

# Geographical profiling vs individual risk profiling in reducing rates of low birth weight and improving school readiness

**Authors:** Michael Parker (M.J.Parker@swansea.ac.uk) on behalf of the Vulnerable Families team  
Professor Sinead Brophy (S.Brophy@swansea.ac.uk)  
Professor Alan Watkins (A.Watkins@swansea.ac.uk)  
Amrita Bandyopadhyay (A.Bandyopadhyay@Swansea.ac.uk)  
Hope Jones (H.E.Jones@Swansea.ac.uk)  
Julie Evans, Public Health Wales (Julie.Evans4@wales.nhs.uk)

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**This Data Insight explores the Flying Start programme as a geographical profiling tool to anonymously identify vulnerable families. It also explores data driven models as an alternative method of identifying individuals at risk of experiencing adverse events.**

## What we did

Rhondda Cynon Taf County Borough Council provided the data on the rollout of Flying Start in their local authority area. The data showed when the postcodes became eligible for Flying Start, allowing us to anonymously identify who was born in eligible areas. Linked anonymised health data on the mother such as weight, smoking, previous children, health conditions and age were used to predict the likelihood (risk) of a child being born low birth weight and, separately, ready for school. Being school ready indicates that an individual has achieved the minimum social and academic requirements for a child between 6 and 7 years old during foundation phase schooling. Machine learning and traditional statistical methods were used to model individual risk to the child. These models were developed using data from all the other regions of Wales (excluding Rhondda Cynon Taf) and tested in Rhondda Cynon Taf to assess how often it correctly predicted the real life outcome of the child.

## Background

Flying Start, launched in 2006/7, it is the Welsh Government's targeted early years programme and provides support to children and families in some of the most disadvantaged areas in Wales. It offers four main entitlements: an enhanced health visiting service; funded part-time, high quality childcare for 2-3 year-olds; access to parenting support; and support for Speech Language and Communication. A quarter of children born in 2019 lived in a Flying Start area<sup>1</sup>. This work aims to assess if support is best delivered by the area a child lives in or a targeted approach based on individuals' risk factors.

# What we found

## Low Birth Weight

A greater proportion of births in Flying Start areas were low weight compared with the rest of Rhondda Cynon Taf (9.2% vs 7.1%). Flying Start eligible areas saw 24.2% of all low weight births, therefore it missed 75.8% who were born in non-Flying Start areas. When the individual risk model predicted a baby would be low birth weight, it was correct in 17.9% of cases which was 51.2% of all LBW cases. Therefore, the risk model detected 2.1x (51.2/24.2) more low birth weight cases overall and made a correct positive prediction 1.9x (17.9/9.2) more often than geographical profiling by Flying Start.

## School Readiness

There were also increased proportions of children who were not school ready in Flying Start areas compared to the rest of Rhondda Cynon Taf (15.8% vs 12.5%). 32.6% of all children who were not school ready lived in Flying Start areas, with 67.4% living outside. The individual profiling model predicted the real-life outcome 32.9% of the time when identifying not school ready children. This was 44.0% of the overall number of not school ready cases. The model detected 1.3x(44.0/32.6) more not school ready children and made a correct positive prediction 2.1x(32.9/15.8) more frequently than Flying Start.

Children on free school meals with access to Flying Start had an increased chance of being school ready compared with those not in eligible postcodes (77.0% vs 72.7%). The resources made available to families in Flying Start areas are therefore associated with a 4.3% (95% CI: 1.1% to 7.5%) higher chance of being school ready.

## Why it matters

Around one quarter of children younger than four have access to Flying Start<sup>1</sup> and as a result, the majority of children who are not school ready/low birth weight do not live where extra support is available. The proportion of children who are not school ready/low birth weight in Flying Start areas are higher than in the rest of Rhondda Cynon Taf, likely due to these areas being generally more deprived. However, children on free school meals are more likely to be school ready if they live in a Flying Start area, which provides potential evidence of the positive effect of Flying Start support. In this work, individual profiling models predicted more children who experienced adverse events with greater accuracy than the geographical model Flying Start. This suggests that targeted profiling for children may be a viable approach for identifying at risk individuals and helping them get the support they need, regardless of where in Wales they live.

### References

<sup>i</sup> Welsh Government. Flying Start : April 2019 to March 2020 [Internet]. 2021. Available from: <https://gov.wales/flying-start-april-2019-march-2020-html>

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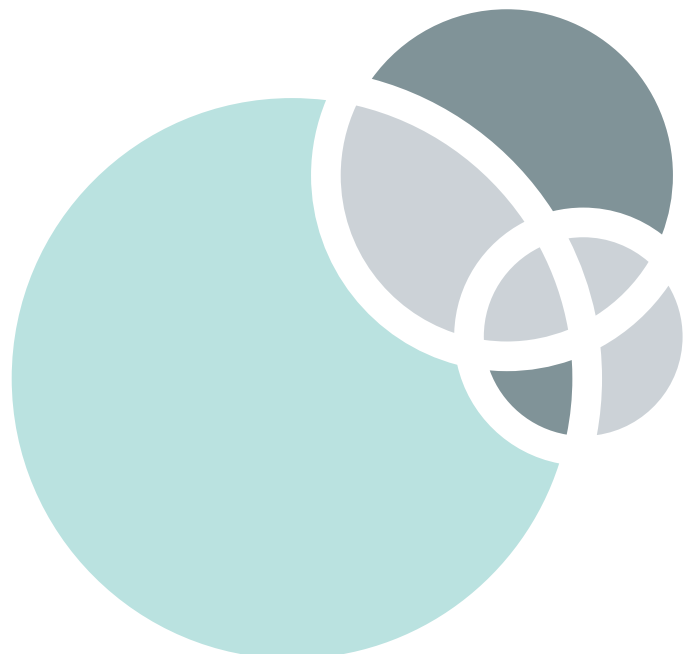
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For further information please contact

[Cathrine.E.Richards@Swansea.ac.uk](mailto:Cathrine.E.Richards@Swansea.ac.uk)

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