Assessment of the cost and benefits of Family Nurse Partnership in two contexts

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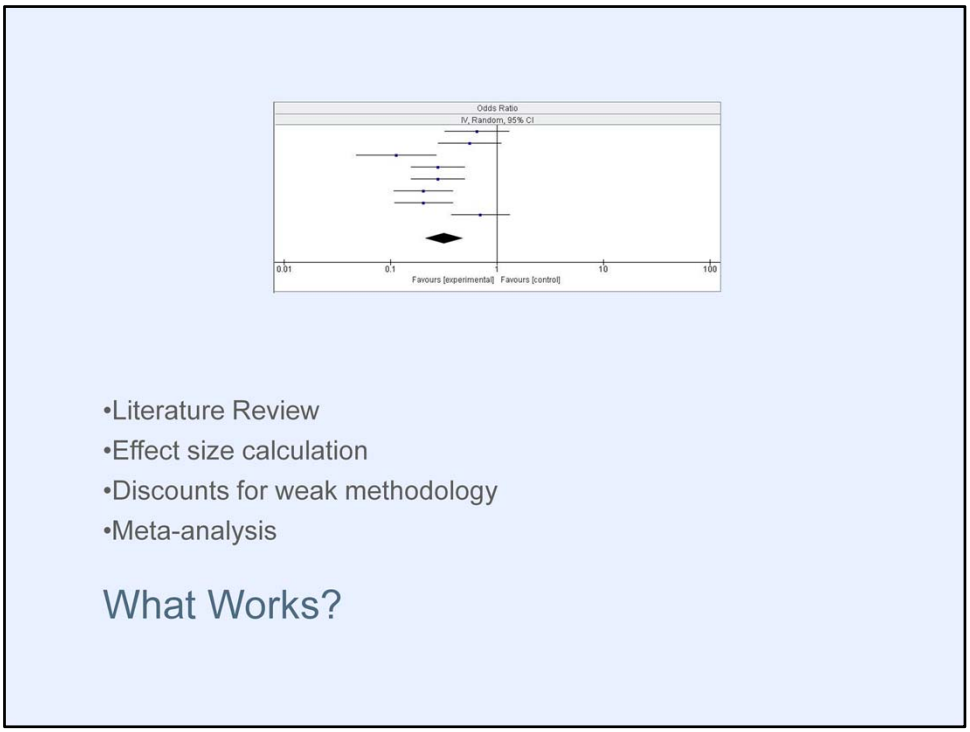
Outline

- Aims
- Overview of the model
- Adaptation to the UK
- Cost of FNP in US and UK models
- How our cost estimate could be improved
- Effect size of FNP
- FNP cost-benefit summary US vs UK
- Next steps

Aims

- Trials measure interventions' impact on outcomes (ES)
- All improvements benefit children & families
- Some improvements can be translated into monetary benefits to children, families, & society
- Aim to show whether these monetary benefits outweigh the programme costs

We have been looking at a particular cost-benefit model to see whether we can monetise some of these outcomes to determine the cost-benefit of interventions for children in the UK. The model we are using was developed in Washington State and is used there to help their policy makers make investment decisions. It is based on….



To assess "What Works", the research literature is reviewed for all evidence for each intervention

Comparison group design (RCT or QED)

Effect sizes are calculated for each outcome. Rather than simply determining "what works", we look specifically at which outcomes have been measured in empirical studies of each intervention, and the effect sizes for each outcome are coded independently. Each outcome will have a different impact on the final cost-benefit results.

Effect sizes are discounted for weak research methodology (e.g. developer involvement, weak measures, non-real-world settings)

Meta-analysis is used to calculate a weighted mean effect size for each outcome

- Causal link between one outcome and another that can be monetised
- Based on empirical evidence from longitudinal studies

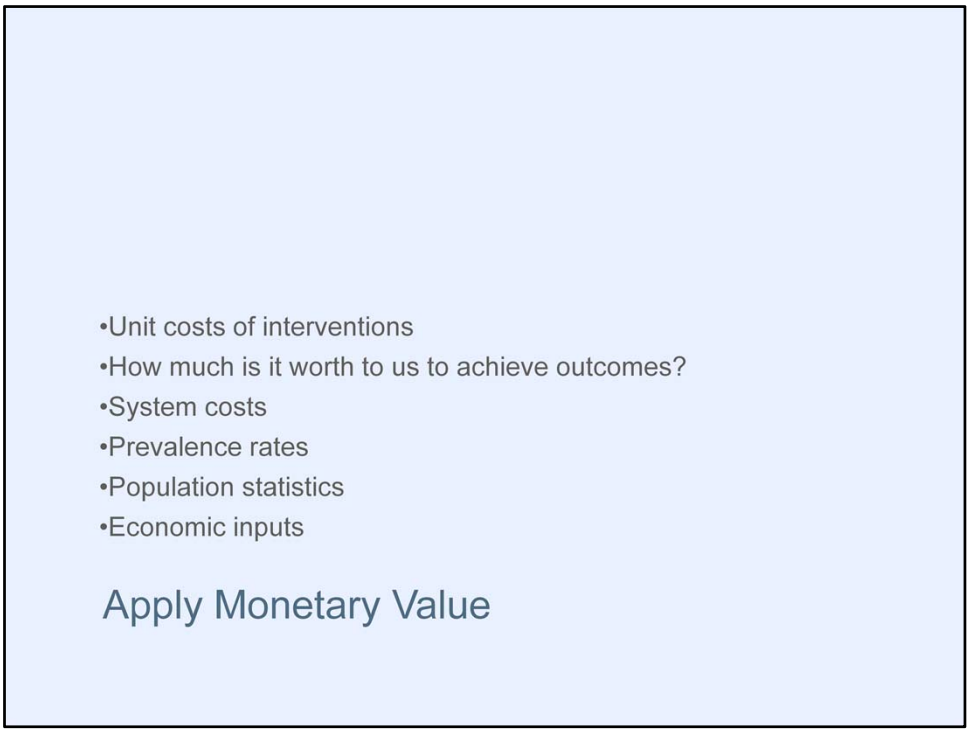
Links to Other Outcomes

Some of the outcomes measured by the trials can be linked to other outcomes that can add information about benefits of an intervention in a new area, by using longitudinal research to establish causality. For example, there are 12 studies in the model that show a causal link between disruptive behaviour in early childhood and later crime. Disruptive behaviour can be directly costed in terms of the costs to health and educational services, but it also will lead to additional costs in terms of future crime, particularly if not treated. These links enable us to predict the benefits of programmes in a wider range of areas.

- Determine the rate of the outcome in an 'untreated' population
- e.g. average rates of school completion
- Apply intervention effect (or linked effect) to that base rate

Unit Change

The model takes the "base rates" of the untreated population that would receive the interventions, in terms of what would be expected in educational outcomes, crime rates, social services, and other areas, and then applies the effect size on outcomes to those base rates. The change in these rates due to the effect size is the first step in measuring benefits. For example, how much crime is prevented, how many fewer children drop out of school, etc.



We then need to find out how much these changes in base rates are worth. How much does crime actually cost? How much does it cost to provide additional educational services or special education? How much does a child protection case cost? A large number of inputs go into the model to establish these costs and each policy area is calculated in a slightly different way. We also have to take into account the cost to provide the intervention in the first place – and this gets subtracted from the monetary value of the benefits.

$$NPV_{progage} = \sum_{y=progage}^{N} \frac{Q_y \times P_y - C_y}{(1+Dis)^y}.$$

Combine:

- The expected unit change in outcomes
- The monetary value of that change
- The cost of the intervention

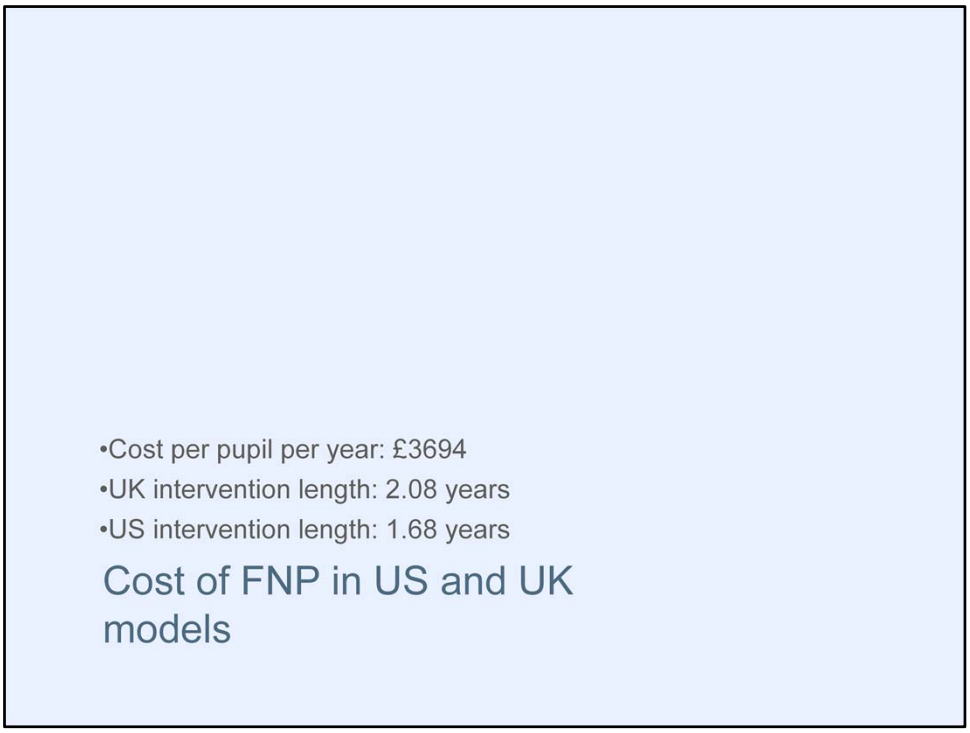
From age of treatment through life course

Compute Cost-benefit

- All estimates include some uncertainty
- Randomly vary most factors
- Test for likelihood of a net benefit (or loss)

Assess Risk of Investment

1) Discounts considered
2) There are differences in the way the justice system, children service's system and education system are structured in both contexts. Not only are there differences in the way cases are processed but also – certain things are just not applicable in different contexts. For example, it is fairly common for children to be required to repeat a school year when they are not doing academically well, but this is not a common practice in the UK, and so this outcome was not included in the adaptation of the model.
3) In addition to changing all relevant data inputs for various aspects of the model such as tax rates etc, we had to consider what to do with parameters when we do not have comparable UK data available to either include certain parameters or make certain assumptions.



The unit cost is calculated based on cost data taken from a study by Apteligen, "A study into the local costs of the FNP programme in England: Summary Report", November 2012. The calculation uses the upper quartile cost per case to be conservative as the estimate does not include national training and other events. It also assumes higher costs for year 1 due to set up costs and spreads the annual costs over 5 years of delivery.

The estimate expects a caseload of 25 clients per full-time family nurse and is based on a typical FNP team of 4 family nurses, one supervisor, and a part-time administrator.

The average programme length is based on the mean number of years between enrolment and completing/inactivity/leaving the programme based on clients who were enrolled in 2009 (N=1957), estimate provided by the FNP National Unit UK.

How our cost estimate could be improved

- Actual annual cost of the National Unit
- Actual caseloads from a sample of sites
- Actual team sizes from a sample of sites
- Actual Year 1 vs annual running costs
- Updated programme duration

Effect size of FNP

- 11 studies included
- All US-based and all involving David Olds
- New studies needed:
- Independent
- International

FNP monetisable outcomes

- Crime
- Child abuse and neglect
- High school graduation (A-levels)
- Test scores
- Special education
- Disruptive behaviour
- Alcohol abuse or dependence
- Public assistance
- K-12 grade repetition

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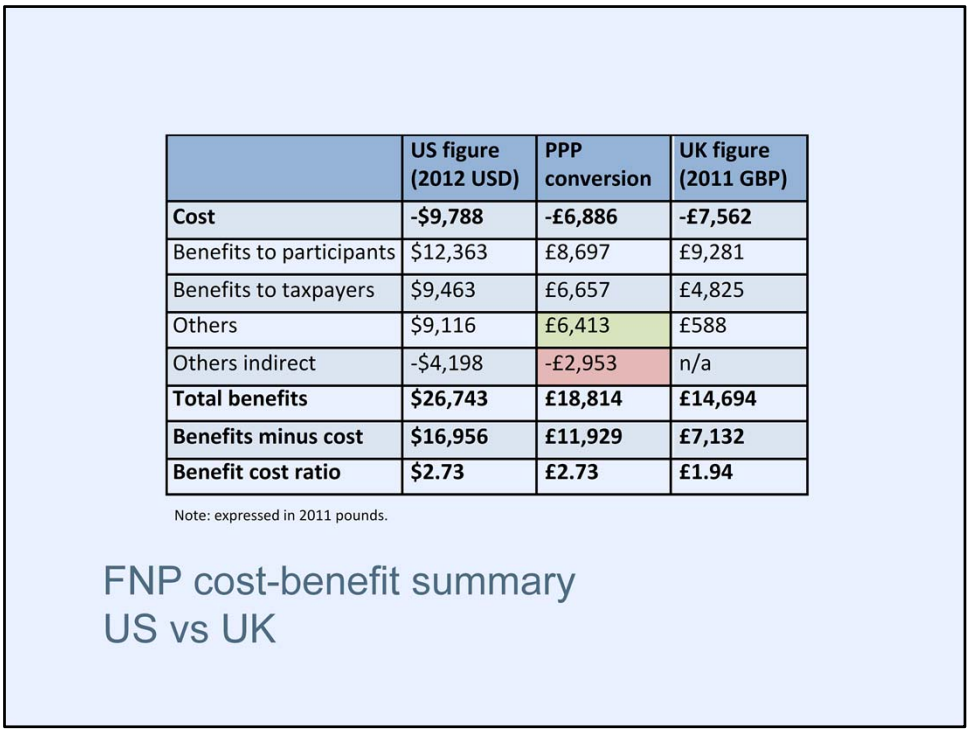

	US figure (2012 USD)	PPP conversion	UK figure (2011 GBP)
Cost	**-$9,788**	**-£6,886**	**-£7,562**
Benefits to participants	$12,363	£8,697	£9,281
Benefits to taxpayers	$9,463	£6,657	£4,825
Others	$9,116	£6,413	£588
Others indirect	-$4,198	-£2,953	n/a
Total benefits	**$26,743**	**£18,814**	**£14,694**
Benefits minus cost	**$16,956**	**£11,929**	**£7,132**
Benefit cost ratio	**$2.73**	**£2.73**	**£1.94**

Note: expressed in 2011 pounds.

FNP cost-benefit summary
US vs UK

If I just take out the difference in benefits to victims in the two countries from the US benefits, their CB ratio drops to 2.23.

If I use 2.08 as the intervention length against the US costs (instead of 1.68), it comes to £8525 when converted to pounds. When that is also taken into account (along with removing additional victim benefits), the US CB ratio drops to 1.8.

These are the summary costs and benefits of FNP from the US and UK models. I have converted the dollars into pounds using the Purchasing Power Parity exchange rate. I have also highlighted a couple of cells, one where you can see that the benefits to others are vastly higher for the US than the UK, and this is mostly due to the fact that the estimates of benefits to victims for preventing crime are much higher in the US than in the UK. In addition, the US model calculates indirect benefits to others using an adjustment for deadweight costs of the programme, which is essentially the loss of economic welfare due to spending on the programme. We do not yet include such an estimate in the UK model but it would reduce the overall benefits of the programme if we did.

	US figure (2012 USD)	PPP conversion	UK figure (2011 GBP)
Sources of benefits			
From primary participant			
Crime	$3,137	£2,207	£639
Labour market earnings (educational attainment)	$7,206	£5,069	£3,458
Child abuse and neglect	$841	£592	£434
K-12 grade repetition	-$79	-£56	£46*
K-12 special education	-$757	-£533	-£473
Health care (educational attainment)	$65	£46	£9**
Subtotals	**$10,413**	**£7,326**	**£4,113**
From secondary participant			
Crime	$1,993	£1,402	£324
Labour market earnings (HS grad)	$27,128	£19,085	£10,256
Public assistance	$1,838	£1,293	n/a
Health care (educational attainment)	$1,107	£779	n/a
Subtotals	**$32,066**	**£22,558**	**£10,580**
Adjustment for deadweight cost of programme	-$15,736	-£11,070	n/a
Totals	**$26,743**	**£18,814**	**£14,693**

*Education system savings (disruptive behaviour)
**Health care and CAMHS savings (disruptive behaviour)
Note: expressed in 2011 pounds.

FNP sources of benefits

This is a more detailed picture of how the benefits break down in each model. You can see the large difference in crime benefits, which includes the victim costs.

In this table you can also see that there is also a large difference in labour market earnings between the two models. This is largely due to the fact that in the US, there is a consistently large increase in earnings when you graduate from high school, whereas in the UK model we had to use attainment of A-levels as the best equivalent, but there is not such a large increase in earnings between GCSEs and A-levels, so making a difference in terms of educational attainment in the US will have a larger impact on earnings than it will in the UK. You are still likely to earn more if you attain higher levels of education in the UK, but the effect on earnings is not as consistent or as large here as it is in the US.

There are also a couple of smaller estimates of benefits that they are able to estimate in the US, but we are not yet able to here (public assistance and health care from educational attainment), as well as one that is not applicable, which is grade repetition as children do not repeat years in school here. One cost of the programme that is calculated for the US model but not yet for the UK model is the deadweight cost of the programme. This reflects the dollars of economic welfare loss per tax dollar raised to pay for program costs, or avoided if a program reduces taxpayer financed costs.

There is some uncertainty around the appropriate values of deadweight costs and WSIPP uses low, modal, and high multiplicative values and varies them in the model. The deadweight cost value is then multiplied by any tax-related cost or tax-related benefit of the program. The resulting net deadweight cost values are tallied and reported in the "Other Benefits" section of the output. For example, if a program costs taxpayers $1,000 per participant, and it is estimated that the program saves $600 in taxpayer savings from an improved outcome, e.g., less taxpayer spending on the criminal justice system, then with a modal deadweight cost value of 50%, there would be a net deadweight cost of the program of $200 ($600 times 50% minus $1,000 times 50%). In the actual run of the model, these calculations are carried out for each year of cash flows.

There are a couple of benefits that we have been able to estimate here that are not in the US model (education and health care benefits from reduction in disruptive behaviour). I have put these in under grade repetition and health care for educational attainment to keep the table simple, but these are different benefits in the UK model, albeit small.

Next Steps

- More accurate cost estimate
- New trials added to meta-analysis
- Model updates

Thank you!

For more information please visit:

www.dartington.org.uk

www.investinginchildren.eu