

Dadansoddi ar gyfer Polisi



Analysis for Policy

Ymchwil gymdeithasol
Social research

Number: 01/2015

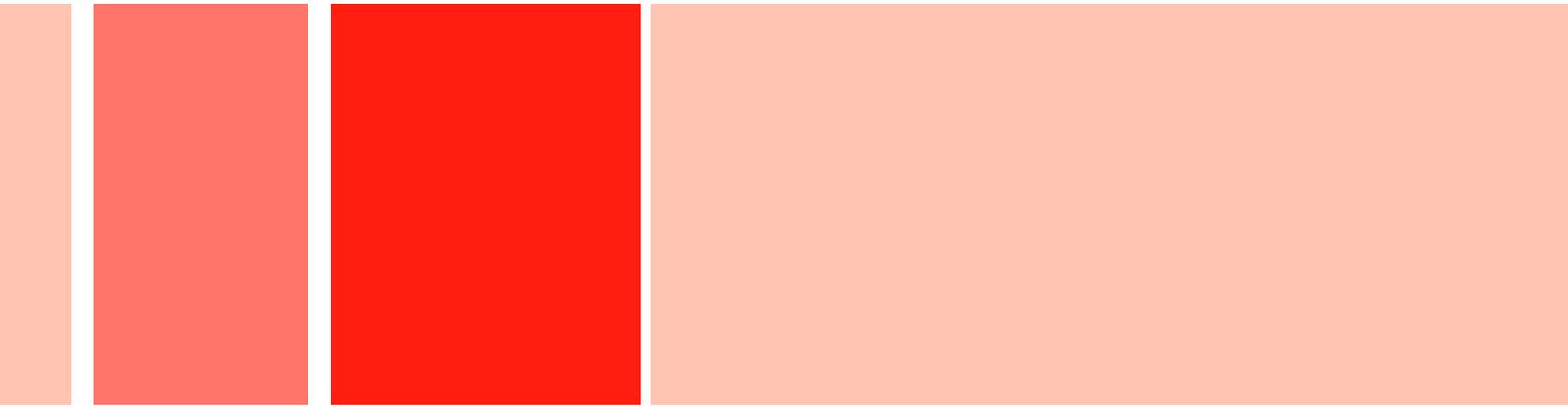


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Evaluating the Foundation Phase:

The Outcomes of Foundation Phase Pupils up to 2011/12 (Report 2)



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Views expressed in this report are those of the researchers and not necessarily those of the Welsh Government

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Welsh Government Social Research, 7 January 2015

ISBN: 978-1-4734-2831-7

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Glossary of Acronyms

CIA	Conditional Independence Assumption
FP	Foundation Phase
FSM	Free School Meals
KS1	Key Stage 1 National Curriculum
KS2	Key Stage 2 National Curriculum
LLC	Language, Literacy and Communication Skills
MD	Mathematical Development
NAfW	National Assembly for Wales
NPD	National Pupil Database
PSDWCD	Personal and Social Development, Well-Being and Cultural Diversity
PSM	Propensity Score Matching
PTR	Pupil Teacher Ratios
ref	Reference Category (multivariate statistics)
SEN	Special Educational Needs
WLD	Welsh Language Development
WISERD	Wales Institute of Social & Economic Research, Data & Methods

EXECUTIVE SUMMARY

Introduction

1. The Foundation Phase is a Welsh Government flagship policy of early years education (for 3 to 7-year-old children) in Wales. Marking a radical departure from the more formal, competency-based approach associated with the previous Key Stage 1 National Curriculum, it advocates a developmental, experiential, play-based approach to teaching and learning. *The Learning Country: a Paving Document* (NAfW 2001) notes that following devolution, Wales intended to take its own policy direction in order to 'get the best for Wales'. Getting the best for Wales appeared to involve meeting the challenges of the globalised marketplace (raising levels of basic skills¹); overcoming social disadvantage; building a strong, enterprising society that embraces multiculturalism; and promoting the language and traditions of Wales. Participation was seen as a key approach.
2. This report arises from the independent evaluation of the Foundation Phase in Wales, commissioned by the Welsh Government and led by the Wales Institute for Social & Economic Research, Data & Methods (WISERD).
3. This is the second in a series of reports that examine outcomes available from analysis of the National Pupil Database (NPD). In particular, it presents findings on rates of absence and teacher assessments for all children in Wales who were aged four to seven between 2004/05 and 2011/12. The inclusion of 2011/12 data corresponds to the completion of the final roll-out of the Foundation Phase; i.e. 2011/12 was the first year during which all Year 2 pupils in Wales were assessed via the Foundation Phase. The availability of this data has enabled the scope of the analysis to be widened in some areas.
4. The main aim of this report is to compare the outcomes for children who followed the Foundation Phase with the outcomes of children who

¹ This is now termed literacy and numeracy in recent Welsh Government policy documents.

previously followed Key Stage 1 of the National Curriculum. The report presents findings relating to a number of key outcomes including:

- i. rates and nature of absenteeism
- ii. teacher assessments made at Year 2 (i.e. assessments that take place at the end of Key Stage 1 or the Foundation Phase)
- iii. teacher assessments made at the end of Key Stage 2 (i.e. at Year 6).

Attendance

5. In terms of absenteeism, the available evidence to date suggests that the introduction of the Foundation Phase, among Final Roll-out schools, has been associated with an improvement in levels of pupils' overall attendance. This is measured in terms of the proportion of sessions pupils are in school, reduced levels of persistent absenteeism and a reduction in the incidence of unauthorised absence.

Teacher Assessments at the End of Year 2

6. In terms of teacher assessments, the analysis was not able to determine whether the introduction of the Foundation Phase has affected levels of pupil attainment at Year 2. The introduction of the Foundation Phase was accompanied by changes in the methods by which pupils were assessed, both in terms of the subject areas covered and the levels against which pupils were graded. Whilst it was intended that there would be a degree of consistency between the two assessment regimes, with the expected level of attainment at Key Stage 1 (Level 2) being equivalent to the expected level of attainment under the Foundation Phase (Level 5), in practice this has been demonstrated not to be the case for Pilot and Early Start schools.
7. Levels of consistency appear to improve during the final roll-out of the Foundation Phase. However, before and after comparisons are not presented for these schools, as it would not be possible to assess whether any changes in the incidence with which pupils attain the expected level could be attributed to real improvements in attainment levels or changes in the way that pupils were graded.

Key Stage 2 Teacher Assessments

8. Due to the discontinuity in assessment methods at Year 2 following the introduction of the Foundation Phase, teacher assessments made at the end of Key Stage 2 (Year 6) provide the only consistent basis upon which the educational outcomes of pupils can be compared utilising the administrative records contained within the NPD. However, this analysis is hampered by the current availability of Key Stage 2 outcome data for children who went through the Foundation Phase.
9. However, despite this it does appear that the relative performance of early cohorts of Foundation Phase pupils from Pilot schools at Key Stage 2, appears to have improved compared to the attainment of earlier cohorts of pupils from these same schools.
10. At this stage, the results cannot be fully conclusive and are sensitive to the estimation techniques used. Furthermore, results based upon these early cohorts of pupils cannot be generalised to the wider population of Foundation Phase pupils. Nonetheless, there is some tentative evidence to suggest that performance in English and science at Key Stage 2 has improved among Foundation Phase pupils in Pilot schools.

Inequalities in Outcomes

11. An important feature of the Foundation Phase was to reduce inequalities in social and education outcomes. However, the analysis reveals that the introduction of the Foundation Phase is not, to date, associated with any significant changes in the differences in outcomes between population sub-groups, such as those defined by gender, ethnicity and socio-economic background.
12. The persistence of inequalities is observed in terms of both absenteeism and attainment. Those groups who exhibit the largest disadvantages in terms of educational outcomes, include those who are eligible for Free School Meals (FSM) and those who have Special Educational Needs (SEN).
13. Although there are some signs of improvement in isolated examples, general patterns of inequalities that existed prior to the introduction of the Foundation Phase are demonstrated to persist following its introduction. However, it is generally well accepted that focussed and targeted

interventions are more appropriate for tackling educational inequalities than universal interventions such as the Foundation Phase (Kerr and West 2010).

Future Analysis

14. This report represents the second iteration of analysis based upon administrative data held on the NPD. The final stage will aim to incorporate other data obtained from the evaluation. This will be important in attempting to identify the possible impact of the Foundation Phase if it were being implemented fully.

1 Introduction

- 1.1. The Foundation Phase is a Welsh Government flagship policy of early years education (for 3 to 7-year-old children) in Wales. Marking a radical departure from the more formal, competency-based approach associated with the previous Key Stage 1 (KS1) National Curriculum, it advocates a developmental, experiential, play-based approach to teaching and learning (Maynard *et al.* 2013).
- 1.2. The Foundation Phase was introduced to primary (or infant) schools in three stages. First, during 2004/05, the Foundation Phase was implemented in 22 schools, referred to as Pilot schools. Second, in 2007/08 the Foundation Phase was implemented in a further 22 schools, referred to as the Early Start schools. Finally, in 2008/09 the Foundation Phase was rolled-out to all remaining schools in Wales. These schools are referred to as the Final Roll-out schools.
- 1.3. In addition to the phased roll-out of the Foundation Phase to different schools, each school introduced the Foundation Phase to one cohort at a time, starting with children in nursery and/or reception classes. This meant that during the first few years of introducing the Foundation Phase to schools, children in the older cohorts would have been following the Key Stage 1 (KS1) National Curriculum whilst children in the younger cohorts would have been following the Foundation Phase. This is further complicated by the significant presence of mixed-aged/cohort classes in Wales, particularly in small primary schools; which means some schools would be delivering both curricula in the same classes by the same teachers but to different groups of children.
- 1.4. This is the second in a series of reports from the independent evaluation of the Foundation Phase in Wales (Taylor *et al.* 2013, 2014), commissioned by the Welsh Government and led by the Wales Institute for Social & Economic Research, Data & Methods (WISERD) that is based upon analysis of the National Pupil Database (NPD). The NPD

contains administrative data for all children in schools in Wales. It includes some key information relating to the characteristics of children in schools and contains other details relating to their educational progress, principally teacher assessments and attendance data.

- 1.5. The first report in this series (Davies *et al.* 2013) used NPD data from 2004/05 up to and including 2010/11 (i.e. seven years of relevant educational data). This second shorter report updates this previous analysis using new NPD data for 2011/12. Both reports present findings on rates of absence and teacher assessments for all children in Wales. Crucially 2011/12 includes Foundation Phase outcomes for the first cohort of Year 2 children in the Final Roll-out schools.
- 1.6. The number of pupils in the NPD covered by the introduction of the Foundation Phase is outlined in Table 1. The phased introduction of the Foundation Phase among successive cohorts of children can be observed. The aim of this report is to compare the outcomes for children who followed the Foundation Phase with the outcomes of children who previously followed KS1 of the National Curriculum. As can be seen from Table 1, 2010/11 marks the final year that any child in Wales followed KS1 National Curriculum.
- 1.7. Throughout this and the previous report, we identify three groups of pupils:
 - i. pupils in schools where the Foundation Phase had yet to be introduced ('KS1');
 - ii. pupils in Foundation Phase schools, but who themselves were not assessed (or due to be assessed) via the Foundation Phase ('FP Out'); and
 - iii. pupils who followed the Foundation Phase and who were assessed via the Foundation Phase ('FP In').
- 1.8. In evaluating the outcomes of the Foundation Phase, there are two main ways in which analysis of the NPD can be undertaken. First, it provides the opportunity to compare outcomes before and after the

introduction of the Foundation Phase by comparing outcomes for children in different cohorts. The second approach to the analysis utilises the sequential roll-out of the Foundation Phase, outlined above, to allow us to compare outcomes for children who followed the Foundation Phase with outcomes for children who followed KS1, from the same academic year. For more details about the stepped wedge design of this approach, see Taylor *et al.* (2013) and for further information about the limitations of the analysis presented in this report, see Davies *et al.* (2013).

1.9. This report begins with a summary of the characteristics of pupils attending schools in different stages of the Foundation Phase implementation (Chapter 2). Chapter 3 then considers the impact of the Foundation Phase on pupil attendance using the latest year of NPD data (2011/12). Chapter 4 compares and contrasts levels of Foundation Phase outcomes and Key Stage 1 assessments before examining the relative performance of Foundation Phase pupils in Key Stage 2 teacher assessments in Chapter 5. Finally in Chapter 6, we consider the impact of the Foundation Phase in inequalities in outcomes in the early years of primary education.

Table 1: Population of Children Covered by the Foundation Phase (Reception+), by Phase of Roll-out

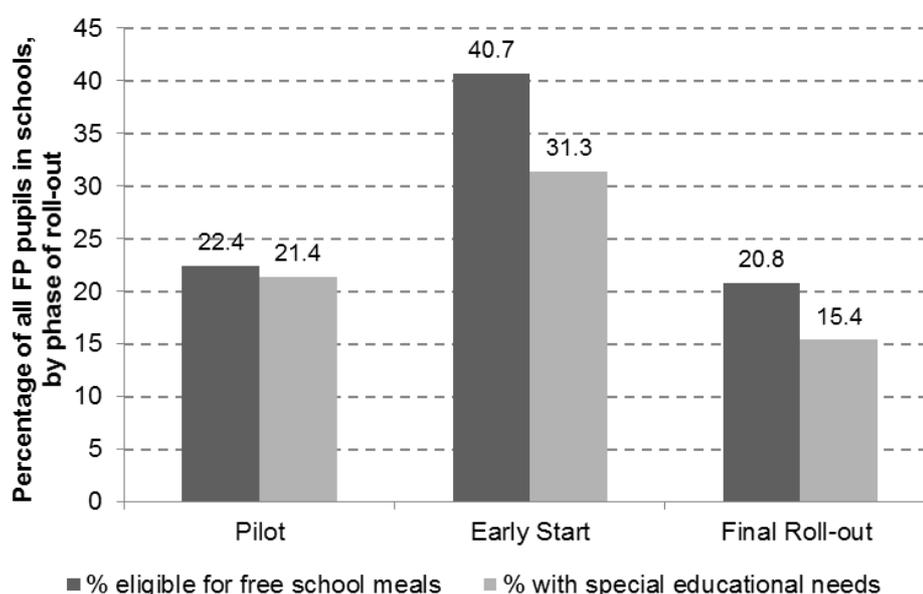
	Pilot		Early Start		Final Roll-out	
	FP Out	FP In	FP Out	FP In	FP Out	FP In
2004/05	1,076	847	2,942	0	95,709	0
2005/06	407	1,496	2,880	0	92,849	0
2006/07	52	1,862	2,831	48	90,554	0
2007/08	0	1,906	1,891	935	90,186	0
2008/09	0	1,834	940	1,903	90,570	0
2009/10	0	1,892	41	2,848	60,828	31,485
2010/11	0	1,918	0	2,959	30,693	63,359
2011/12	0	1,934	0	2,994	0	95,885

Source: NPD: 2004/05-2011/12

2 Characteristics of Foundation Phase Schools

2.1. In this Chapter we outline some of the key characteristics of pupils attending Pilot and Early Start schools relative to those within Final Roll-out schools. All Early Start schools were selected on the basis that they were located in areas covered by the Welsh Government's Flying Start programme. Flying Start is an early years programme targeted at families with children under four years of age living in some of the most deprived areas of Wales². The analysis in Figure 1 confirms that children in Early Start schools are much more likely to be entitled to FSM; the proportion of pupils in Early Start schools in receipt of FSM (41%) is nearly twice the level observed among the Final Roll-out schools (21%).

Figure 1: Selected Characteristics of Foundation Phase Pupils (Reception+), by Phase of Roll-out



Source: NPD: 2004/05-2011/12

2.2. The relatively deprived nature of Early Start schools is also reflected by the higher proportion of pupils in these schools classified as SEN. In

² <http://wales.gov.uk/topics/people-and-communities/people/children-and-young-people/parenting-support-guidance/help/flyingstart/?lang=en>

particular, within Early Start schools approximately 29% of pupils were classified as SEN during the period covered by the NPD data, some 11 percentage points higher than that observed among Wales as a whole (18%).

- 2.3. In rolling-out the Foundation Phase, there is a commitment to achieving a new (higher) adult:child ratio of 1:8 among pupils aged three to five years and a ratio of 1:15 for those aged six to seven years. An early indication of the impact of the Foundation Phase is whether these ratios are observed following the introduction of the Foundation Phase.
- 2.4. Table 2 provides combined school level adult:child ratios for those in Reception, Year 1 and Year 2. Due to the level of detail contained within the administrative data, it is not possible to present separate adult:child ratios for particular year groups – thereby distinguishing cohorts on the basis of whether or not they were covered by the Foundation Phase. Nonetheless, it can be seen in Table 2 that amongst Early Start schools there was an immediate fall in the number of children per adult following the introduction of the Foundation Phase. Within Early Start schools during 2007/08, adult:child ratios are shown to improve by approximately six pupils per adult compared to the previous year. The effect of the introduction of the Foundation Phase on adult:child ratios in Pilot schools is more difficult to assess as data is not available prior to 2004/05. However, it is still observed that the rate of improvement in adult:child ratios within Pilot schools is greater than that observed for Final Roll-out schools. Among the Final Roll-out schools, an improvement in the adult:child ratio of two pupils per adult is observed around the time during which the Foundation Phase was introduced among reception class children (2008/09).

Table 2: Average Number of Children to every Adult³ in Schools (Reception to Year 2), by Phase of Roll-out⁴

Year	Phase of Roll-out			All Schools
	Pilot	Early Start	Final Roll-out	
2004/05	14.6	17.2	14.8	14.9
2005/06	13.7	15.4	14.7	14.7
2006/07	12.2	16.9	14.2	14.2
2007/08	11.7	11.1	13.8	13.7
2008/09	10.5	10.9	11.5	11.5
2009/10	8.7	10.2	10.6	10.6
2010/11	9.3	9.7	10.2	10.1
2011/12	10.6	9.6	9.8	9.8
Total	11.4	12.6	12.5	12.5
2004/05-2011/12	-4.0	-7.6	-5.0	-5.0

Source: NPD: 2004/05-2011/12

³ Throughout this analysis, 'adults' refer to teachers and teaching assistants.

⁴ The results in this table differ markedly from the equivalent Table 4 in the first NPD report from the evaluation (Davies *et al.* 2013:15). This is because the original table was based on inaccurate information. This table should be considered the correct version.

3 Absenteeism

- 3.1. One area in which the Foundation Phase may have an important impact upon children, is in relation to attendance. Increases in attendance may reflect changes in attitudes (among both children and parents) towards primary education. It is therefore important to assess whether the introduction of the Foundation Phase has had an effect on levels of absenteeism.
- 3.2. Where a pupil is recorded as absent, the register records whether the absence was authorised or unauthorised. Definitions of authorised and unauthorised absences, as provided by the Welsh Government, are as follows:
- Authorised absence - an absence with permission from a teacher or other authorised representative of the school. This includes instances of absence for which a satisfactory explanation has been provided (e.g. illness, family bereavement or religious observance).
 - Unauthorised absence - an absence without permission from a teacher or other authorised representative of the school. This includes all unexplained or unjustified absences.
- 3.3. Pupil-level absence data was collected from maintained primary schools for the first time in 2007/08. It is therefore not possible to provide any information on levels of absenteeism in Pilot schools prior to the introduction of the Foundation Phase. Furthermore, among Early Start schools, 2007/08 was during the transition stage in which some cohorts of children were still to be assessed via KS1 of the National Curriculum. It is therefore noted that absenteeism data is not available for Early Start schools prior to the implementation of the Foundation Phase.
- 3.4. Absenteeism data only relates to children of compulsory school age (those aged five and above) and so the analysis that follows only

relates to pupils within Year 1 and Year 2 of primary school (i.e. children in reception class are excluded from the analysis). The analysis of absenteeism focuses upon three measures derived from the NPD:

- i. Days present: this relates to the time that pupils are present in school, measured in terms of the proportion of half-day sessions that pupils were in attendance.
- ii. Persistent absenteeism: this refers to pupils who have been absent for at least 20% of half-day sessions during the school year and is a measure used by the Welsh Government in the presentation of data on pupil absenteeism.
- iii. Unauthorised absence: this relates to the proportion of pupils who have had at least one unauthorised absence during the school year.

3.5. In our first report (Davies *et al.* 2013), we demonstrated that Foundation Phase Pilot schools exhibited levels of absenteeism that were comparable to Final Roll-out schools and this continues to be the case (Table 3). Indeed, levels of attendance appear to have increased by 0.3 percentage points in Final Roll-out schools.

3.6. Across all schools, levels of absenteeism are approximately three percentage points higher among pupils eligible for FSM. However, this differential does not appear to translate to lower school level attendance among pupils in Early Start schools where the proportion of pupils demonstrated to be eligible for FSM is higher.

Table 3: Percentage of Days Present (Year 1 and Year 2), by Phase of Roll-out

	Pilot		Early Start		Final Roll-out		Total
	FP Out	FP In	FP Out	FP In	FP Out	FP In	
Gender							
Male		92.4	91.5	91.5	92.9	93.3	93.0
Female		92.2	91.8	91.5	92.9	93.1	92.9
<i>Differential</i>		0.2	-0.3	0.0	0.0	0.1	0.1
Ethnicity							
White		92.7	92.0	91.9	93.1	93.5	93.2
Non-White		90.6	88.7	88.8	90.7	91.0	90.7
<i>Differential</i>		2.1	3.3	3.1	2.5	2.4	2.5
FSM Status							
Non-FSM		93.0	92.4	92.5	93.6	93.9	93.6
FSM		89.9	90.4	90.2	90.2	90.6	90.3
<i>Differential</i>		3.1	1.9	2.3	3.4	3.3	3.3
SEN Status							
Non SEN		92.8	92.2	92.1	93.4	93.6	93.4
SEN		90.9	90.4	90.5	91.2	91.7	91.3
<i>Differential</i>		1.9	1.8	1.6	2.2	1.9	2.1
Total		92.3	91.6	91.5	92.9	93.2	92.9

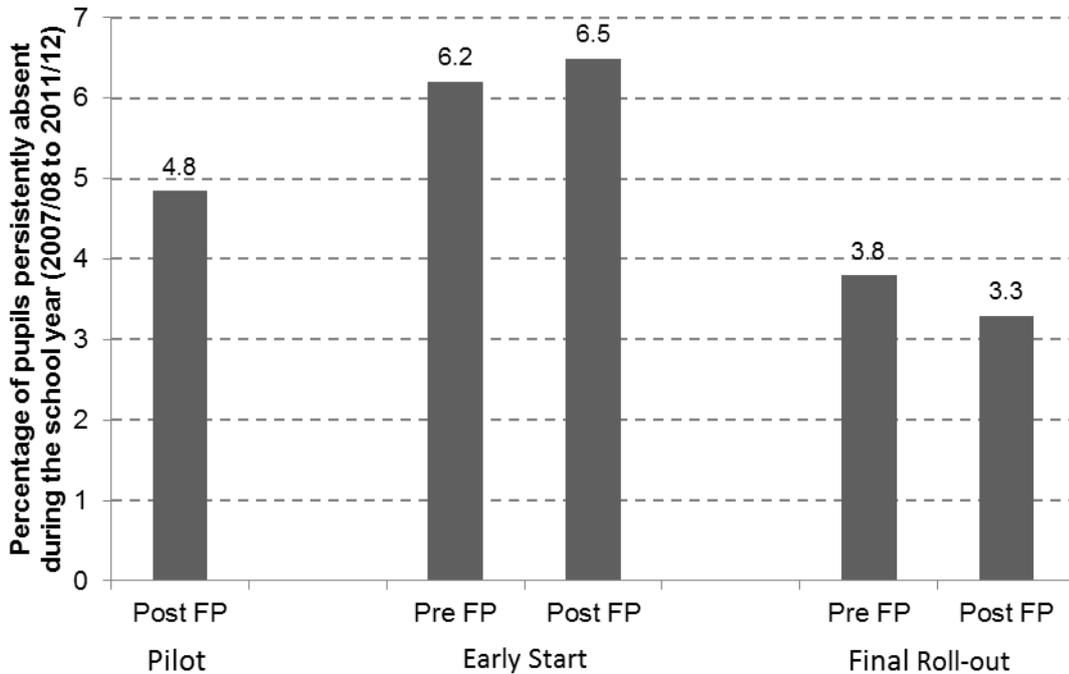
Source: NPD: 2007/08-2011/12

3.7. Similar patterns can be observed for persistent absenteeism. The available evidence to date suggests that levels of persistent absenteeism have declined by 0.5 percentage points in Final Roll-out schools following the introduction of the Foundation Phase (Figure 2). It should be noted that this represents a 13% decline in levels of persistent absenteeism. This is consistent with estimates published by the Welsh Government which also demonstrate a decline in persistent absenteeism within primary schools since 2009/10.

3.8. Further analysis not presented here also indicates that the introduction of the Foundation Phase in Final Roll-out schools, has also been associated with an improvement in levels of pupils' overall attendance,

measured in terms of the proportion of sessions pupils are in school and a reduction in the incidence of unauthorised absence.

Figure 2: Levels of Persistent Absenteeism (Year 1 and Year 2)⁵



Source: NPD: 2007/08-2011/12

Estimating the Effect of the Foundation Phase on Absenteeism

3.9. As with our previous report, we are particularly interested to identify the possible influence of the Foundation Phase on absenteeism after controlling for pupil characteristics. Therefore, the question to be addressed is whether, given the individual characteristics of pupils participating in the Foundation Phase, are levels of absenteeism higher or lower than we would expect them to be.

3.10. To develop a better understanding of these issues, we utilise a statistical approach that is able to identify how a range of individual and

⁵ <http://wales.gov.uk/docs/statistics/2013/130515-absenteeism-pupil-characteristics-2011-12-en.pdf>

school-related characteristics contribute to observed levels of absenteeism (see Davies *et al.* 2013 for more explanation). This provides a more robust indication as to the possible impact of the Foundation Phase on absenteeism.

3.11. Three sets of regression models have been estimated (Tables 4 to 6):

- The first set examines the effect of the Foundation Phase on the overall levels of absenteeism. Here the methodology employs a basic Ordinary Least Squares specification and examines what factors contribute to our understanding of which pupils are present for more or less time during the academic year. The results in Table 4 are the percentage change in the number of sessions⁶ attended.
- The second set of models examines the effect of the Foundation Phase on levels of persistent absenteeism. Here pupils are classified in terms of whether or not they are persistently absent. Table 5 presents results for the relative likelihood that a pupil has experienced persistent absenteeism during the academic year.
- The third set of models examines the effect of the Foundation Phase on levels of unauthorised absence. Here, pupils are distinguished in terms of whether or not they have had an unauthorised absence during the academic year. Table 6 presents results for the relative likelihood that a pupil has experienced unauthorised absence during the academic year.

3.12. For the second and third set of models, logistic regressions are then used to determine what characteristics are associated with the relative likelihood of a child being classified as persistently absent or having an unauthorised absence. Within each set of regressions, six separate models are estimated in order to take advantage of the sequential roll-out of the Foundation Phase (resulting in a total of 18 models). Models

⁶ School attendance is measured by half-day sessions; attendance in the morning and attendance in the afternoon.

are also estimated for specific year groups to ensure that 'like for like' comparisons are being made.

3.13. The results of the analysis are presented in Tables 4 to 6. For ease of exposition, only results relating to the coverage of the Foundation Phase are presented. All statistical models simultaneously controlled for a range of other characteristics including gender, age, ethnicity, FSM eligibility and SEN status. These control variables are included at both an individual and school level (e.g. the percentage of pupils within a school who are white). Asterisks are used to denote the presence of statistically significant relationships at the 5% (**) and 10% (*) significance levels.

3.14. Model 1 and Model 2 demonstrates that levels of attendance improved among both Year 1 and Year 2 pupils in the Foundation Phase (FP In) compared to those who were not covered by the Foundation Phase (FP Out) (Table 4). Levels of attendance are also estimated to be higher among Year 1 pupils in both the Pilot and Early Start schools and Year 2 pupils in Early Start schools.

3.15. Model 3 and Model 4 repeats the analysis on the Final Roll-out schools only. Once again, it is estimated that attendance improves by 0.7% among Year 1 pupils and 0.8% among Year 2 pupils. Analysis of the NPD data reveals that pupils attend school for approximately 370-375 sessions per year. An increase in attendance of 0.7% is therefore equivalent to approximately 2.5 sessions, and an increase of 0.8% is equivalent to approximately 3 sessions.

3.16. Within Early Start schools, there is also the opportunity to compare children who were covered by the Foundation Phase to those who were assessed via the KS1 National Curriculum. In contrast to our previous report, Model 6 suggests an *improvement* in attendance among Year 2 pupils in Early Start schools of 0.7%, equating to approximately 2.5 extra sessions attended.

Table 4: Percentage Change in Days Present using Multivariate Estimates, by Phase of Roll-out

	Full Sample		Final Roll-out		Early Start	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Pilot						
FP Out	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
FP In	0.3*	-0.1				
Early Start						
FP Out	0.4	0.1			ref.	
FP In	0.8**	0.8**			0.3	0.7**
Final Roll-out						
FP Out	ref.		ref.			
FP In	0.7**	0.9**	0.7**	0.8**		

Source: NPD: 2007/08-2011/12 (* p<0.10, ** p<0.05)

Table 5: Relative Likelihood of Persistent Absenteeism using Multivariate Estimates, by Phase of Roll-out

	Full Sample		Final Roll-out		Early Start	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Pilot						
FP Out	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
FP In	0.958	1.049				
Early Start						
FP Out	0.790	0.971			ref.	
FP In	0.790**	0.751**			1.032	0.840
Final Roll-out						
FP Out	ref.		ref.			
FP In	0.732**	0.713**	0.732**	0.712**		

Source: NPD: 2007/08-2011/12 (* p<0.10, ** p<0.05)

Table 6: Relative Likelihood of Unauthorised Absenteeism using Multivariate Estimates, by Phase of Roll-out

	Full Sample		Final Roll-out		Early Start	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
Pilot						
FP Out	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
FP In	1.190	1.346				
Early Start						
FP Out	1.368	1.399*			ref.	
FP In	1.300	1.354**			1.090	1.070
Final Roll-out						
FP Out	ref.		ref.			
FP In	0.806**	0.773**	0.807**	0.774**		

Source: NPD: 2007/08-2011/12 (* p<0.10, ** p<0.05)

3.17. Due to the different modelling techniques used, the results relating to persistent absence and unauthorised absence are interpreted differently to those above. The concept of 'relative likelihood' is fundamental to the interpretation of the results presented in this section. Before presenting these results, we describe what we mean by risk. In Final Roll-out schools, approximately 51% of Year 1 pupils that were eligible for FSM, were recorded as having an unauthorised absence. By comparison, 26% of pupils who were not eligible for FSM had an unauthorised absence. We therefore observe, based upon a comparison of rates of unauthorised absence, pupils in receipt of FSM exhibit a higher relative likelihood of unauthorised absence. An alternative way of expressing this increased risk of absence is to say that relative to those who are not eligible for FSM, those who are eligible are approximately twice as likely (51% divided by 26%) to have an unauthorised absence. This is how estimates of relative likelihood that are estimated from the regression analysis are presented in Tables 5 and 6.

3.18. Model 7 and Model 8 suggest that persistent absenteeism has declined by approximately 20% for Year 1 and Year 2 pupils in both Early Start and Final Roll-out schools. Analysis undertaken on these school types separately, suggests that the greatest decrease occurs in Final Roll-out schools (Models 9 and 10), at 28%. On the face of it, the estimated reduction in persistent absenteeism seems excessively large. However, published estimates for persistent absenteeism for primary schools published by the Welsh Government, report that levels of persistent absenteeism fell from 3.3% in 2010/11 to 2.6% in 2011/12. Although only a reduction of 0.7 percentage points, in proportionate terms this represents a fall in the rate of persistent absenteeism of 21%. The estimates derived from the statistical models are therefore consistent with published estimates.

3.19. Across the full sample of Year 1 and Year 2 children, the incidence of unauthorised absence appears to have fallen amongst pupils within Final Roll-out schools who followed the Foundation Phase (FP In) when compared to children in these schools who were not in the Foundation Phase (FP Out). This finding applies to both Year 1 (Model 13) and Year 2 (Model 14) pupils. After controlling for the characteristics of pupils and schools, pupils within the Foundation Phase are approximately 20% less likely to have an unauthorised absence overall.

3.20. The analysis presented in Table 6 also confirms higher levels of unauthorised absence within Pilot schools and Early Start schools after controlling for pupil characteristics. Furthermore, in Early Start schools there is no evidence of a reduction in the levels of unauthorised absence following the introduction of the Foundation Phase. Indeed, analysis based only on data from Early Start schools suggests that levels of unauthorised absence may have increased. However, it is noted that the number of pupils in the schools is relatively small and the estimated increase in levels of unauthorised absence are not statistically significant.

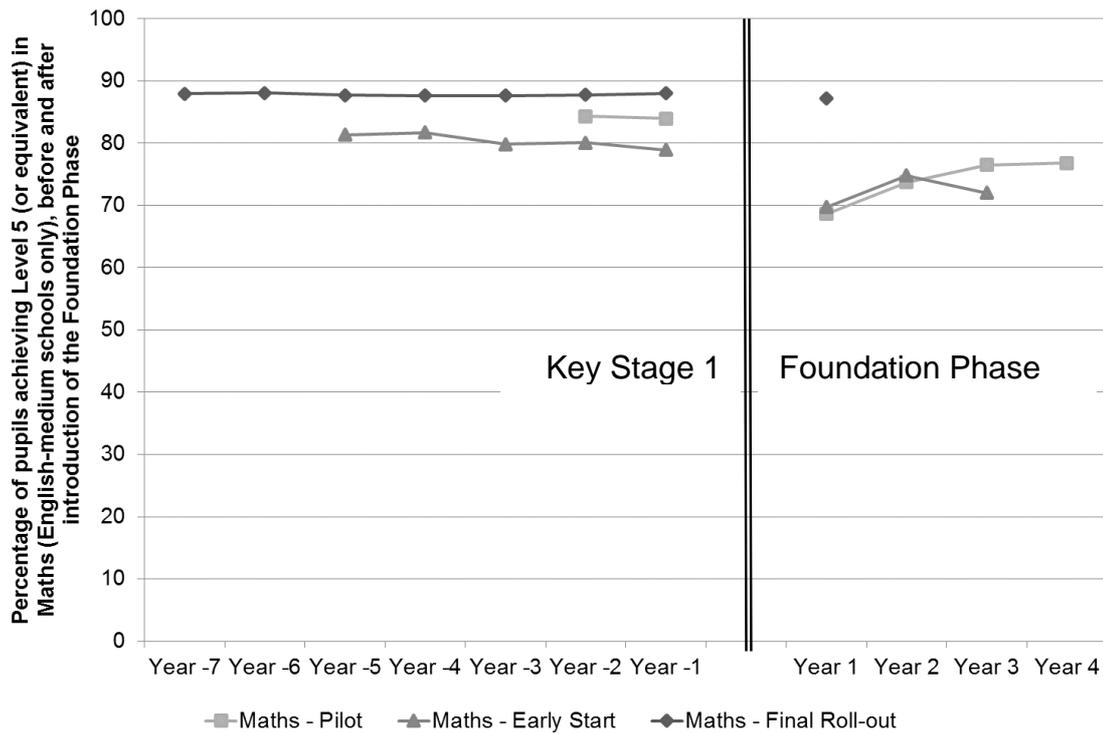
4 Comparing Key Stage 1 and Foundation Phase Outcomes

- 4.1. The introduction of the Foundation Phase was accompanied by change in the methods by which pupils were assessed at the end of Year 2 (age seven). Those who were previously assessed according to the KS1 National Curriculum were graded to one of six levels, including working towards Level 1, Level 1 and so on up to Level 5. These grades were awarded for maths, science, English and Welsh. In practice, only a very small number of pupils achieved Level 4 or Level 5 by the end of Year 2. A majority of pupils achieved Level 2 in each of these subject areas, Level 2 being the expected level of attainment for Year 2 pupils.
- 4.2. Conversely, in the End of Foundation Phase Assessments pupils are graded to one of seven levels (including working towards Level 1, Level 1 and so on up to Level 6) for Personal and Social Development, Well-being and Cultural Diversity (PSDWCD), Language, Literacy and Communication Skills (LLC) and Mathematical Development (MD). In English-medium schools, pupils are also assessed against the Welsh Language Development (WLD) area of learning. Initially it was only a statutory requirement for schools to compile and report Foundation Phase assessments in two areas of learning, LLC and MD – and these are the focus of this analysis. Under the Foundation Phase, the majority of Year 2 pupils are expected to achieve Level 5.
- 4.3. The availability of data over successive years both before and after the introduction of the Foundation Phase means that it is possible to track levels of attainment within Pilot, Early Start and Final Roll-out settings. Here we focus on the proportion of pupils who achieved the expected levels of attainment during KS1 and FP. The analysis is restricted to English-medium schools due to the relatively small sample sizes associated with Welsh-medium schools among the Pilot settings.

- 4.4. In our previous report (Davies *et al.* 2013) we indicated that the introduction of the Foundation Phase resulted in a discontinuity in assessment data within Pilot and Early Start schools. As a result, it was difficult to assess whether the introduction of the Foundation Phase resulted in improved outcomes at the end of Year 2 within these schools. However, with the inclusion of the first cohort of Foundation Phase outcomes in the majority Final Roll-out schools we now find a high level of consistency in the levels of attainment achieved by pupils before and after the introduction of the Foundation Phase. It is apparent that a similar proportion of pupils achieve the expected level at Foundation Phase (Level 5) than those who achieved the expected level at KS1 of the National Curriculum (Level 2) across a variety of subject areas. This could suggest that there was a particular issue for teachers in Pilot and Early Start schools as they moved from Key Stage 1 assessments to Foundation Phase outcomes. However, it could also suggest that the more recent Final Roll-out schools are not employing the full range of levels that the Foundation Phase outcomes provides and that we initially saw being used in Pilot and Early Start schools.
- 4.5. Figures 3 and 4 demonstrate that within Pilot schools, the introduction of the Foundation Phase contributed to a discontinuity in levels of attainment. It is observed that in these schools, the introduction of the Foundation Phase was associated with a 15 percentage point reduction in the proportion achieving the expected level in maths (from 85% to 70%) and a 10 percentage point reduction in the proportion achieving the expected level in English. Such discontinuities are less evident among Early Start schools, although it remains the case that the introduction of the Foundation Phase is associated with a reduction in the proportion of pupils achieving expected levels of attainment.
- 4.6. By the time that the Foundation Phase was introduced in Final Roll-out settings, the levels of attainment achieved by pupils appear to be much more consistent with that previously achieved under KS1. But either way, this analysis demonstrates that we are unable to identify any

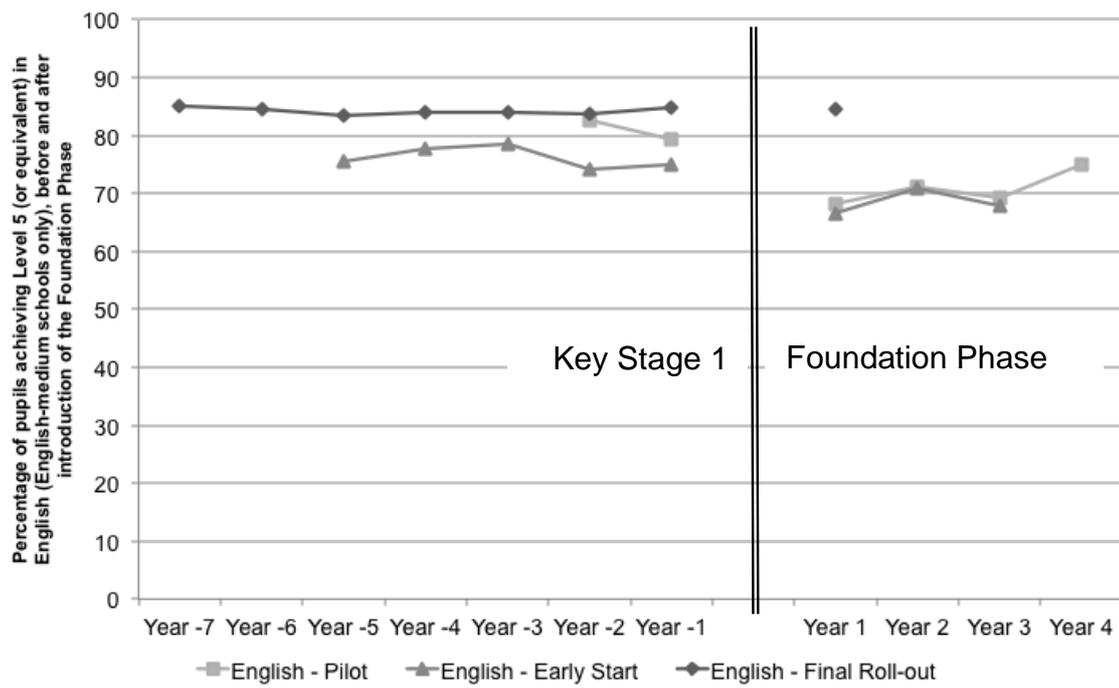
significant improvement in maths and English outcomes (in English-medium schools) at the end of Year 2 following the introduction of the Foundation Phase. However, further more detailed comparison of outcomes at the end of Year 2 is still not possible for two main reasons. First, the discontinuity in attainment levels in Pilot and Early Start reminds us that making before and after comparisons of attainment levels may be problematic due to inconsistencies in how attainment levels are being recorded following the introduction of the Foundation Phase. And second, any comparison for Final Roll-out schools would be dependent on just using the first year of outcome data following the introduction of the Foundation Phase.

Figure 3: Continuity in KS1/FP Outcomes: Maths



Source: NPD: 2004/05-2011/12

Figure 4: Continuity in KS1/FP Outcomes: English



Source: NPD: 2004/05-2011/12

5 The Outcomes of Foundation Phase Pupils at Key Stage 2

- 5.1. There are several benefits associated with considering the relative performance of FP pupils at Key Stage 2 (KS2). Firstly, *all* children are assessed on a consistent basis⁷, irrespective of whether or not they were assessed via the Foundation Phase at Year 2. Comparisons are therefore not hampered by changes in assessment methods. Beyond issues of measurement, if the possible benefits associated with the Foundation Phase take a longer period to be realised (i.e. when the children are older), these effects may only be captured through an examination of KS2 data. The disadvantage of examining KS2 outcomes is that, at the time of writing, only three cohorts of FP pupils from Pilot settings have been assessed at KS2. No children from the Early Start or Final Roll-out schools have yet been assessed at KS2 (see Table 7). However, this second NPD report using 2011/12 data provides a further 669 pupils from Foundation Phase Pilot schools who have now completed KS2 (nearly trebling the relevant sample size for comparison).
- 5.2. Tables 8, 9 and 10 provide information on the KS2 attainment levels of pupils from different schools in English, maths and science respectively. Assessments related to Welsh are excluded from the analysis due to the relatively small sample sizes associated with this subject area.
- 5.3. These tables also compare the outcomes for different groups of pupils, by gender, ethnicity, free school meal status, and special educational needs. We are primarily interested in comparing pupils who attended Pilot schools before the Foundation Phase was introduced (FP Out) and after it was introduced (FP In). We also include the levels of achievement of pupils in other schools for context despite none of them having experienced the Foundation Phase.

⁷ At least within the context of ensuring consistency within and across teacher assessments.

5.4. The data refer to the proportion of pupils who achieved Level 4 or above; Level 4 being the expected level of attainment of Year 6 pupils.

5.5. Figure 5 then summarises KS2 attainment levels of all pupils from Pilot settings in English, maths and science respectively.

Table 7: Availability of Key Stage 2 Outcomes for Foundation Phase Pupils, by Phase of Roll-out

	Pilot		Early Start	Final Roll-out	Total
	FP Out	FP In	FP Out	FP Out	
2011/12	669	0	980	32,873	34,522
2010/11	350	265	971	31,926	33,512
2009/10	52	597	970	30,706	32,325
2008/09	0	629	947	30,270	31,846
All pupils	1,071	1,491	3,868	125,775	132,205

Source: NPD: 2008/09-2011/12

Table 8: Percentage of Pupils Achieving Level 4 (or above) in KS2 English, by Phase of Roll-out

	Pilot		Early Start	Final Roll-out	Total
	FP Out	FP In	FP Out	FP Out	
Gender					
Male	70.8	75.6	68.5	79.2	78.8
Female	80.0	88.6	80.9	88.5	88.3
<i>Differential</i>	-9.2	-13.1	-12.4	-9.4	-9.5
Ethnicity					
Non-white	83.5	83.3	76.8	83.2	83.0
White	74.3	81.6	74.3	83.8	83.4
<i>Differential</i>	9.1	1.8	2.6	-0.6	-0.5
FSM Status					
Non-FSM	78.5	84.4	81.4	87.2	87.0
FSM	65.2	72.1	63.2	68.2	67.9
<i>Differential</i>	13.3	12.4	18.2	19.0	19.1
SEN Status					
No	85.5	94.1	88.8	93.4	93.2
Yes	48.9	53.8	48.4	54.6	54.3
<i>Differential</i>	36.6	40.3	40.4	38.7	38.9
All pupils	75.4	81.8	74.5	83.7	83.4

Source: NPD: 2008/09-2011/12

Table 9: Percentage of Pupils Achieving Level 4 (or above) in KS2 Maths, by Phase of Roll-out

	Pilot		Early Start	Final Roll-out	Total
	FP Out	FP In	FP Out	FP Out	
Gender					
Male	78.5	82.7	75.9	83.1	82.9
Female	79.2	84.8	79.6	86.9	86.6
<i>Differential</i>	<i>-0.7</i>	<i>-2.1</i>	<i>-3.7</i>	<i>-3.7</i>	<i>-3.7</i>
Ethnicity					
Non-white	84.3	83.8	82.0	83.9	83.8
White	78.1	83.6	77.2	85.0	84.8
<i>Differential</i>	<i>6.2</i>	<i>0.2</i>	<i>4.9</i>	<i>-1.2</i>	<i>-0.9</i>
FSM Status					
Non-FSM	82.5	86.8	83.8	88.1	88.0
FSM	67.0	72.1	67.5	70.8	70.6
<i>Differential</i>	<i>15.6</i>	<i>14.7</i>	<i>16.3</i>	<i>17.3</i>	<i>17.3</i>
SEN Status					
No	89.0	93.8	90.9	93.7	93.6
Yes	52.2	60.6	53.5	58.6	58.4
<i>Differential</i>	<i>36.8</i>	<i>33.2</i>	<i>37.4</i>	<i>35.1</i>	<i>35.2</i>
All pupils	78.8	83.7	77.7	85.0	84.7

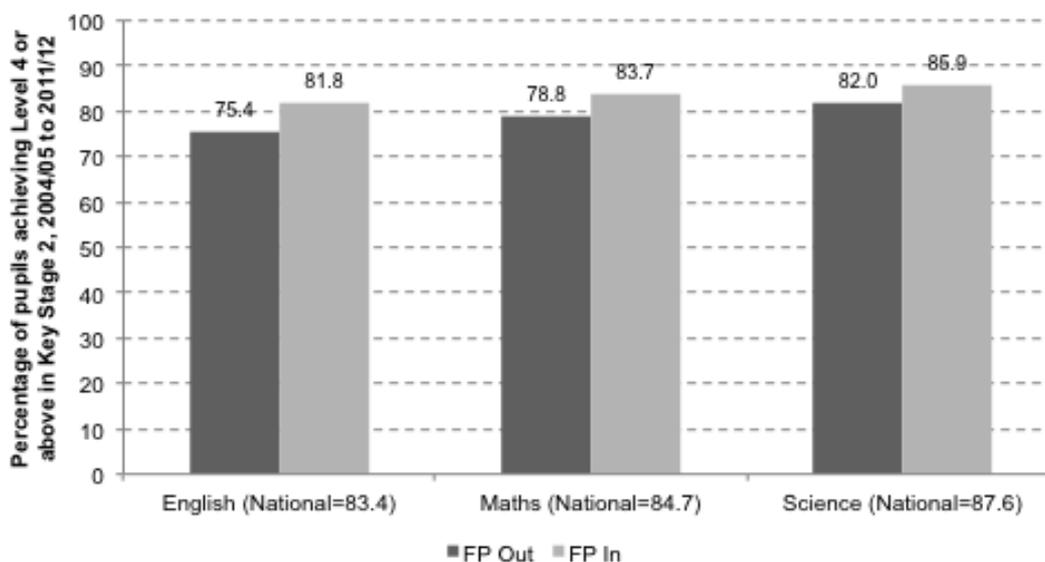
Source: NPD: 2008/09-2011/12

Table 10: Percentage of Pupils Achieving Level 4 (or above) in KS2 Science, by Phase of Roll-out

	Pilot		Early Start	Final Roll-out	Total
	FP Out	FP In	FP Out	FP Out	
Gender					
Male	81.3	82.5	79.3	85.7	85.5
Female	82.6	89.7	83.3	90.0	89.8
<i>Differential</i>	-1.3	-7.1	-4.0	-4.3	-4.3
Ethnicity					
Non-white	89.6	84.8	87.8	86.9	86.9
White	81.0	86.1	80.4	87.9	87.6
<i>Differential</i>	8.6	-1.3	7.3	-1.0	-0.7
FSM Status					
Non-FSM	85.7	88.0	86.9	90.8	90.6
FSM	70.0	78.5	71.8	74.6	74.4
<i>Differential</i>	15.7	9.5	15.1	16.2	16.2
SEN Status					
No	90.6	95.9	93.4	95.6	95.5
Yes	59.2	63.4	58.9	64.4	64.2
<i>Differential</i>	31.5	32.5	34.5	31.1	31.3
All pupils	82.0	85.9	81.2	87.8	87.6

Source: NPD: 2008/09-2011/12

Figure 5: Percentage of Pupils from Pilot Schools Achieving Level 4 (or above) at Key Stage 2



Source: NPD: 2008/09-2011/12

- 5.6. From the outset it is important to note that attainment at KS2 among children who attended Pilot schools was lower on average than those observed among the wider population of KS2 pupils in Wales (see also Davies *et al.* 2013). This is consistent with what we know about the relatively disadvantaged characteristics of children who attended these schools, including higher levels of entitlement to FSM and a higher proportion that are assessed as having SEN at KS1.
- 5.7. But as Figure 5 clearly illustrates, levels of attainment of pupils from Pilot schools at KS2 and who were assessed via the Foundation Phase, are higher than those of pupils who were assessed via KS1 of the National Curriculum. This is consistent with what we previously reported, albeit with a larger but still relatively small sample size.
- 5.8. A problem underlying such 'simple' comparisons of attainment levels before and after the introduction of the Foundation Phase, is that they could simply reflect improving levels of attainment at KS2 more

generally. To take this into account, statistical matching techniques⁸ are used to match pupils from Pilot schools to comparable pupils from comparable schools within the wider population. Changes in relative KS2 attainment levels among KS1 and Foundation Phase pupils are then compared. Our interest is therefore in how any pre-existing differentials in attainment levels change following the introduction of Foundation Phase.

5.9. The analysis is conducted in two stages. Firstly, a ‘baseline’ comparison of KS2 attainment is made by comparing the outcomes of pupils who attended Pilot schools, and who were not assessed by the Foundation Phase, with pupils from Final Roll-out schools. The baseline analysis aims to identify any differences in the levels of attainment of these pupils prior to the introduction of the Foundation Phase that could be due to otherwise unobservable pupil or school characteristics that cannot be taken into account within the statistical analysis. These are the estimated percentage point differentials presented in Table 11 for pre-Foundation Phase pupils.

5.10. Then the PSM analysis is repeated for pupils who attended Pilot schools and who were assessed in the Foundation Phase (i.e. they fully participated in the Foundation Phase). Their levels of attainment are again compared to a matched sample of pupils in Final Roll-out schools for the equivalent years. The estimated percentage point differentials for post-Foundation Phase pupils are presented Table 11. This analysis differs from that presented in an earlier report (Davies *et al.* 2013) with the inclusion of an additional cohort of post-Foundation Phase pupils who attended the Pilot schools.

5.11. We see that the estimated percentage point differentials are greater for the post-Foundation Phase pupils than they were for the pre-Foundation Phase pupils in all three subjects. This confirms the

⁸ The technique used is Propensity Score Matching and an overview of this is provided at Appendix B.

findings presented previously in Davies *et al.* (2013) that suggests a relative improvement in the attainment of pupils at the end of KS2 who participated in the Foundation Phase in Pilot schools.

Table 11: PSM Analysis of the Effect of the Foundation Phase on Key Stage 2 Outcomes

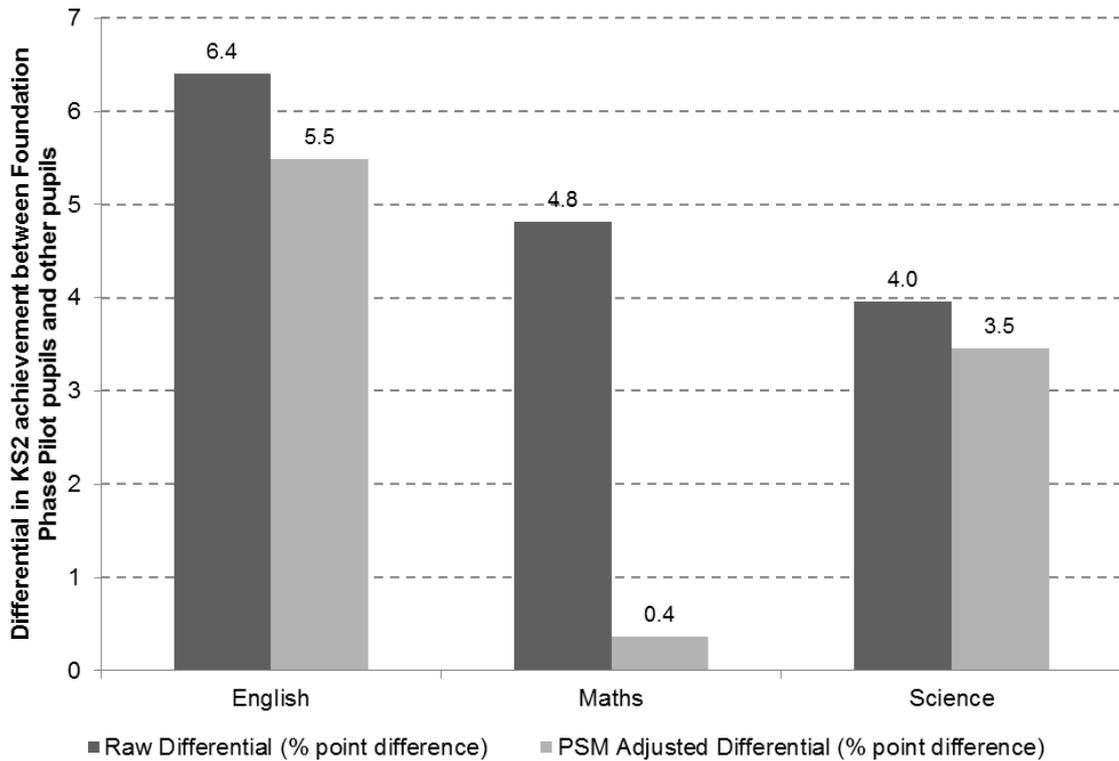
Calliper	Estimated % Point Differential Relative to Matched Control Group			
	None	0.001	0.0001	Average
English				
Pre-Foundation Phase				
With replacement	0.03	0.03	0.02	0.02
<i>n</i>	931	923	902	
Post-Foundation Phase				
With replacement	0.10	0.10	0.11	0.08
<i>n</i>	1,400	1,384	1,314	
Maths				
Pre-Foundation Phase				
With replacement	0.08	0.08	0.07	0.06
<i>n</i>	931	923	902	
Post-Foundation Phase				
With replacement	0.08	0.08	0.08	0.07
<i>n</i>	1,400	1,384	1,314	
Science				
Pre-Foundation Phase				
With replacement	0.03	0.03	0.02	0.02
<i>n</i>	931	923	902	
Post-Foundation Phase				
With replacement	0.06	0.06	0.07	0.05
<i>n</i>	1,400	1,384	1,314	

Source: NPD: 2008/09-2011/12

5.12. The relative difference in the achievement of 'matched' Foundation Phase pupils compared to matched KS1 pupils is presented in Figure 6. These are presented alongside the 'raw' percentage point differentials between the KS2 attainment of all Foundation Phase pupils

and the KS2 attainment of all non-Foundation Phase pupils over time (from Figure 5).

Figure 6: Relative Attainment of Pupils from Pilot Schools at Key Stage 2: Raw Differential and Matched Pairs Comparisons of Percentage Achieving Level 4 (or above)



Source: NPD: 2008/09-2011/12

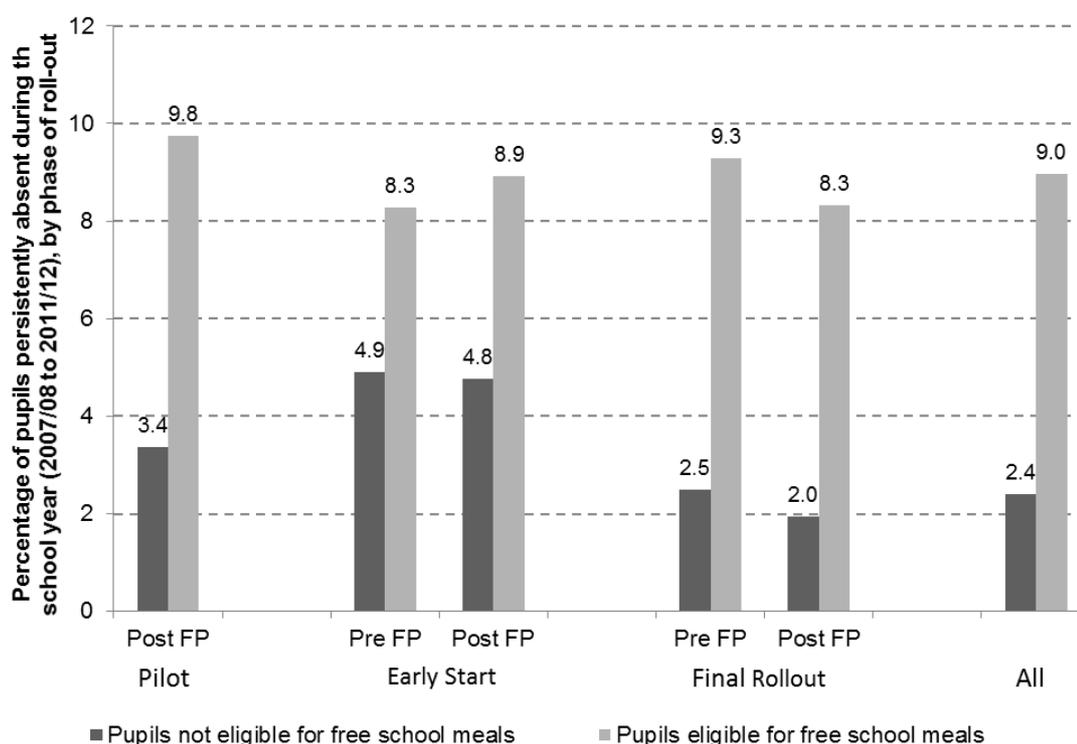
5.13. Figure 6 shows that in English and science, based upon matched comparisons with pupils in non-FP settings, the introduction of FP within Pilot schools was associated with improvements in relative attainment at KS2. In English we estimate that the proportion of pupils achieving Level 4 or above in KS2 increased by at least 5.5% points following the introduction of the Foundation Phase, and at least a 3.5% point improvement in science. However, it also demonstrates that the apparent improvement in maths achievement at KS2 shown in Figure 6, is almost insignificant after controlling for improvements in maths achievement in KS2 generally – we estimate that 0.4% point more

pupils achieved Level 4 or above in maths after participating in the Foundation Phase.

6 Inequalities in Outcomes

- 6.1. An important feature of the Foundation Phase was to reduce inequalities in social and education outcomes. However, our initial analysis revealed that the introduction of the Foundation Phase is not, to date, associated with changes in the differences in outcomes between population sub-groups, such as those defined by gender, ethnicity and socio-economic background (Davies *et al.* 2013).
- 6.2. This latest analysis utilising NPD data from 2011/12 continues to show that inequalities continue to persist in terms of both absenteeism and attainment. Those groups who exhibit the largest disadvantages in terms of educational outcomes continue to be those who are eligible for Free School Meals (FSM) and those who have Special Educational Needs (SEN).
- 6.3. By way of example, we consider here inequalities in persistent absenteeism and inequalities in Key Stage 2 attainment.
- 6.4. Figure 7 shows the differentials in persistent absenteeism for pupils in Early Start and Final Roll-out schools. In both sets of schools, differences in the relative levels of persistent absenteeism between pupils eligible for FSM and all other pupils remains the same before and after the introduction of the Foundation Phase. As suggested above, persistent absenteeism amongst FSM pupils in Early Start schools appears to have worsened relative to levels of persistent absenteeism amongst other pupils in those schools.
- 6.5. These patterns of inequalities of persistent absenteeism remain the same even after controlling for other characteristics of pupils.

Figure 7: Inequalities in Persistent Absenteeism (Year 1 and Year 2)



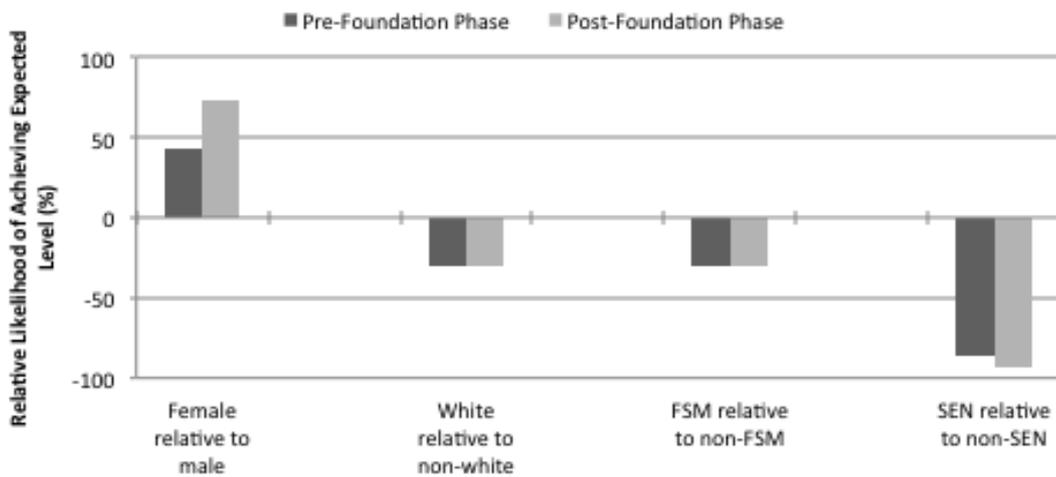
Source: NPD: 2007/08-2011/12

6.6. Figure 8 illustrates the apparent impact of the Foundation Phase on inequalities in Key Stage 2 English for pupils attending Foundation Phase Pilot schools⁹. Figures 9 and 10 present the same results for Key Stage 2 maths and science, respectively. Here we present the estimates from multivariate analyses in KS2 achievement in each subject that exist between different sub-groups of pupils attending Pilot schools. It should be noted, that the number of pupils upon which this analysis is based remains relatively small; approximately 1,000 Pre-Foundation Phase pupils and 1,500 Post-Foundation Phase pupils. Therefore, the small sample sizes associated with particular population sub-groups may contribute to some instability in the size of estimated differentials, particularly among non-white pupils.

⁹ We can only examine inequalities in KS2 attainment in these schools because Foundation Phase pupils in other schools have yet to reach the end of KS2.

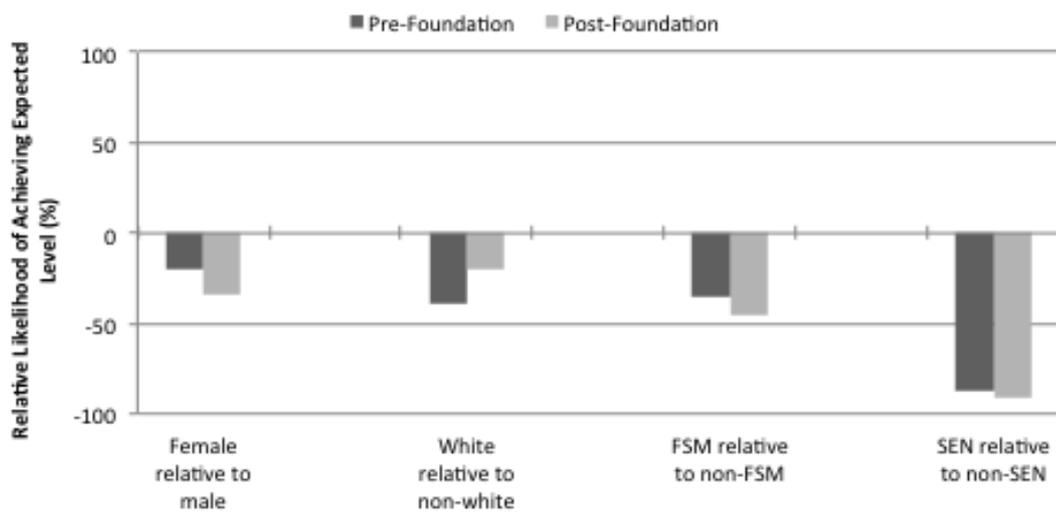
- 6.7. Overall, the analysis reveals that the patterns of inequality that existed prior to the introduction of the Foundation Phase tend to persist following its introduction. However, there are some small but perhaps important changes in inequalities in KS2 achievement that we can observe. For example, we see that inequality gaps in KS2 English (favouring females) (Figure 8) and KS2 maths (favouring males) (Figure 9) appear to widen after the introduction of the Foundation Phase. However, in KS2 science not only has the 'gap' in achievement between males and females narrowed very slightly, it now appears to favour females (having previously appearing to favour males) (Figure 10).
- 6.8. Although the number of non-White pupils is very small in this analysis, the results suggest that the relative low achievement of White pupils compared to non-White pupils prior to the introduction of the Foundation Phase has improved, particularly in KS2 maths and science.
- 6.9. The picture for inequalities in KS2 achievement between pupils eligible for free school meals (FSM) and non-FSM pupils is more mixed. In KS2 English, the 'gap' in achievement remains relatively unchanged. In KS2 maths, the 'gap' appears to have worsened. But in KS2 science, the inequality in achievement of FSM and non-FSM pupils appears to have halved.
- 6.10. Unfortunately, on the basis of this analysis, inequalities in KS2 attainment of SEN and non-SEN pupils remain worryingly large; although again the numbers of SEN pupils in the analysis is small.
- 6.11. These results provide evidence that the Foundation Phase could be having a small impact on some inequalities in educational outcomes. However, there is neither the consistency nor size of impact to suggest that it will make any significant inroads in tackling inequalities in outcomes, certainly not in the foreseeable future.

Figure 8: Inequalities in Key Stage 2 English (Pilot Schools)



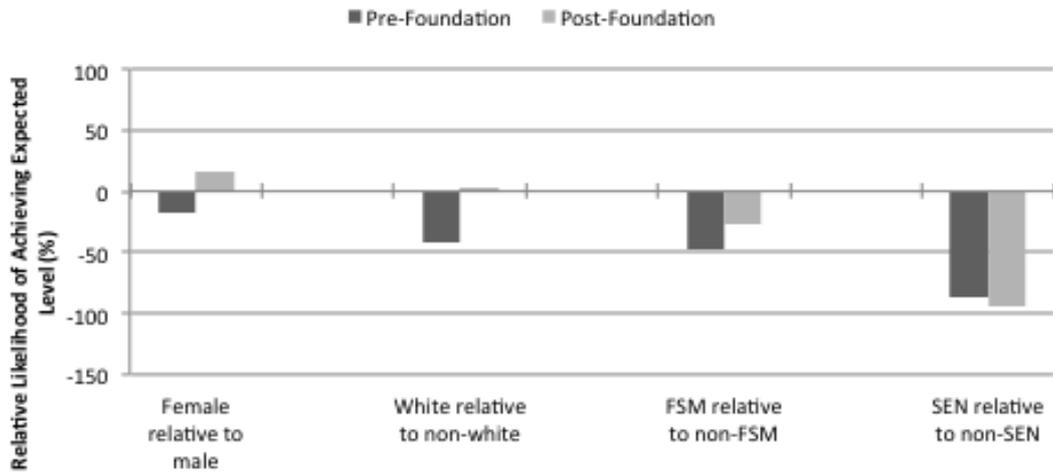
Source: NPD: 2008/09-2011/12

Figure 9: Inequalities in Key Stage 2 Maths (Pilot Schools)



Source: NPD: 2008/09-2011/12

Figure 10: Inequalities in Key Stage 2 Science (Pilot Schools)



Source: NPD: 2008/09-2011/12

7 Conclusions

- 7.1. The report builds on a previous report (Davies *et al.* 2013) to present the latest results of analysis that has aimed to compare the outcomes for children who followed the Foundation Phase, with the outcomes of children who previously followed the KS1 National Curriculum. The report presents findings relating to a number of key outcomes; including
- i. rates and nature of absenteeism;
 - ii. teacher assessments made at Year 2 (i.e. assessments that take place at the end of Key Stage 1 or the Foundation Phase); and
 - iii. teacher assessments made at the end of Key Stage 2 (i.e. at Year 6).
- 7.2. At the outset, it is important to stress the limitations of the analysis. Firstly, the impact of the Foundation Phase is to lead to changes in a broad range of outcomes that cannot be captured by narrowly defined 'bottom line' outcome measures that are collected via teacher assessments. Secondly, whilst the report aimed to take advantage of the sequential roll-out of the Foundation Phase so that 'like with like' comparisons could be made, the content and structure of the analysis has ultimately been determined by the availability of data. The availability of absenteeism data from 2007/08, changes in the way attainment is recorded at Year 2 (introduced under the Foundation Phase) and the limited time that has so far elapsed following the introduction of the Foundation Phase, have each shaped the scope of the analysis.
- 7.3. With these caveats in mind, several key findings emerge that either tend to support those presented in the previous report or that may now appear to highlight the positive impact of the Foundation Phase.

- 7.4. **Firstly, levels of absenteeism appear to have fallen, particularly in terms of persistent absenteeism** – i.e. where pupils are absent for more than 20% of half-day sessions throughout the academic year. Of course, it is possible that these improvements could be partly due to other interventions to tackle absenteeism over the same time period. However, throughout our analysis of the NPD we attempt to utilise a range of analytical approaches, largely based around the stepped wedge design, to try and isolate the possible impact of the Foundation Phase from other national strategies and interventions that may have occurred at the same time.
- 7.5. **Secondly, the relative KS2 performance of early cohorts of Foundation Phase pupils from Pilot schools appears to have improved.** At this stage, the results cannot be entirely conclusive and are sensitive to the estimation techniques used. Furthermore, results based upon these early cohorts of pupils cannot be generalised to the wider population of Foundation Phase pupils. Nonetheless, there is some tentative evidence to suggest that performance in English, maths and science at KS2 has improved among Foundation Phase pupils. The greater emphasis upon a play-based approach to teaching and assessment, may be acting as a ‘springboard’ to higher levels of attainment at KS2.
- 7.6. **Thirdly, inequalities in outcomes have generally not fallen following the introduction of the Foundation Phase.** The analysis reveals that the introduction of the Foundation Phase is not associated with changes in the differences in outcomes between population sub-groups, such as those defined by gender, ethnicity and socio-economic background. The persistence of inequalities is observed in terms of both absenteeism and attainment. Those groups who exhibit the largest disadvantages in terms of educational outcomes, include those who are eligible for FSM and those who have SEN. Although there are some small and isolated examples of declining educational inequalities following the introduction of the Foundation Phase, the scale and

coverage of these examples does not suggest that the Foundation Phase has, at least not yet, been able to tackle or mitigate the underlying causes of inequalities in education.

- 7.7. This final conclusion is important given other findings reported in the evaluation (see Waldron *et al.* 2014a). For example, according to practitioners in Wales, including head teachers, the majority believe that the Foundation Phase is having a positive benefit on children and learning, and particularly for some key groups of learners, such as boys and children with special educational needs. However, analysis of the NPD thus far does not tend to confirm these views.
- 7.8. This could suggest that the perceived 'benefits' of the Foundation Phase are not sufficient enough to be realised in terms of changes in educational achievement. It could also reflect that any benefits of the Foundation Phase are broader than the narrow measures of educational achievement considered here.
- 7.9. It could also highlight possible prejudices or very subjective views of practitioners about the Foundation Phase. It is also quite possible that any impact of the Foundation Phase on educational outcomes is being diluted by observed variations in the degree of implementation of the Foundation Phase in schools and classrooms (Waldron *et al.* 2014b).
- 7.10. Furthermore, it is generally well accepted that focussed and targeted interventions are more appropriate for tackling educational inequalities than universal interventions such as the Foundation Phase (Kerr and West 2010).
- 7.11. This report represents the second iteration of analysis based upon administrative data held on the NPD. Before the three-year evaluation ends, it would be possible to include an additional year of NPD data for 2012/13 in further analysis. However, according to our review of Foundation Phase schools and pupils the only real benefit of including this additional year of data, would be to include an estimated 48 pupils

who attended an Early Start school who will have reached the end of Key Stage 2. Given the uneven and very small distribution of these pupils across Early Start schools, their inclusion in analysis of KS2 outcomes will inevitably be problematic. Since this second iteration of NPD analysis with the addition of 2011/12 data has tended to only confirm findings from initial analysis up to and including 2010/11 data, we do not expect the inclusion of 2012/13 data to alter our findings.

7.12. Instead, further analysis of NPD data will concentrate on the possible links we can make between educational outcomes (as reported here and in Davies *et al.* 2013) with other aspects of the evaluation. In particular we will be keen to explore the relative impact of the Foundation Phase on outcomes by observed implementation of the Foundation Phase. This could be crucial in attempting to isolate the possible impact of the Foundation Phase *if* it were being implemented fully.

7.13. The evaluation will also examine any association between the Foundation Phase, child involvement and wellbeing (Waldron *et al.* 2014c), and educational outcomes.

References

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Appendix A. Contents of the National Pupil Database

Extracts from the NPD were supplied to the research team in the form of an Access database comprising of a series of linkable tables. The contents of the database can broadly be summarised as follows.

PLASC 2004/05-2010/11 for KS1 (Nursery-Year 2)

- The Pupil Level Annual Schools Census (PLASC) is a census of pupils taken in January each year. The data provides individual level information on the demographic characteristics of pupils (age, ethnicity and gender), information on Special Educational Needs (distinguishing SEN status according to whether pupils are Action, Action Plus or Statemented) and whether pupils are eligible for Free School Meals (FSM). Records are available for Nursery 1, Nursery 2, Reception, Year 1 and Year 2. Pupils can therefore appear in the database for a period of up to five years, although a majority are first observed during reception.

Absenteeism (Yr 1+, 2007/08+)

- Individual level data shows the number of sessions that a pupil attended school in a given academic year. The total number of sessions that a pupil could have attended school is also provided, allowing a measure of the proportion of time spent in school to be derived. Information is also provided about whether or not these absences were authorised.

Pupil teacher ratios (Reception+, 2004/05+)

- This table provides annual data on the number of pupils and adults within a school. The level of detail contained within the data varies by school. For some schools, only a single report is made. Such reports cover all classes (e.g. 5 classes, 80 children, 10 staff). For other schools, several entries are made in relation to separate year groups, classes or groups of classes. Some entries refer to mixed year groups.

Outcomes (Year 2 pupils)

- Outcome data is available in separate tables of data according to whether pupils are being assessed via the Foundation Phase or via KS1 of the National Curriculum. For each pupil, separate entries are made for each subject area being assessed. Both subject areas and assessment levels differ between assessments conducted via KS1 and the Foundation Phase.

Appendix B. Overview of Propensity Score Matching¹⁰

Conditional Independence Assumption

The key assumption made in matching models is the Conditional Independence Assumption (CIA), also known variously as ignorability and unconfoundedness. The treated and untreated groups may differ because they have different characteristics. Some of these characteristics (e.g. gender or age) are observable and can be used as control variables to adjust for differences between the groups. Others are unobservable, but any comparison has to assume that these unobservables do not have a systematic effect on the outcomes that varies across the two regimes. The CIA is a statement of conditions under which the effects of the unobservables can be ignored. The CIA or its equivalent, underlies simple comparisons of mean values. In the context of evaluating the Foundation Phase, it is important that schools selected to take part as Pilot or Early Start schools were not selected for unobservable reasons that could contribute to differential outcomes among pupils from these schools (e.g. under-performing schools).

Each pupil in the Foundation Phase (treatment) sample and the non-Foundation Phase (control) sample has certain observable characteristics such as gender, age, ethnicity, FSM status and SEN status. These variables are individually referred to as Z_k and collectively as the vector Z . If each individual is denoted by subscript i , the data comprise observations on outcomes and characteristics (Y_i, Z_i) . Each pupil can attain values for the outcome variable Y (e.g. attainment of the expected assessment level), firstly assuming that they were covered by the Foundation Phase (Y_1) and secondly, that they were not (Y_0). One of these states will actually occur and the other – the counterfactual - will be hypothetical. The CIA states that the outcome values in each regime (the values of Y_0 and Y_1) do not depend on whether the individual is a Foundation Phase participant once the values of the control

¹⁰ The material in this appendix is drawn from the report of the 2010 ESF Leavers Survey (Davies *et al.* 2010) which also employed statistical matching techniques in the evaluation of the effectiveness of ESF funded labour market interventions.

variables are taken into account¹¹. If we take two individuals, A and B, with identical values of the control variables ($Z_A=Z_B$), the differences in their outcome values (A's and B's values of Y_0 and A's and B's values of Y_1) are randomly determined and do not depend on whether they are treated or not. If A is a Foundation Phase participant and B is not, we can use B's actual value of Y_0 to predict what would happen to A if they were not to participate in the Foundation Phase programme and A's actual value of Y_1 to predict what would happen to B if they were to participate in the programme. In practice, we would wish to reduce the effect of random noise and compare average values for comparable groups.

The CIA relates to the assumption of exogeneity made in regression models. The comparable regression model is:

$$Y_i = \alpha + \delta D_i + Z_i \beta + \varepsilon_i$$

The CIA guarantees the standard exogeneity assumption that D (being a member of the treated sample) and ε are uncorrelated. The regression format makes clear that treatment could affect the outcome directly or indirectly via changes in the values of the control variables. If we wish to identify the total effect of the treatment on Y , we require that the values of Z are not affected by D . In this interpretation used in matching, the control variables can affect the value of D but are not in turn affected by it. We assume our control variables are determined outside of the Foundation Phase programme. Matching is sometimes referred to as selection on observables. It makes an adjustment for the effect of the observable variables and the CIA rules out the possibility of any further selection bias because there is no remaining correlation between the unobservable variables (the error term in the regression above) and treatment status.

Common Support

The common support is the domain over which the control and treatment groups are directly comparable. In simple terms, it is the set of individuals in

¹¹ More formally, $((Y_0, Y_1 \perp D) | \mathbf{Z})$ where \mathbf{Z} is a vector of control variables. We are using \mathbf{Z} rather loosely to represent a theoretically correct set of control variables as well as the actual ones used here.

the control and treatment groups who share similar values of the control variables and who under the right circumstances, could reasonably be expected to be in either group. If there were some types of pupil who were always Foundation Phase participants, then there would be no comparable individuals in the remainder of the NPD sample to make a direct comparison of their outcomes. One weakness of regression-based investigation, is that it may inadvertently make such comparisons by extrapolating the experience of the non-Foundation Phase sample into areas where it is not appropriate. Matching explicitly rules out this possibility by restricting comparisons to the common support. Matching proceeds by taking each treated individual and finding an individual in the control group with similar characteristics. Given the limited number of schools that took part in the early roll-out of the Foundation Phase, comparable pupils should be available from the population of non-Foundation Phase pupils.

Propensity Score Matching

The propensity score is the probability of a pupil participating in the Foundation Phase. It is defined as:

$$p(Z) = \Pr(D=1 | Z)$$

In practice, the propensity score is estimated using a probit or logit model.

The CIA implies that outcome values in each regime (the values of Y_0 and Y_1) do not depend on whether the pupil is a Foundation Phase participant once the values of the propensity score are taken into account¹². In practice, this means that we can match on the propensity score. Conceptually, the simplest type of propensity score matching (PSM) is nearest neighbour matching. The nearest neighbour of a person in the treated sample, is the person in the untreated sample that is the smallest distance away in terms of the propensity score¹³. This criterion may result in poor matches especially if the number in the control sample is small so a calliper is often specified. The calliper specifies a maximum acceptable difference between the two propensity

¹² More formally, $((Y_0, Y_1 \perp D) | p(Z))$ where $p(Z)$ is the true propensity score.

¹³ The measure of distance is the absolute value of the difference in propensity scores. Other measures of distance are possible.

scores. A common practical problem is what to do when there are relatively few controls. Matching without replacement makes the closest match between the control and treated observation and removes the corresponding control from the list available for matching. Matching with replacement allows each control to be potentially matched to more than one treated observation. After each match is made, the control is returned to the pool available for matching.