

The logo for 'wood for trees' features the word 'wood' in white, 'for' in green, and 'trees' in white. A faint, stylized tree graphic is visible in the background behind the text.

wood
for **trees**

The logo for 'Believe in children Barnardo's' includes the text 'Believe in children' in green and 'Barnardo's' in white. A small green square icon with a white tree symbol is positioned to the left of the text.

**Believe in
children**
Barnardo's

Using analysis to develop a strategic approach to our cash and raffle programs

November 2017



Introductions



At Barnardo's we believe in children and we want to create better outcomes for more children.

We do this is by working with society's most vulnerable children through our 1,000 children services and last year we worked with around 240,000 children.

To support this we have an ambition to double our voluntary net income over the next ten years.



Insight & CRM Team



“We actively work in partnership with Fundraising and other teams, engaging them with fundraising systems, providing insight and recommendations, and assisting with campaign delivery.

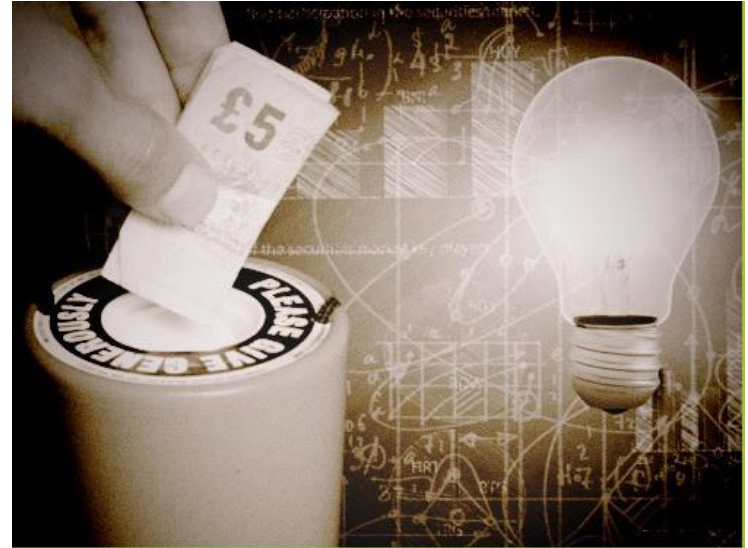


Our work enables strategic decision making to maximise the net income of fundraising activities, ensuring we grow our supporter base and deliver relevant, tailored and timely communications.”

Wood for Trees

- Wood for Trees is an independent marketing services provider established in 2007, based in the historic city of Bath.
- We provide an intelligent and proactive approach to data understanding, placing the focus firmly on insights and what can be done with them.
- Our project-appropriate approaches include data processing and hygiene, data analysis, strategic reporting and consulting, building marketing databases and database analysis software (both as a bureau and enterprise offering).
- We are a top-three partner with Apteco for the FastStats suite of analytical tools.

Advanced analytics for the not-for-profit sector





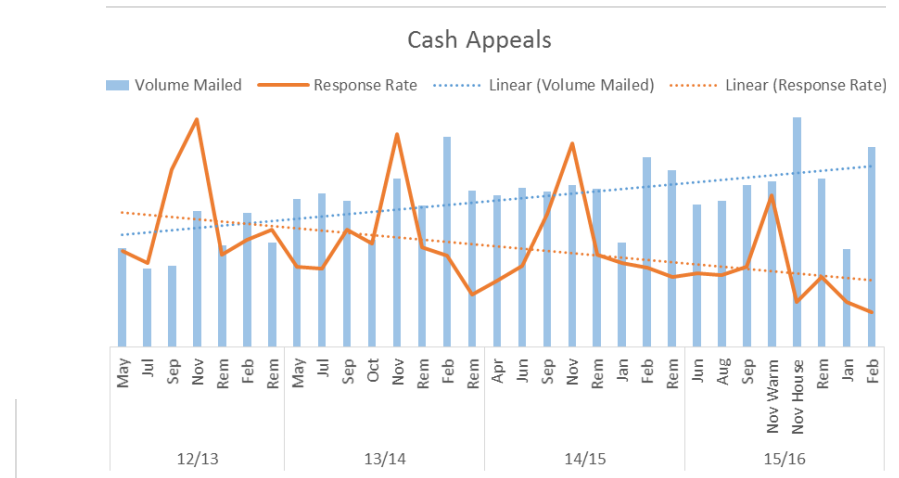
The Problem



Decline of Cash Appeals

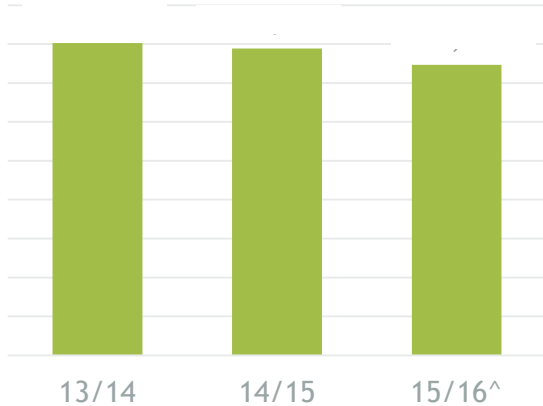
An initial investigation of our cash appeals found:

- Over time our selected volume had increased as we sought to increase income
- Whilst selected volume increased response rates decreased
- Our existing selection strategy was RFV based and the segmentation was highly complex

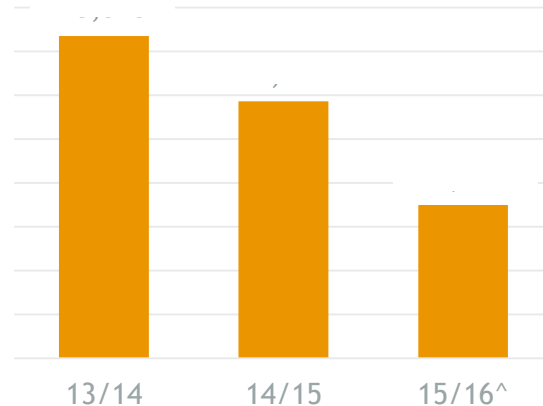


Decline of Raffle Appeals

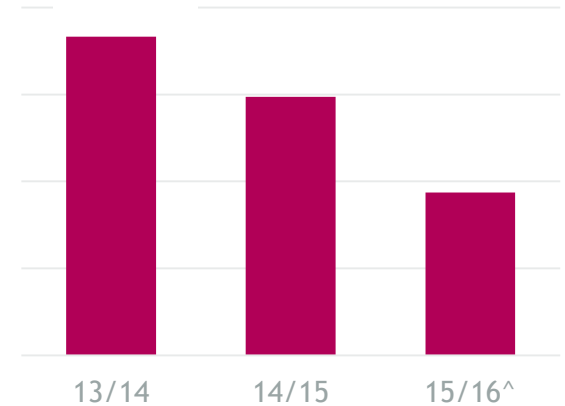
Mailing Volume



Responses



Response rate



Our initial review of our raffle appeals showed a very similar situation although response rates were declining despite mailing volumes also declining. At this time our raffle selections were also being out-sourced.



The Solution





Model design



Model design: the groundwork

- Cash Model:
 - Christmas 2015 (Test mailing (200K names))
 - Analysis of 2014 campaigns
 - Represent more supporter groups e.g. eventers, prospects
- Raffle Model:
 - Spring 2015
 - Less time, so used existing campaigns
- Ensure data accuracy and compliance throughout process



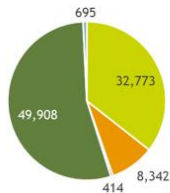
Think
DATA

Before modelling, consider what data is available and appropriate

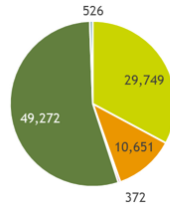
Model design: assessing bias in the data sample

- The data for the Cash Model was selected to be **representative** of audiences in mind
- However, the data for the Raffle model was taken from four campaigns from the previous year
 - How consistent were the selections? (selection bias)
 - How consistent was the marketing? (external bias)
 - How representative is the data of future campaigns (extrapolation)

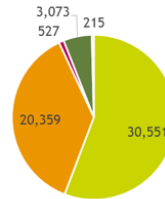
Campaign A



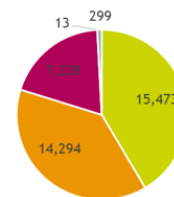
Campaign B



Campaign C



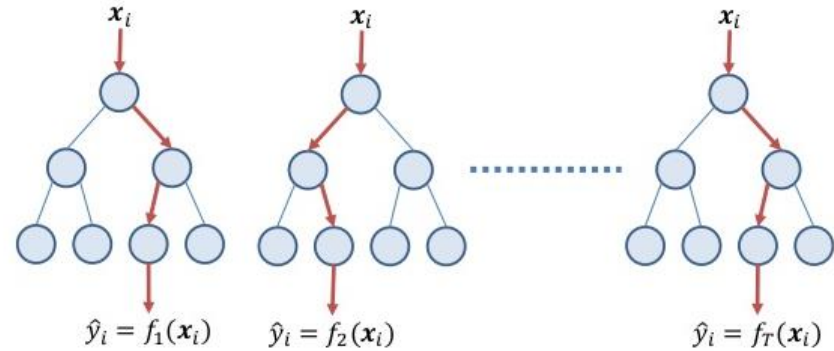
Campaign D



Beware of sampling bias and extrapolation

Choosing sub-models

- In theory sub-models can improve model performance, by overcoming non-linear relationships
- However, in practice choosing sub-models can be (mathematically) complex
- Better to be pragmatic and focus on objectives (Raffle had 'cash prospects' sub-model to help grow audience)
- Cash 3 sub models; raffle 2 sub models



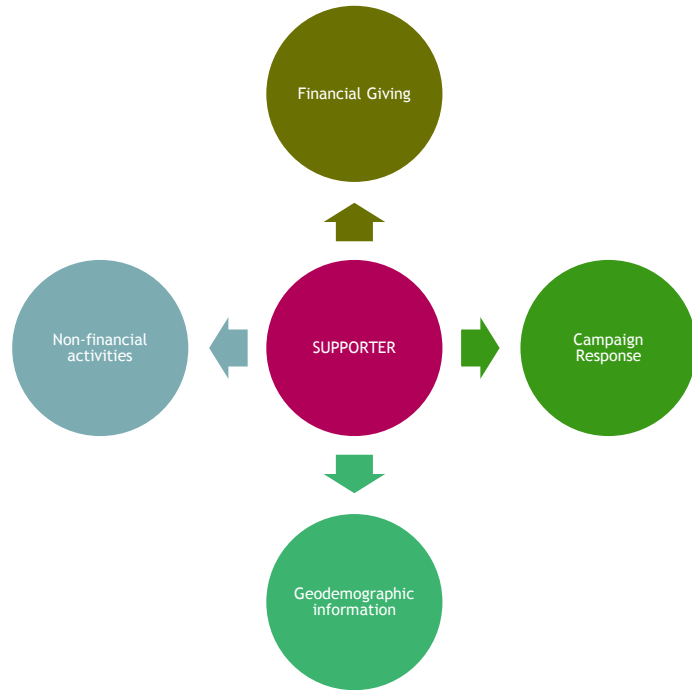
Keep it as simple as possible



Data Preparation



Data preparation: holistic view of the supporter



- Both models followed a similar process, creating around 300 behavioural variables, using SAS
 - Calculated at point of selection
 - Independent data
 - Trends (velocity)
 - Ratios
 - Range of time period
- Past behaviour is most powerful predictor of future behaviour, but it's not perfect and there is more and more data out there
 - Email open (themes)
 - Digital data (identified vs inferred)
 - Social media

In general, the better data, more relevant the communications

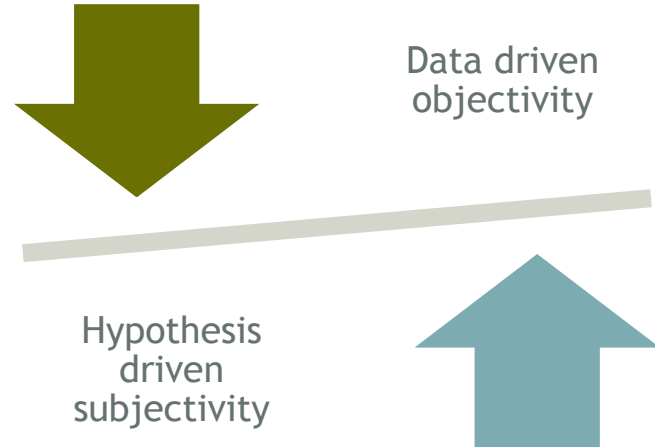


Statistical modelling



Data reduction and model development

- Both the Cash and Raffle models followed the same broad process
- Reduce the 300 Behavioural variables to 6-10 per sub-model
 - Chi-square tests
 - Stepwise selection
 - Manual, sequential fitting into Logistic Model
 - SAS Macros

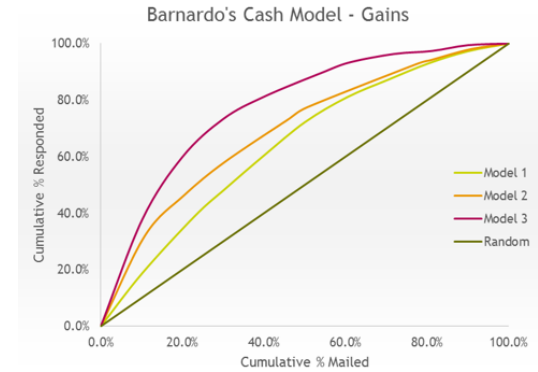


Strike balance between data driven approach and intuition

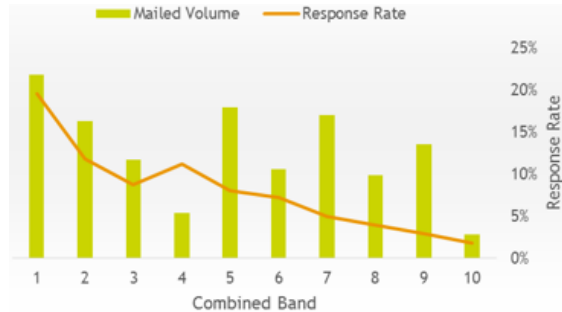
Validation

Many ways to evaluate the model:

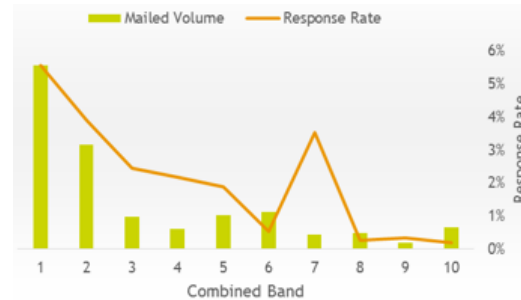
- Significance testing
- Gains Chart
- Gini & other stats
- Holdout sample
- Separate campaigns
- Discuss with stakeholders



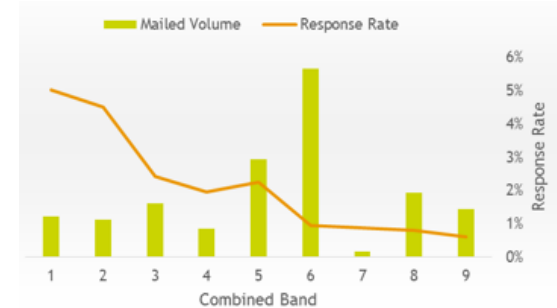
Sub Model 1



Sub Model 2



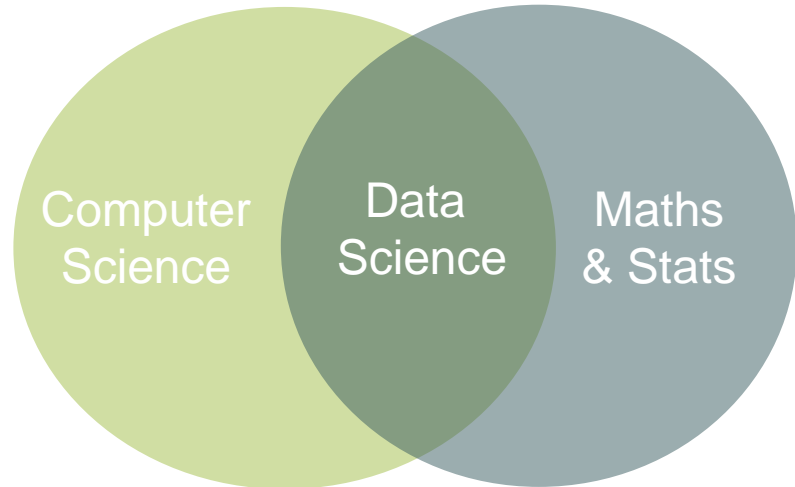
Sub Model 3



Models help make the communication much more relevant to the supporter

Data Science

- Big overlap between DS and Statistics
 - Techniques used
 - Types of problems
- ... But there are differences
 - Terminology
 - Philosophies (AI)
- Benefits
 - Data
 - Maximise predictive power
 - Emphasis on learning
- Challenges
 - Complexity/Transparency
 - Cost vs benefits





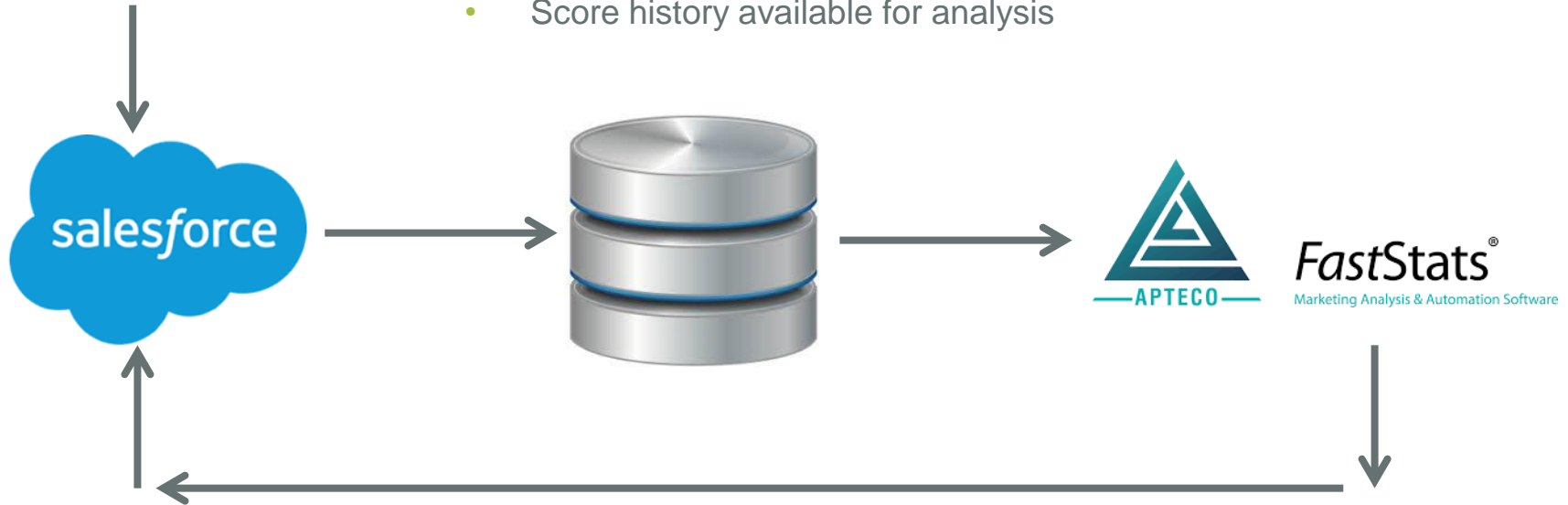
Production



Automation



- Models integrated into automated data processing
- Available for campaign selection in FastStats
- Score history available for analysis



Keep in mind how to integrate the model with the selection process for efficiency gains



The Results

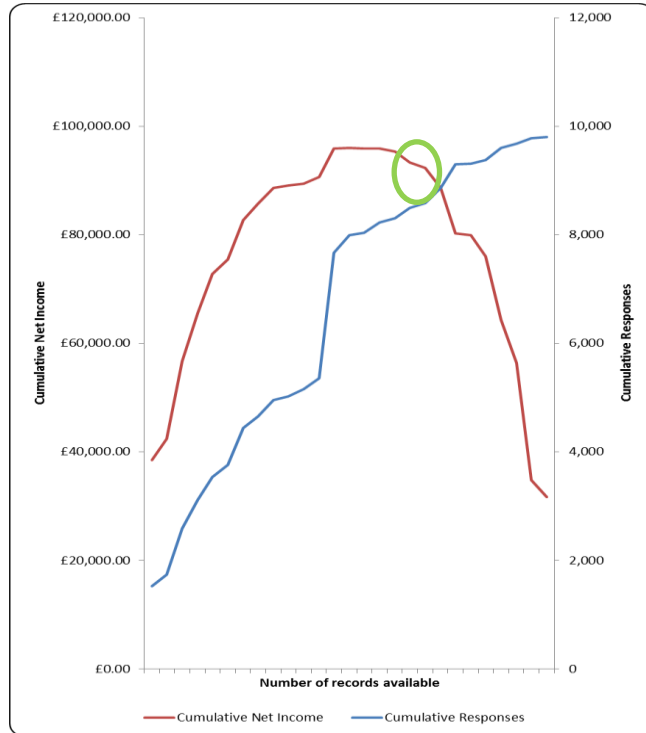


Summary and next steps

All in all this approach allowed us to exceed budgeted net income from appeals in 2016/17 by £300,000

We're currently working on a way to determine the most appropriate ask level to further enhance the appeal

Use of the model



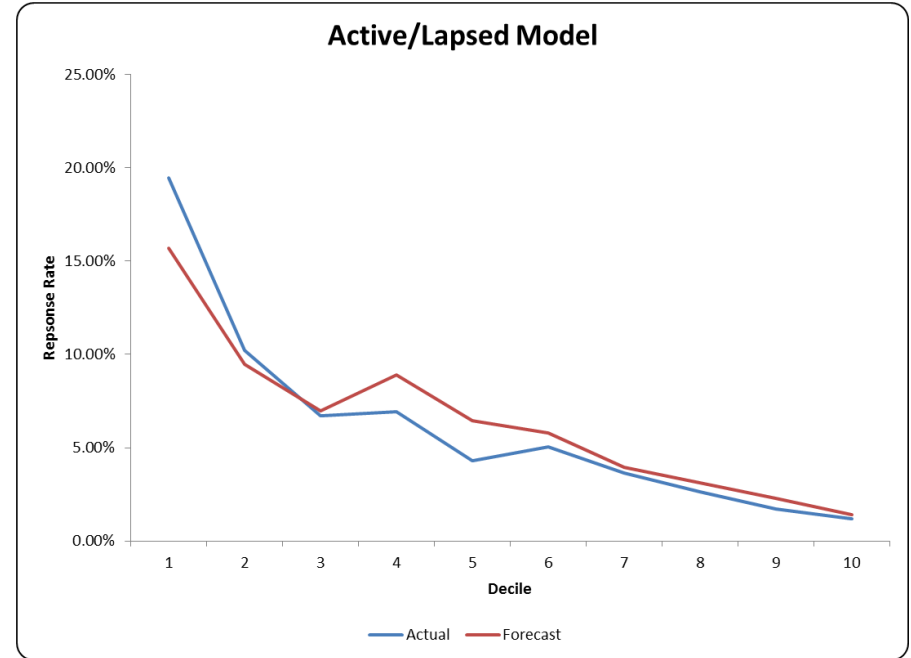
We took a novel approach to the how we deployed our models. In many instances models like these are used to just target the best performing supporters but our approach allowed us to:

- Ensure that we were not compromising net income on any given appeal
- Maximise the number of supporters being approached
- Ensure that the communications are only sent to those supporters who it is relevant for

Operational Process

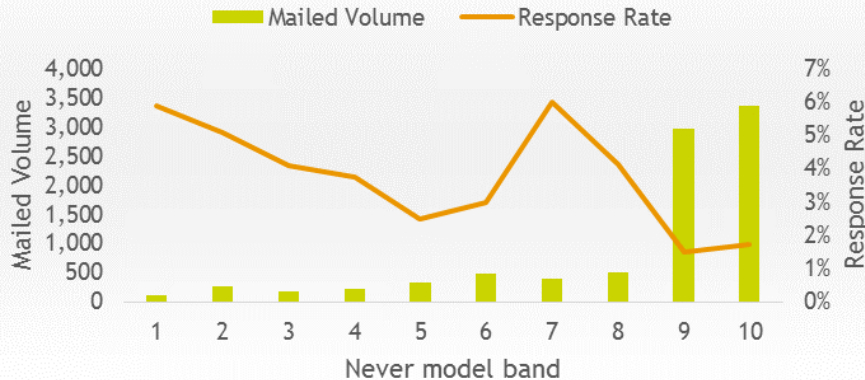
By combing the models with an analysis of the historical campaign performance and taking into account current context we were able to:

- Create highly accurate appeal and program forecasts
- We're also able to continually validate the models



The Raffle Model was not fully rolled out

Barnardo's Raffle Never Model
Validation on Jan16 Raffle



Whilst validating the raffle model development the decision was made to not roll out the model for those who have never taken part in a raffle campaign in the past.

The distribution of volume across the model was not in line with expectations and the trend in response rate also indicated the model was not as discerning as we'd want.

In January we'll be redeveloping the raffle model with a view to making it more effective for those who haven't played the raffle previously



Questions?

We're
HIRING

Barnardo's is looking for a new analyst to join the team. If you're interested search the Barnardo's website for "CRM analyst".

Closing date for applications is 04/12/17