



Llywodraeth Cymru
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Data Linking Demonstration Project - Flying Start

Research Summary

Social research

Number: 09/2014

1. The Flying Start data linkage demonstration project has been delivered as part of the Welsh Government (WG) Programme to Maximise the Use of Existing Data. It was one of three projects aiming to demonstrate the unique contribution data linking can make to the evidence base. The three projects have examined the WG-funded Secure Anonymised Information Linkage (SAIL) system developed at Swansea University, from acquiring additional data to carrying out analysis on new data sets created by linking existing administrative data in order to deliver policy-relevant findings. SAIL is a Welsh Government (WG) funded facility which contains a growing number of anonymised health and social policy-relevant datasets that, subject to ethical and data controller approval and under to strict information governance arrangements, can be made available for analysis by accredited researchers.
2. Data Linking is a technique for creating links between data sources so that anonymised information that is thought to relate to the same person, family, place or event can be connected for research purposes.
3. Flying Start is the Welsh Government's flagship early years programme and provides a path towards improving the life chances of children in some of our most disadvantaged communities. This multi-disciplinary programme provides a 'universal' set of entitlements which all children under the age of 4, and their families within targeted geographical areas can access. The entitlements offer a range of support that will provide a quality early years provision for the child and a range of support for parents to build skills and resilience.

The 4 key elements are:

- quality part-time childcare for 2-3 year olds in Flying Start areas;
 - an enhanced Health Visiting service (caseloads are capped at 1:110);
 - access to Parenting Programmes; and
 - support for Early Language Development.
4. The projects were delivered by a Knowledge Transfer Research Fellow jointly funded by the Welsh Government (WG) and the Economic and Social Research Council (ESRC) working on a one-year fellowship which ran on a part-time basis over the period from October 2011 to March 2013.

Aims

5. To stimulate engagement of appropriate WG officials with regard to information governance and practical issues around acquiring, processing and analysing new linked data sets.
6. To demonstrate data linkage in a practical way by establishing whether any impact of the Flying Start programme could be identified by analysing linked longitudinal administrative data sets that already routinely flow into the SAIL databank.
7. To demonstrate that routinely collected datasets, handled appropriately, can provide the means to retrospectively establish baselines and provide control groups in order to monitor the effect of an existing intervention, and to prospectively monitor changes in outcomes over time. The recipient population is oblivious to the assessment process so there are no data collection biases and the cost of 'keeping in touch' is avoided.

Methodology

8. The Project focused on eligibility for, rather than receipt of, Flying Start services i.e. the analysis relates to families resident in areas eligible to receive services rather than identifying individuals who were in receipt of services. Data was not available on individual receipt of services.
9. Flying Start Eligible (FSE) areas were defined by WG from school catchments in deprived areas across Wales. A set of 'control' areas was also defined by WG, based on the areas where the 'Next Most Deprived' (NMD) populations were located. The control group was the best comparator available but, being somewhat less deprived, was nevertheless not ideal. Extracting both the FSE and NMD Groups of households from the complete list of households in Wales created a third Group – households in the "Rest of Wales" (RoW).
10. Linkage of these three household Groups to the Welsh Demographic Service (WDS) established which people were associated with the relevant residences on the relevant dates.
11. For each of the three Groups, we established which residences contained a child aged less than 4 years on 1st April of each year, for the years 2004 to 2012. For each residence containing a child of the right age, the complete list of residents was used to create annual population follow-up Groups for FSE, NMD and RoW.

12. For the three Groups, variation in demographic characteristics and in a number of health and education indicators was compared and definitions documented to allow long-term follow up over time. Indicators were chosen according to whether they matched a specific Flying Start indicator or were theorised to align with Flying Start outcomes. Flying Start is designed to improve the home environment and encourage the use of health services where there is a real need, so could potentially influence a range of health outcomes.

Key Findings

13. Flying start is a programme with long term aims, and this Project is only able to report on data for the first couple of years following the establishment of the intervention in 2009. Any changes observed in the selected indicators were therefore expected to be relatively small. The NMD Group was used to control for any underlying population change. We checked whether any remaining i.e. 'excess', changes we did observe were big enough for us to be confident they did not happen purely by chance – such changes are referred to as 'statistically significant' or 'significant'. Other findings where a consistent trend over time was observed, but where that effect was not big enough to reach the level of statistical significance, are nevertheless worthy of note so are reported but using the phrase 'the data suggests'.

14. The analysis compared the average rate for each indicator in the FSE Group for the period before the introduction of Flying Start (2004-2008) with the average rate for the period after Flying Start began (2009-2012), adjusting for any underlying

change in population health using the NMD Group. Areas were not randomly assigned to the FSE and control (NMD) Groups, so it was expected that both observable and unobservable differences in socio-demographic characteristics would exist between the two groups. Caution therefore needs to be exercised when assessing whether any observed changes represent an effect of the intervention. This is an experimental project with limited scope, where lessons have been learned with regard to data quality and further analysis would have assisted with interpretation, so all findings must be viewed with caution.

15. The Project found that for:
- The percentage of low birth weight babies (<2,500 grams): a statistically significant reduction was observed in the number of low birth weight babies born to the FSE Group after 2009.
 - The percentage of pre-term births: the data indicate a significant decrease in pre-term births in the FSE Group after the introduction of Flying Start.
 - The percentage of teenage mothers (aged under 20 years) at birth of first child: the data indicates a significant decrease in first births to teenage mothers in the FSE Group after Flying Start. Although the decrease appeared to begin in 2008, a continuing trend downward from 2009 suggests some form of Flying Start effect.
 - Number of injury and poisoning hospital admissions for babies aged less than 1

year: the data show a statistically significant decrease in the FSE Group after the introduction of Flying Start.

- Primary care interactions for children aged 0-12 years: the data is likely to be biased, since the primary care event data includes fewer GP practices in more deprived areas. Under representation of more deprived areas may lead to us underestimating any effect of Flying Start. Nevertheless, for:
 - Injuries and poisonings: the data suggest a slightly greater decrease between 2004-08 and 2009-12 in the FSE Group compared with the NMD Group.
 - Preventive procedures¹: the data suggest that the number of consultations for the FSE Group increased after 2010 to bring them in line with the numbers seen in the RoW Group.
 - Respiratory conditions: there was a statistically significant *increase* in consultations about respiratory conditions in the FSE Group between 2004-08 and 2009-12; it is not clear whether this should be interpreted as a positive finding (i.e. more FSE children being taken to see the doctor instead of left to get over a cough), or a negative finding (i.e. increasing numbers of respiratory conditions).

¹ "Preventative Procedures" are routine examinations that can be carried out on children as they grow and develop e.g. head circumference, breast feeding, sensory and motor control testing, carried out at specified ages.

- Percentage of 7 year old children meeting the expectation that they would attain level 2 in each subject at KS1: data was only available for 2004-08 so it was only possible to make baseline comparisons between the three Groups. In line with what we know about the relationship between relative deprivation and educational outcomes, fewer children in the FSE Group attained the expected level at KS1 compared with NMD and RoW.
- No significant or noteworthy change was identified in the following indicators when comparing the periods before and after the introduction of Flying Start:
 - maternal smoking in pregnancy;
 - infant Mortality;
 - percentage of mothers breast feeding at birth and at 8 weeks
 - immunisation: percentage receiving the '5 in 1' immunisation by the age of 3 months, the percentage receiving first MMR before the age of 13 months, the percentage receiving first MMR before 3.5 years of age; the percentage of children receiving their second MMR by 3.5 years of age;
 - hospital admissions for babies aged <1 year: all emergencies, infectious disease emergency admissions, admissions for 'signs and symptoms (not otherwise classified)'; and
 - primary care consultations for infectious diseases in children aged 0-12 years.

- No significant change was identified in respiratory condition emergency admissions in babies aged 0-1 years; however, the figures for 2012 show a reduction in the FSE Group not seen in the other two Groups. Further years of data would be required to establish if this is the beginning of a significant downward trend.
16. Looking beyond Flying Start to the contribution the analysis of linked administrative data can make to the evidence base, the Project has demonstrated that data linking can provide significant added value. In particular, that linked administrative data can be used to:
- establish retrospective baselines;
 - create 'control' groups for comparison purposes; and
 - anonymously flag individuals eligible to receive services (and, when data become available, individuals receiving services) to identify changes in service use resulting from the policy intervention.

Discussion

17. The three Groups demonstrated consistent differences across many of the indicators, with FSE, as expected, having relatively poorer health and educational outcomes than the NMD Group and NMD, in turn, having worse outcomes than the less deprived (by default) RoW Group. Therefore, in terms of targeting the *areas* where individuals were most in need, Flying Start does seem to have achieved its objective.
18. As noted above, this is an experimental project and **all findings must be viewed with caution**. It is also possible that other interventions may have influenced the outcomes e.g. Communities First or Families First, but it was not possible within the limited scope of a demonstration project to identify and control for the effects of other interventions. It is also possible that the rate of any underlying population improvement may be greater in areas where there is greater scope for improvement, accounting for some of the 'excess' improvement in the FSE Group.
19. Although only small changes have been detected and not in all of the chosen indicators, the Project does suggest some narrowing in health inequalities between the FSE and NMD Groups in the years following the introduction of Flying Start. Although not all of the findings reach the level of statistical significance, the consistent way in which the three Groups tend to come 'first, second and third' in terms of most indicators (with FSE having the worst outcomes and RoW the best) and the way the gap between the FSE and NMD Groups narrows on a number of indicators taken together represent a somewhat more conclusive picture.
20. After the 2009 introduction of Flying Start, the FSE Group does show significant signs of improvement relative to the NMD Group in terms of reducing pre-term births, births to young mothers and low birth weight babies as well as in hospital admissions and primary care consultations for 'injury and poisoning'. The data also suggests improvements in the number of preventative procedures and the number of Injury and Poisonings recorded in primary care.

21. Having said that, there are some indicators where changes are apparent in the NMD and RoW Groups that are not reflected in the FSE Group e.g. increased primary care consultations for respiratory conditions for NMD and RoW; it is not clear whether this should be interpreted as a positive finding (i.e. more FSE children being taken to see the doctor instead of left to get over a cough), or a negative finding (i.e. indicating worse respiratory condition rates in these children).

Next steps

22. If, in future, data on the individual receipt of Flying Start services becomes available, the analysis can be completed with greater precision and without the 'diluting' effect on findings of eligible individuals who have not received services.

23. Using linked administrative data and undertaking longitudinal analysis both add massive complexity to any analytical task. More work will be needed for WG and SAIL to jointly decide which indicators and from which data sets would provide the best, most comparable outcome indicators for Flying Start over time. This work will inform reporting in future years. Further, as time goes on, data for additional years will become available, allowing examination not just of families newly joining the three population Groups but also the progress of those Groups over a longer follow-up period, for example through to secondary school education.

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

Authors:

Martin Heaven

Health Information Research Unit, Swansea University / Data Linkage Fellow, Welsh Government

Sarah Lowe

Knowledge and Analytical Services, Welsh Government

Contact:

Sarah Lowe

Phone: 029 2082 6229

Email: sarah.lowe@wales.gsi.gov.uk

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