Wales Centre for Public Policy
Canolfan Polisi Cyhoeddus Cymru

Have we got the right data to solve the problem?

Welsh Policy and Politics in Unprecedented Times

May 2019

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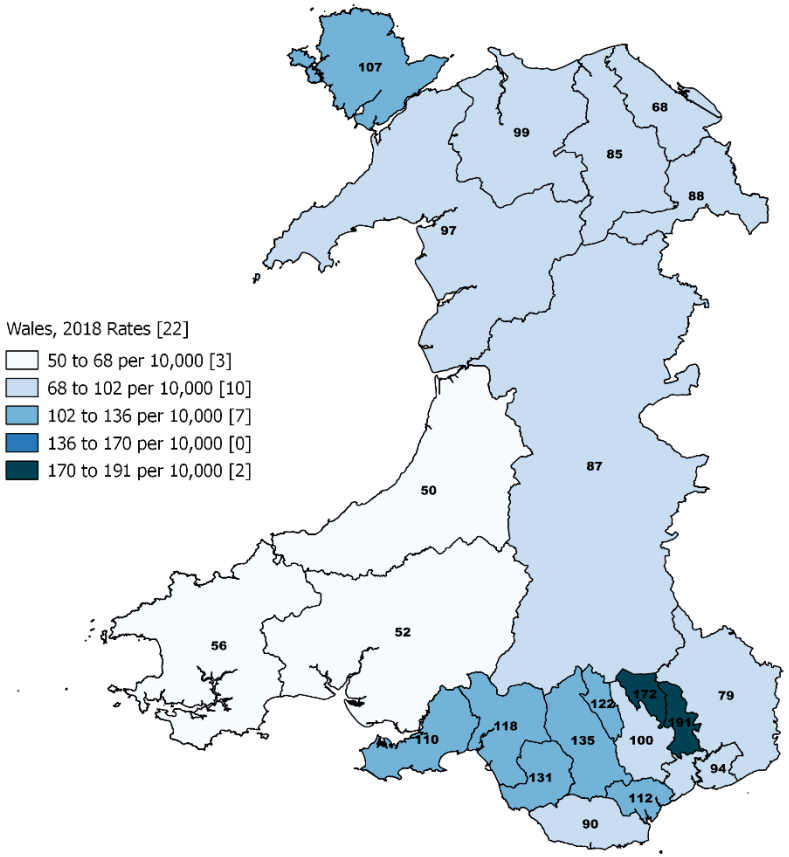
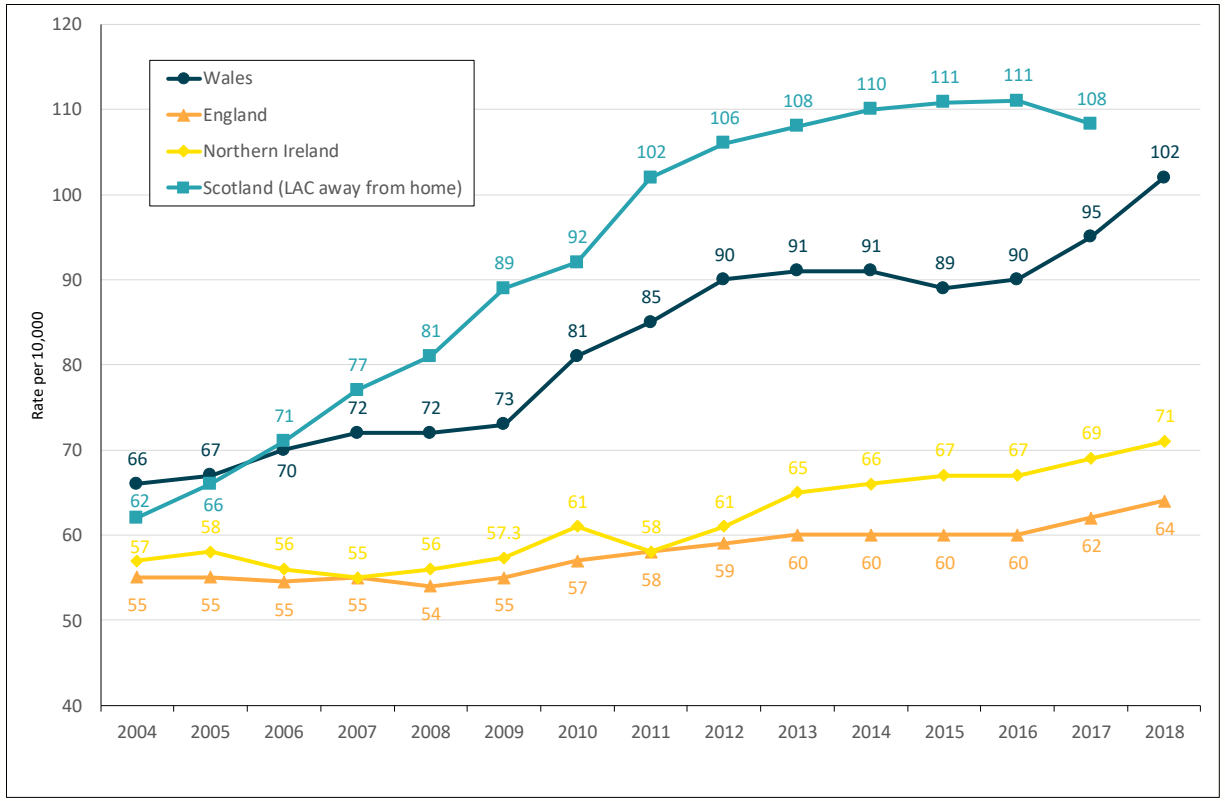
The Motivation …

- Spend on Children's Services has increased, especially the spend on services for Children Looked After:
    - In 2017-18, total spend on children and families services = **£613.1m cf. £531m** 5 years ago (+15.5%)
    - Spend on children looked after services increased by **15.8%** and now accounts for **46.3% of total spend on children and families' services in Wales**
    - Spend per head on children and families' services equivalent to **£975.88 per child** – there are approx. 628,000 children in Wales.
- The number of children looked after on 31st March 2018 was **6,405** - an increase of **11.5%** over 5 years.

Policy / Practice Context

- High rates of children looked after in Wales, with the gap widening between England and Wales
  - Wales: 102 per 10,000
  - England: 64 per 10,000





Lot of variation within Wales – as at 31st March 2018:

- Highest = Torfaen (191 per 10,000)
- Lowest = Ceredigion (50 per 10,000)

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Conceptual Framework

Demand Factors	Interact With	Supply Factors
Contributory structural factors associated with levels of need, for example: • Socio-economic circumstances of families • Community strengths • Neighbourhood conditions • Demographic factors including ethnicity		Contributory structural factors associated with the provision of services, for example: • National legal frameworks, policies, structures, cultures • Local policies, priorities, practices and cultures • The level and distribution of expenditure and resources
To produce variations in Children Looked After and Child Protection Register Rates		

Adapted from the Child Welfare Inequalities Project

Understanding the Drivers

Rates per 10,000
(Cordis Bright, 2013)

Contributing factors:

- ✓ Population size
- ✓ Deprivation
- ✓ Lone parent households

However, they found that the following factors did not explain differences:

- ✘ Age profile of the local popN
- ✘ Average household sizes
- ✘ Population density
- ✘ Proportion from BAME groups
- ✘ Levels of housing overcrowding

Spend on Children's Services
(Making Sense, 2018)

- ✓ Deprivation
- ✓ Size of the 0-25 population
- ✓ Disposable household income
- ✓ Levels of unemployment
- ✓ Levels of crime
- ✓ Safeguarding rates (LAC + CPR)

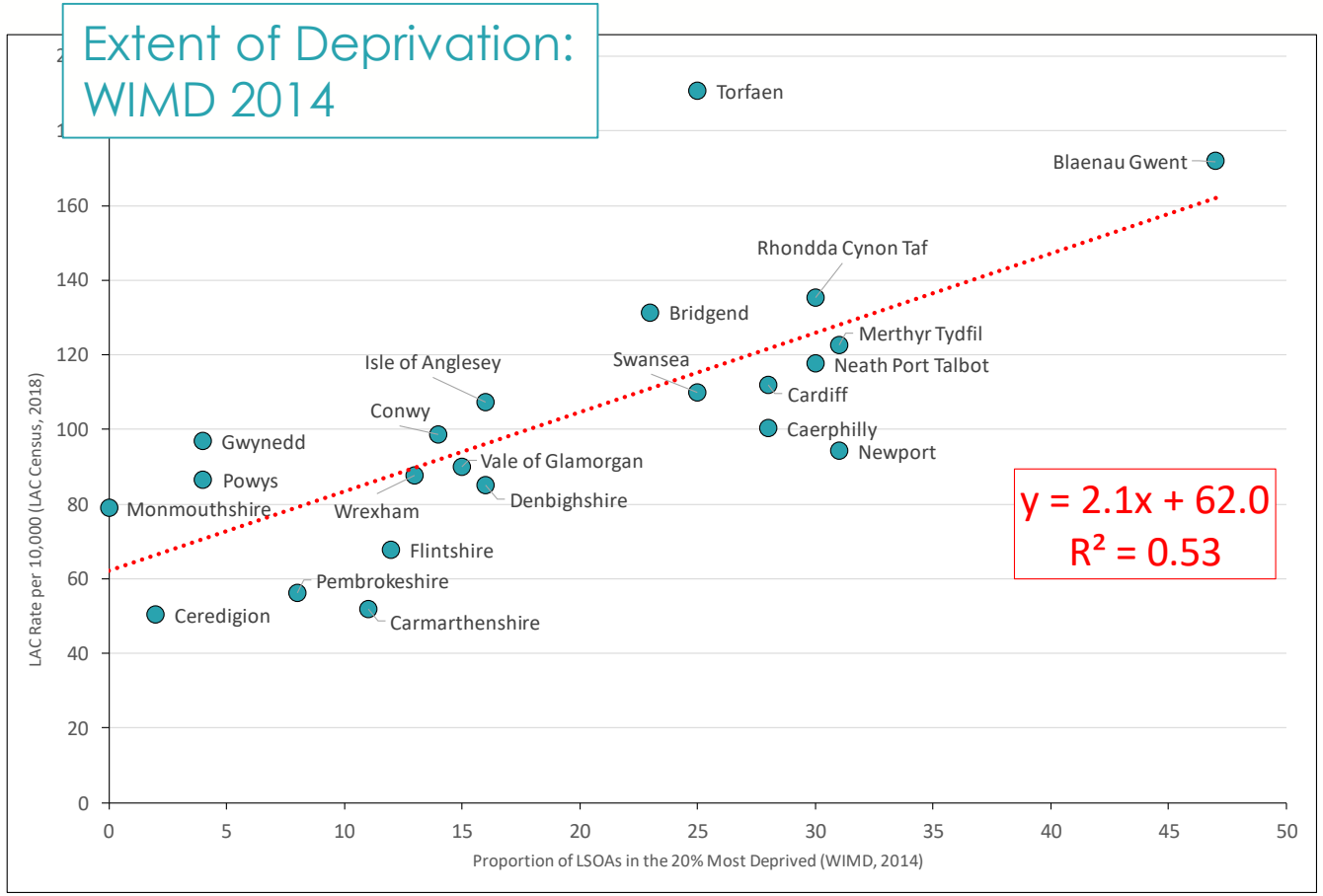
Pressures on Children's Services (WLGA, 2018)

- External demands and complexities
  - Increased awareness eg CSE, ACEs
  - Lack of funding for early intervention
  - "Trigger Trio"
- Placements (availability and costs)
- Legislation and work with the courts
- Workforce

Have we got the right data to solve the problem?

Deprivation

- Source: WIMD 2014
  - 8 domains plus an overall Index
  - LSOAs ranked 1 to 1,909 in Wales
- Extent measured using proportion of LSOAS in the 20% most deprived in Wales (Ranked 1 to 382)



Findings

- Positive correlation (r = 0.73)
- Linear Regression
  - Based on R-squared, 53% of the variation in the rates of children looked after is explained by deprivation

- Based on calculations of spend per head of the child population, deprivation accounts for **59%** of the variation in total spend on children and families within Wales **BUT** only **28%** of the spend on children looked after services.
- However, not possible to determine spend per child looked after.

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Parental Factors: The Trigger Trio

- Data on 5 parental factors available from the Children Receiving Care and Support Survey (pre-2016 collected as part of the Children in Need Survey):
  - Parental mental ill-health
  - Parental substance or alcohol misuse
  - Subject to domestic abuse
  - Parental physical ill-health
  - Parental learning disabilities

The "Toxic" or "Trigger Trio"

- Work commissioned by the Children's Commissioner in England recently sought to estimate the prevalence of the 'trigger trio' and related issues within households with children in the general population (Chowdry, 2018).
  - an estimated 0.9% of all children are in a household where an adult faces all three of the 'trigger trio' issues to a severe extent,
  - 3.6% are in a household where that adult faces the 'trigger trio' issues to a moderate /severe extent.

https://www.childrenscommissioner.gov.uk/wp-content/uploads/2018/07/Vulnerability-Technical-Report-2-Estimating-the-prevalence-of-the-toxic-trio.pdf

Stats Wales

- If only interested in children looked after, then need to change the Child Status
- The default is all Welsh local authorities. Need to separately select the data for each of the 22 local authorities
- Export each area

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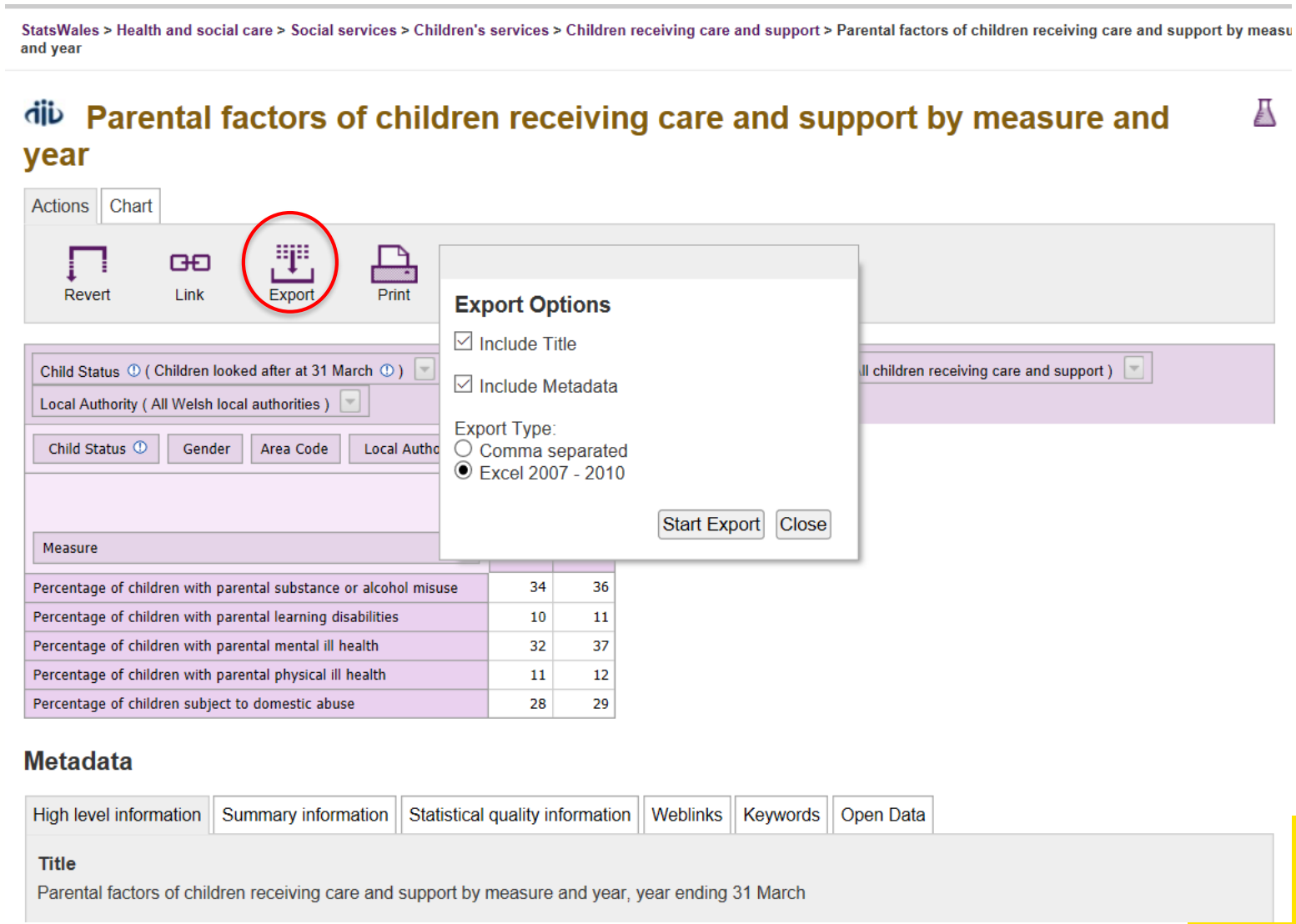
Stats Wales

- If only interested in children looked after, then need to change the Child Status
- The default is all Welsh local authorities. Need to separately select the data for each of the 22 local authorities
- Export each area
- Combine the 23 spreadsheets into a single workbook



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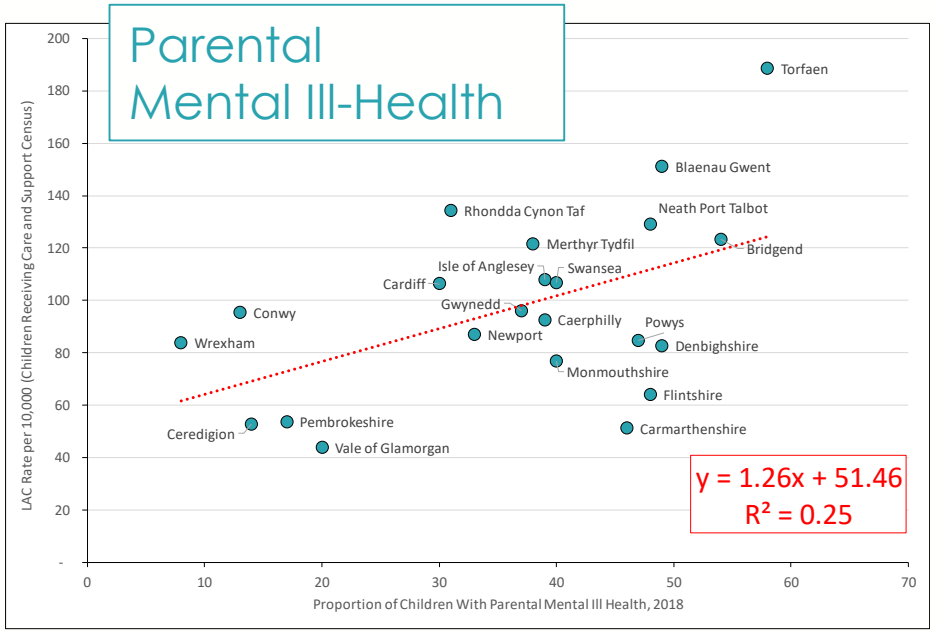
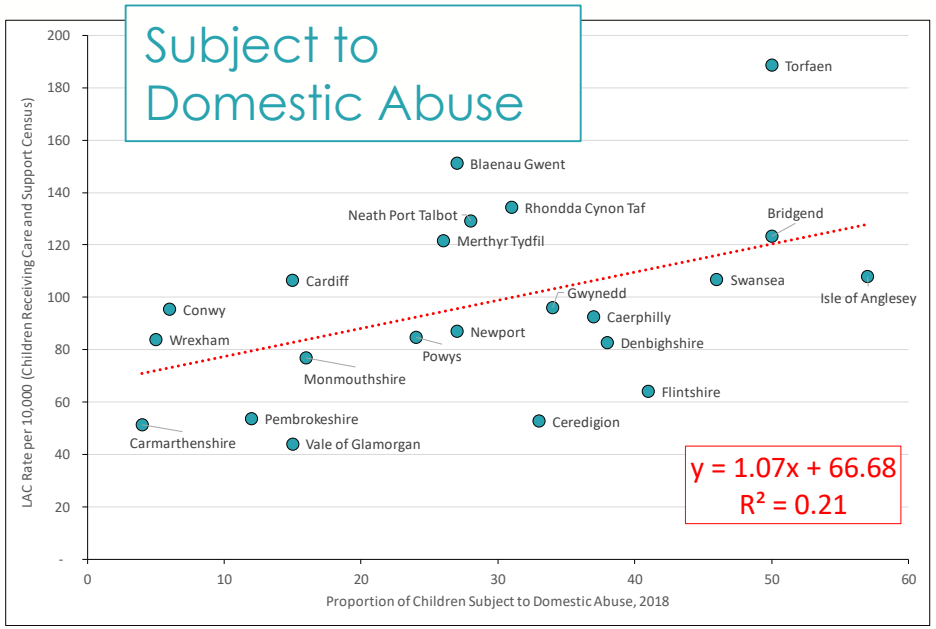
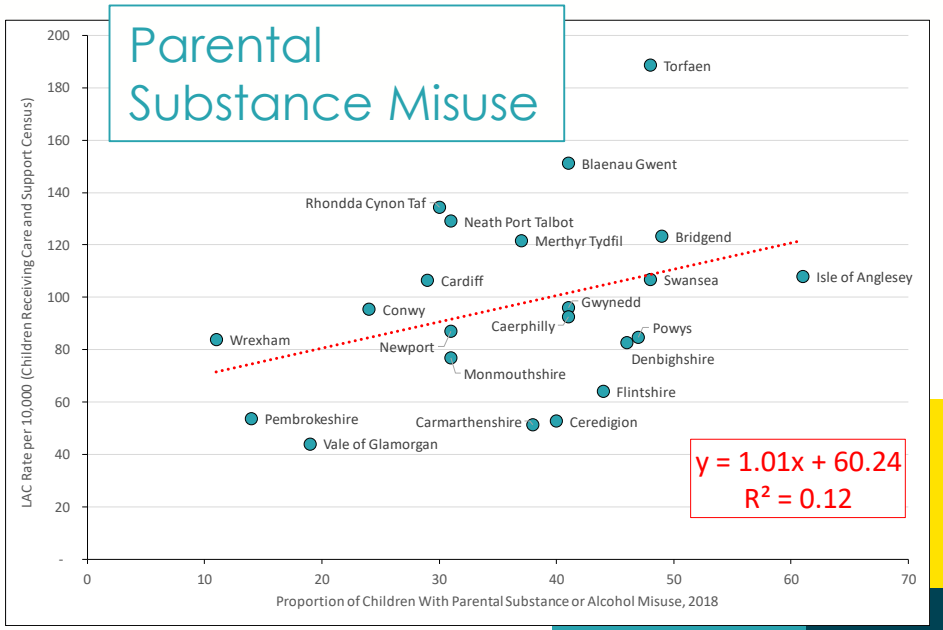
Parental Factors

- Measure: % of children looked after at local authority level experiencing the parental factor
- Positive correlations between each of the parental factors and the calculated LAC Rate
- Parental mental ill-health accounts for highest amount of variation.

** Calculated rate based on the number of children looked after on 31st March 2018 (taken from the CRCS Survey) and the MYE 2017.*







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The Problem

- Now have 4 parameters for which there is a theoretical rationale for including in a model
- N = 22 (22 local authorities in Wales)
- Advice for linear regression: Should really have 15-18 cases for each parameter
  - 4 x 15 = 60
  - 4 x 18 = 72

Options

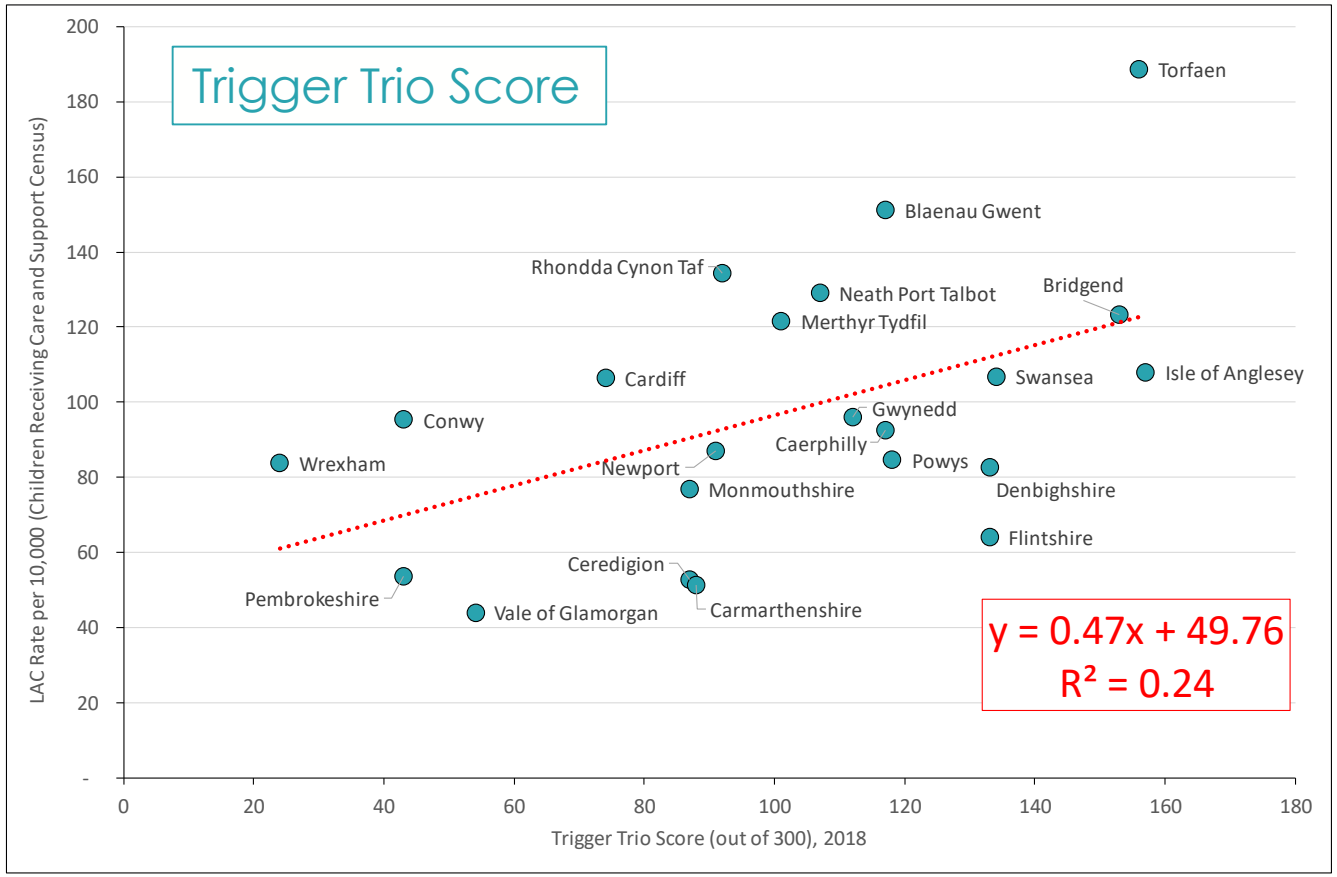
1. Reduce the number of parameters being explored
2. Use a technique which is less sensitive to sample size …

1. Trigger Trio Score

- Proxy Measure: sum of the % of children looked after at local authority level experiencing each parental factor
- Gives a maximum score of 300

Trigger Trio Score: Wales = 102

(% parental substance misuse = 36
% parental mental ill-health = 37
% subject to domestic abuse = 29)



- Positive correlation ie those with higher Trigger Trio Scores tend to have higher calculated rates
- R-squared = 0.24 ie the Trigger Trio Score accounts for **24%** of the variation in local authority rates within Wales

Ideally we would want to know the % in each LA experiencing one or more and the % experiencing all three…

2. Bayesian

- Free software
- https://jasp-stats.org/
- Possible to undertake analysis in traditional and Bayesian frameworks
- Range of different commonly used tests including Bayesian linear regression
- Growing community with more online help becoming available all the time!

Posterior probability ∝ Likelihood x Prior probability

Bayesian Linear Regression

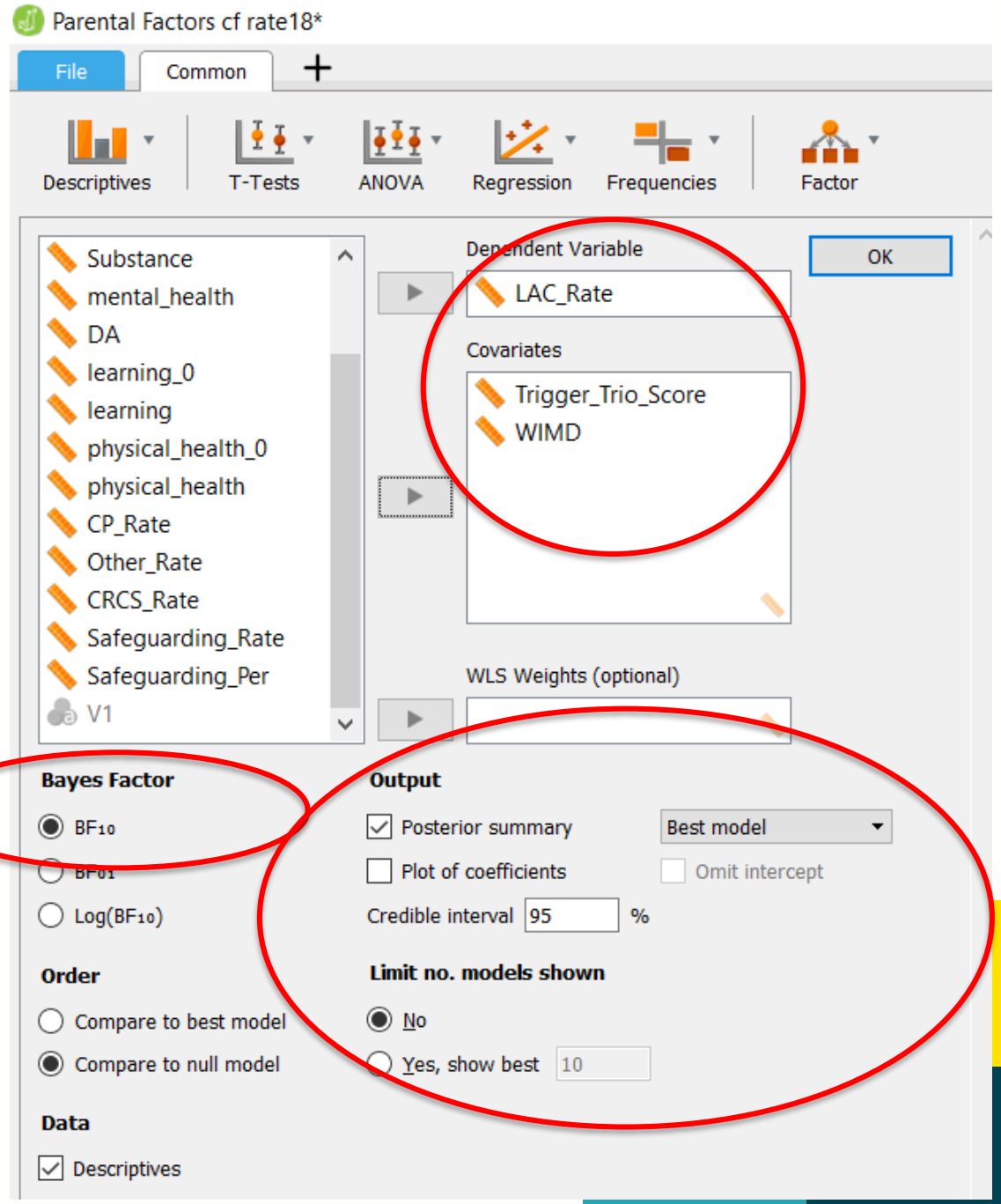
- Dependent Variable = LAC Rate
- Covariates
  - Trigger Trio Score
  - WIMD

Bayes Factor

- **BF10**: Bayes factor to quantify evidence for the alternative hypothesis relative to the null hypothesis
- **BF01**: Bayes factor to quantify evidence for the null hypothesis relative to the alternative hypothesis
- **Log(BF10)**: Natural logarithm of BF10

Output / Order

- Compare to null model
- Posterior summary



Bayesian Linear Regression: Model Comparison

Models	P(M)	P(M|data)	BF_M	BF_{10}	R^2
Null model	0.333	0.009	0.018	1.000	0.000
WIMD + Trigger_Trio_Score	0.333	0.793	7.660	90.611	0.568
WIMD	0.167	0.184	1.128	42.075	0.448
Trigger_Trio_Score	0.167	0.014	0.072	3.241	0.245

Best Model accounts for **57%** of the variation in the local authority rates of care ($R^2 = 0.568$)

LAC Rate = Intercept + WIMD + Trigger Trio Score

There is substantial evidence to support this model. It is **90 times 'better'** at predicting local authority rates than the null model ($BF_{10} = 90.61$)

Bayes Factor (BF_{01})	Bayes Factor (BF_{10})	Interpretation: Jeffreys
1 to .33	1 to 3	Anecdotal
.33 to .10	3 to 10	Substantial
.10 to .03	10 to 30	Strong
.03 to .01	30 to 100	Very Strong
>.01	>100	Decisive

Bayesian Linear Regression: Coefficients for Best Model

Posterior Summaries of Coefficients

Coefficient	Mean	SD	P(incl)	P(incl|data)	$BF_{inclusion}$	95% Credible Interval	
						Lower	Upper
Intercept	97.091	5.206	1.000	1.000	1.000	86.264	107.918
WIMD	1.505	0.428	0.500	0.977	42.604	0.614	2.396
Trigger_Trio_Score	0.294	0.137	0.500	0.807	4.185	0.009	0.579

LAC Rate = Intercept + WIMD + Trigger Trio Score

ie LAC Rate = 97.091 + (WIMD * 1.505) + (Trigger Trio Score * 0.294)

- The 95% credible intervals suggest that there is some uncertainty around the estimates for the coefficients

Do we have the right evidence?

- No! BUT we do have some options

What is required?

- Sharing of anonymised individual level data for research purposes
- Failing that, determining the proportion experiencing one or more of the trigger trio (and all three) within each local authority
- Data linkage to establish more about the circumstances of the household where the child was living prior to the entry into care
- In year figures with a sense of flows by individuals in and out of care. Only get a partial picture if have to rely on snapshot figures each year

Further Information

This analysis forms an extension of work undertaken as part of the public services work programme at WCPP around the factors contributing to the high rates of care in Wales. A copy of the report can be downloaded from the WCPP website:

https://www.wcpp.org.uk/publication/analysis-of-the-factors-contributing-to-the-high-rates-of-care-in-wales/

(The Welsh version is currently being prepared)

If you would like to discuss the potential of using Bayesian analysis or simply find out more about it, I can be contacted:

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