 only unless situation has changed at phase 2)

Nursery's opening hours:

Total number of staff:

How many of them are qualified?

How many of them are part time?

What shifts (if any) do you operate?

Number of children the nursery registered for?

Number of children at the moment:

Number of children who are full time:

Number of children with special needs:

The cost of a full time place:

Are you eligible to receive a nursery education grant?

Is this included in the price for a full time place?

Do you have placement students on regular basis?

Relaxing ratios

What do you think about relaxing ratios?

What do you think is the optimum ratio and why?

Phase 2 only:

Have things changed since you've been operating a relaxed ratio of 1:10?

Have you changed your planning and organisation of activities since operating a ratio of 1:10?

Have you changed the type and/or implementation of daily activities?

Do you think your planning; organisation and implementation of activities would change if you were to operate a 1:10 ratio indefinitely?

A Semi Structured Interview for the Teacher

Teacher's background

(NOTE: Collect at phase 1 only unless new teacher at phase 2)

Qualifications:

How many years experience in early years setting?

Length of employment with the present nursery:

Annual salary?

Number of working hours per week:

Group Organization

Typical group size

Maximum group size

Time spent in groups

Planning the Curriculum

Is the curriculum planned on Weekly / Monthly / Termly basis?

Who is involved in the planning process?

How is the curriculum implemented?

Regular Meetings

How often do you have staff meetings?

What topics are covered in those meetings?

How often do you have parents' evenings?

Time Management

What proportion (hours/week) do you spend:

In direct contact with children?

Planning the daily activities?

Liasing with other staff?

Providing/Receiving support to/from other members of staff?

Talking to parents?

On training?

On administration?

Relaxing ratios

What do you think about relaxing ratios?
What do you think is the optimum ratio and why?

Phase 2 only:

Have things changed since you've been operating a relaxed ratio of 1:10?

Have you changed your planning and organisation of activities since operating a ratio of 1:10?

Have you changed the type and/or implementation of daily activities?

Do you think your planning; organisation and implementation of activities would change if you were to operate a 1:10 ratio indefinitely?

A Semi Structured Interview for the Nursery assistant

Nursery assistant background

(NOTE: Collect at phase 1 only unless new nursery assistant at phase 2)

Qualifications:

How many years experience in early years setting?

Length of employment with the present nursery:

Annual Salary?

Number of working hours per week:

Relaxing ratios

What do you think about relaxing ratios?
What do you think is the optimum ratio and why?

Phase 2 only:

Have things changed since you've been operating a relaxed ratio of 1:10?

Have you changed your planning and organisation of activities since operating a ratio of 1:10?

Have you changed the type and/or implementation of daily activities?

Do you think your planning; organisation and implementation of activities would change if you were to operate a 1:10 ratio indefinitely?

Appendix E

Summary of statistical comparisons

<i>Comparison</i>	Result
<p><i>Observed ratio and joint attention episodes</i></p> <p>The median¹ observed ratio for each nursery was correlated (using Pearson's correlation co-efficient²) with the total number of joint attention episodes observed in each nursery.</p> <p><i>NOTE:</i> The comparison was repeated using partial correlation controlling for group size. The relationship remained significant when controlling for the mean small-group size ($r = -0.33$; $n = 50$; $p = .01$) and the mean total group size (the total number of children in the room) ($r = -0.33$; $n = 50$; $p = .02$) observed during the TCRU core-question observations.</p>	<p>$r = -0.37$; $n = 50$; $p < .01$</p> <p><i>See Figure 1.</i></p>
<p><i>Observed ratio and TCRU (section 1) core-question checklist</i></p> <p>The median observed ratio for each nursery was correlated (using Spearman's correlation co-efficient²) with the median score from the TCRU core-question checklist for each nursery.</p>	<p>Not significant</p>

<i>Comparison</i>	Result
<p>The nurseries were divided into three groups of similar size based on the median adult:child ratio for each nursery. Group 1: N = 16; median observed ratio = 1 adult : < 1.25 children. Group 2: N = 18; median observed ratio = 1 adult : 1.26-6.99 children. Group 3: N = 16; median observed ratio = 1 adult : > 7 children.</p> <p>Separate correlations (using Spearman's correlation co-efficient) between observed median ratio for each nursery and median TCRU core-question checklist scores were performed for each group.</p> <p><i>NOTE:</i> This correlation remained significant with the removal of one nursery with an observed adult:child ratio of 1:13 ($r_s = -0.63$; $n = 15$; $p = .01$).</p> <p>The correlation for group three was repeated using partial correlation controlling for group size. The relationship remained significant when controlling for the mean small-group size ($r = -0.62$; $n = 16$; $p = .01$) and the mean total group size (the total number of children in the room) ($r = -0.62$; $n = 16$; $p = .01$) observed during the TCRU core-question observations.</p>	<p>Group 1: Not significant</p> <p>Group 2: Not significant</p> <p>Group 3: $r_s = -0.70$; $n = 16$; $p < .01$.</p> <p><i>See Figure 2.</i></p>
<i>Observed ratio and TCRU (section 2) general questions</i>	
<p>The median observed ratio for each nursery was correlated (using Spearman's correlation co-efficient) with the total score from the TCRU general questions for each nursery.</p>	Not significant
<p>The nurseries were divided into three groups of similar size based on the median adult:child ratio for each nursery. Group 1: N = 16; median observed ratio = 1 adult : < 1.25 children. Group 2: N = 18; median observed ratio = 1 adult : 1.26-6.99 children. Group 3: N = 16; median observed ratio = 1 adult : > 7 children.</p> <p>Separate correlations (using Spearman's correlation co-efficient) between observed median ratio for each nursery and total score from the TCRU general questions for each nursery were performed for each group.</p>	<p>Group 1: Not significant</p> <p>Group 2: Not significant</p> <p>Group 3: Not significant</p>
<i>Observed ratio and TCRU (section 3) environment questions</i>	
<p>The median observed ratio for each nursery was correlated (using Spearman's correlation co-efficient) with the total score from the TCRU physical environment questions for each nursery.</p>	Not significant

<i>Comparison</i>	Result
<p>The nurseries were divided into three groups of similar size based on the median adult:child ratio for each nursery. Group 1: N = 16; median observed ratio = 1 adult : < 1.25 children. Group 2: N = 18; median observed ratio = 1 adult : 1.26-6.99 children. Group 3: N = 16; median observed ratio = 1 adult : > 7 children.</p> <p>Separate correlations (using Spearman's correlation co-efficient) between observed median ratio for each nursery and total score from the TCRU physical environment questions for each nursery were performed for each group.</p>	<p>Group 1: Not significant</p> <p>Group 2: Not significant</p> <p>Group 3: Not significant</p>
<i>Observed ratio and TCRU (section 4) dealing with distress & discipline</i>	
<p>The median observed ratio for each nursery was correlated (using Spearman's correlation co-efficient) with the total score from the TCRU dealing with distress & discipline questions for each nursery.</p>	Not significant
<p>The nurseries were divided into three groups of similar size based on the median adult:child ratio for each nursery. Group 1: N = 16; median observed ratio = 1 adult : < 1.25 children. Group 2: N = 18; median observed ratio = 1 adult : 1.26-6.99 children. Group 3: N = 16; median observed ratio = 1 adult : > 7 children.</p> <p>Separate correlations (using Spearman's correlation co-efficient) between observed median ratio for each nursery and total score from the TCRU dealing with distress & discipline questions for each nursery were performed for each group.</p>	<p>Group 1: Not significant</p> <p>Group 2: Not significant</p> <p>Group 3: Not significant</p>
<i>Observed ratio and Pre-school Behaviour Checklist (Richman & McGuire, 1987).</i>	
<p>The median observed room ratio from each nursery was correlated (using Spearman's correlation co-efficient) with the mean Pre-school Behaviour Checklist (Richman & McGuire, 1987) score from each nursery.</p>	Not significant

Notes:

- ¹ Observed ratios were tested for normal distribution. It was found that ratios recorded during TCRU observations and JAE observations were skewed (skewness = 2.21, SE = 0.11; kurtosis = 7.71, SE = 0.23; skewness = 2.40, SE = 0.11; kurtosis = 10.57, SE = 0.22 respectively). Therefore the median rather than the mean has been used as a measure of central tendency.
- ² Pearson's correlation co-efficient has been used for the correlation of observed ratio and joint attention episodes because this is interval data (i.e. measured on a continuous scale where intervals between data can be assumed equal) whereas Spearman's correlation co-efficient has been used for correlations including

TCRU observation checklists scores because this is ordinal data (i.e. measured on a scale where intervals cannot be assumed to be equal).

Table E1
Cost of a place per week

	N	Minimum	Maximum	Mean (SD)
Sessional nursery	7	£21	£49	£41 (£12.50)
Nursery school	7	£82	£150	£110 (£23.50)
Day nursery	36	£69	£160	£111 (£23)

Table E2
Registered ratio and cost of a place per week

Registered ratio	£20 - £50	£51 - £75	£76 - £100	£101 - £125	£126 - £150	£151 - £175	Total
1:5			1	2			3
1:7			1		1		2
1:8	7		15	8	9	1	40
1:10		1	1				2
1:11.5					1		1
1:12					1		1
1:13				1			1
Total	7	1	18	11	12	1	50

Table E3
Number of children and staff

	Minimum	Maximum	Mean (SD)
<i>Children</i>			
Part-time	0	92	28 (21)
Full-time	0	210	22.5 (34)
<i>Staff</i>			
Qualified	2	28	10 (6.7)
Unqualified	0	17	4 (4)