Chase Africa

Preliminary Analysis

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Contents

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1 Introduction

This material has been prepared for the introductory meeting between Chase Africa and the Institute of Population Ageing at the start of our collaboration funded by GCRF NGO Secondary Data Funding in the form of a Mini knowledge exchange fellowship.

It is based on a preliminary analysis of part of the data supplied by Chase Africa and aims to outline and demonstrate some of the possibilities that the data afford.

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2 Data

Chase Africa has provided six Excel formatted datasets, one for each charity in Kenya or Uganda that they support:

- `2012-18 CHAT data summary CP.xlsx` – 7 annual sheets + summary sheet
- `2014-18 Dandelion data summary & CYP CP.xlsx`– 5 annual sheets + summary sheet
- `2014-18 MKT data summary & CYP CP.xlsx` – 5 annual sheets + summary sheet
- `Big Life data summary & CYP CP.xlsx` – 2 annual sheets + summary sheet
- `CHV data summary & CYP CP.xlsx` - 3 annual sheets + summary sheet
- `RICE WN Data summary & CYP CP.xlsx`– 1 annual sheet + summary sheet

For the purposes of this demonstration only data from *Dandelion* is used for the years 2014-2018 [1]. The data has been cleaned and consolidated into a single data table. The original variables are listed in the appendix, as are the new, derived variables.

The data is made *tidy*:

[1] All the analysis was performed on all the clinic types i.e. standard and Amboseli as well as Amplify change.

- each variable forms a single column
- each observation forms a row: a date-venue combination

All derived variables are derived anew, to avoid the possibility of errors inherent in Excel-style cell formulae, and additional variables are derived as well.

Finally summary statistics are calculated by year and by *funding period* to allow a less granular overview of the trends.

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3 Analysis

3.1 Simple time series

Each of the raw variables on service delivery under the family planning and integrated health services headings can be plotted as a simple time series. Figure 1 shows the simple time series of 5-year implant delivery, both first time and repeated fittings.

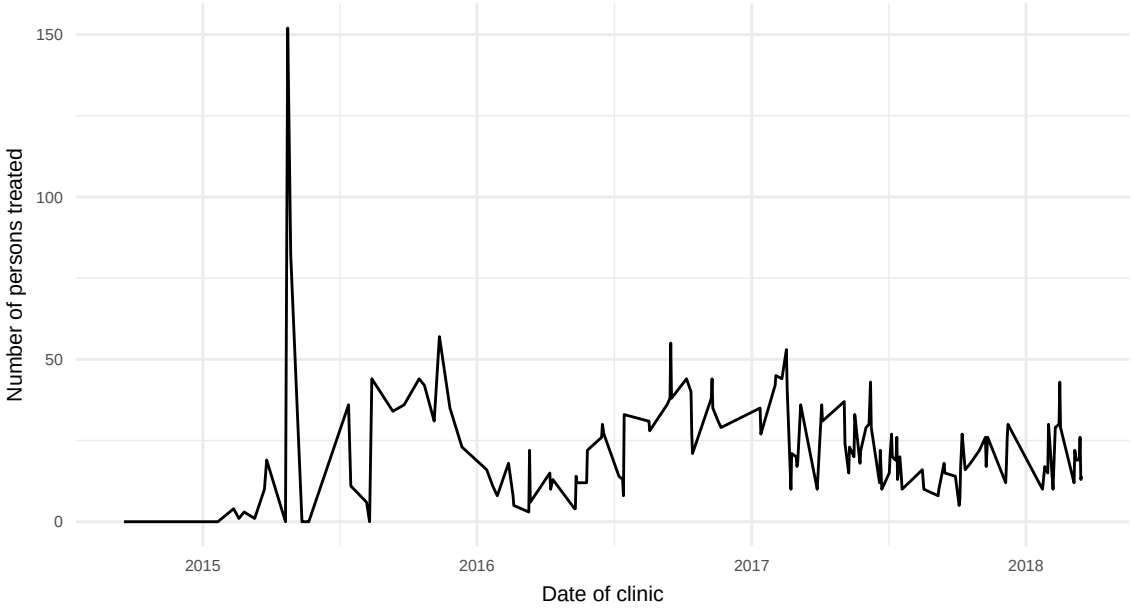

Figure 1: Simple time series of 5-year implant delivery (Dandelion: 2014 - 2018)

Figure 2 plots another one of the family planning services provided, this time Depo injections, while Figure 3 shows one of the health services provided: deworming. Again the simple time series plots the number of recipients of each service in each clinic over time.

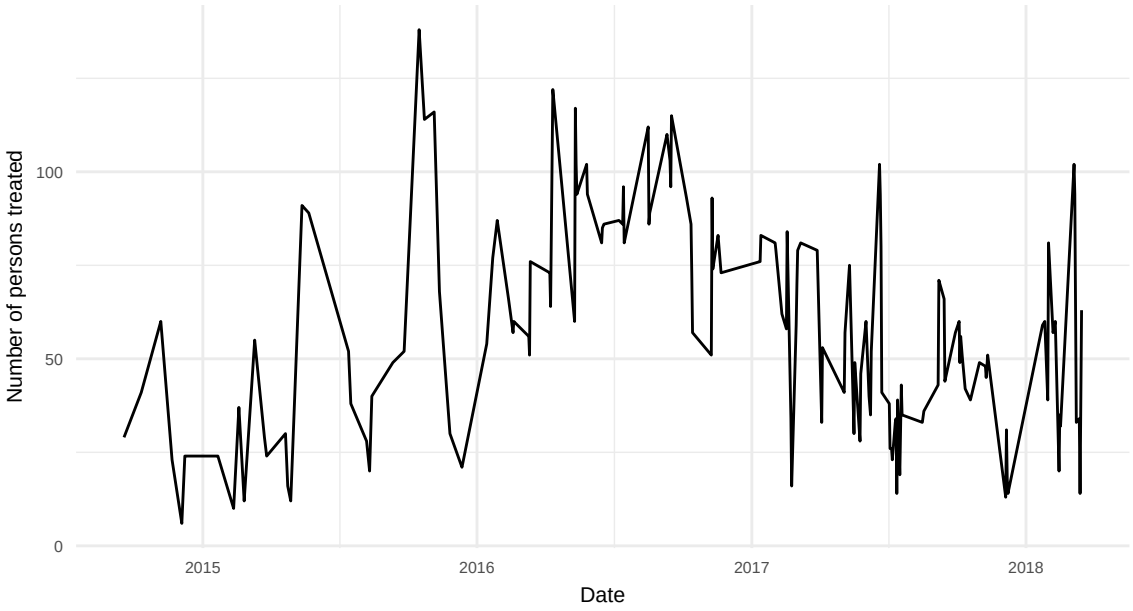

Figure 2: Simple time series of Depo injection delivery (Dandelion: 2014 - 2018)

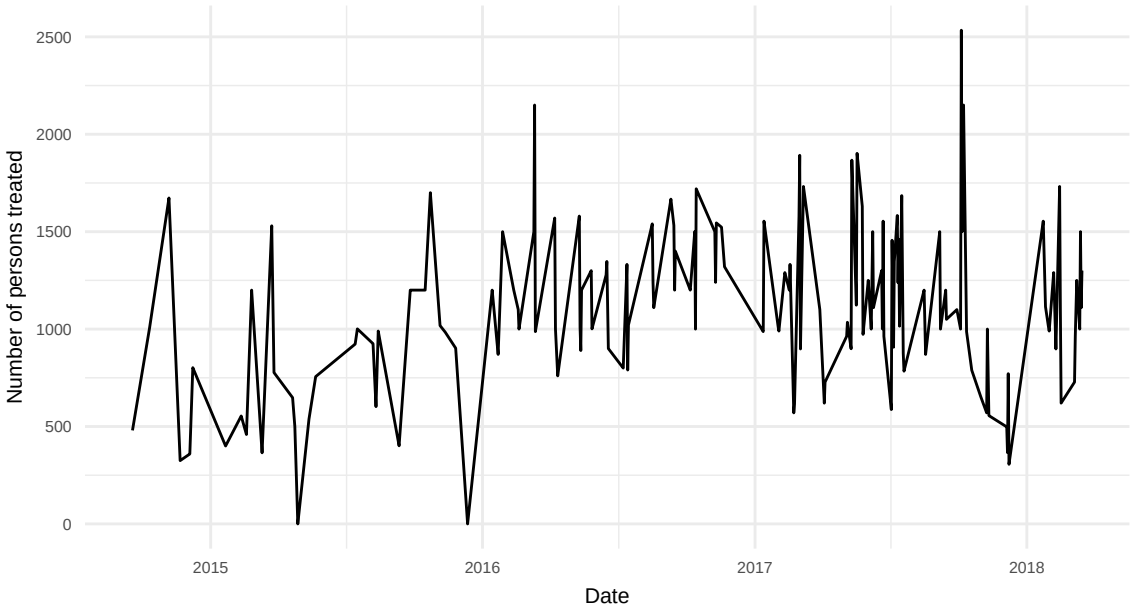

Figure 3: Simple time series of deworming

Due to the rather high levels of noisiness in the data it makes sense to try and fit a smooth curve to the data, for example using LOESS—locally estimated scatterplot smoothing as in Figure 4 which plots the time series for 3-year implant delivery or Figure 5 which plots the trend in condom uptake.

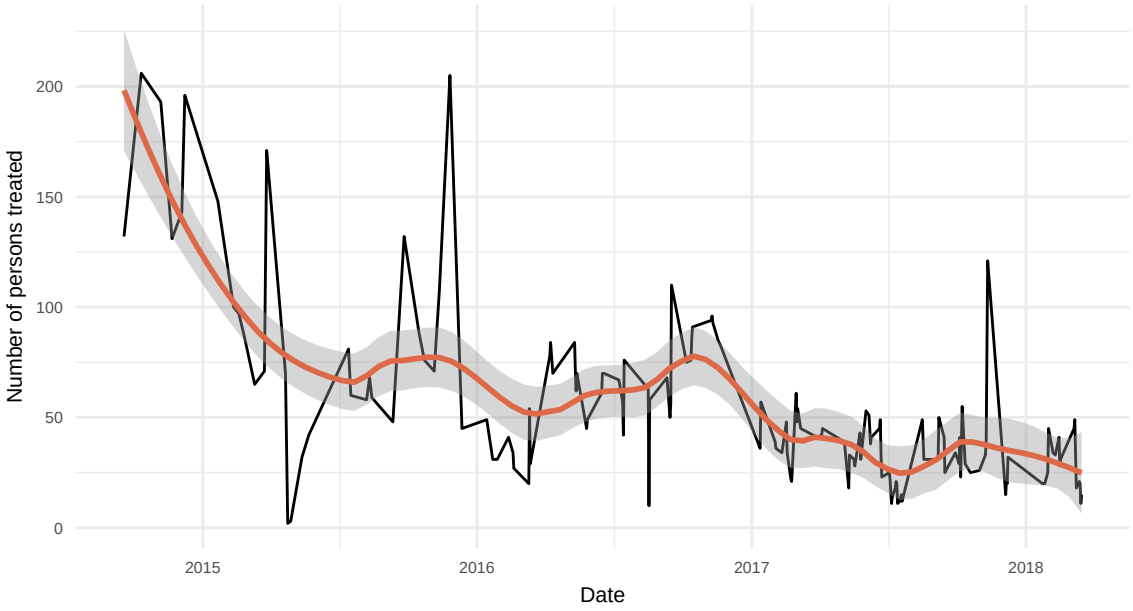

Figure 4: Simple time series of 3-year implant delivery with LOESS curve (Dandelion: 2014 - 2018)

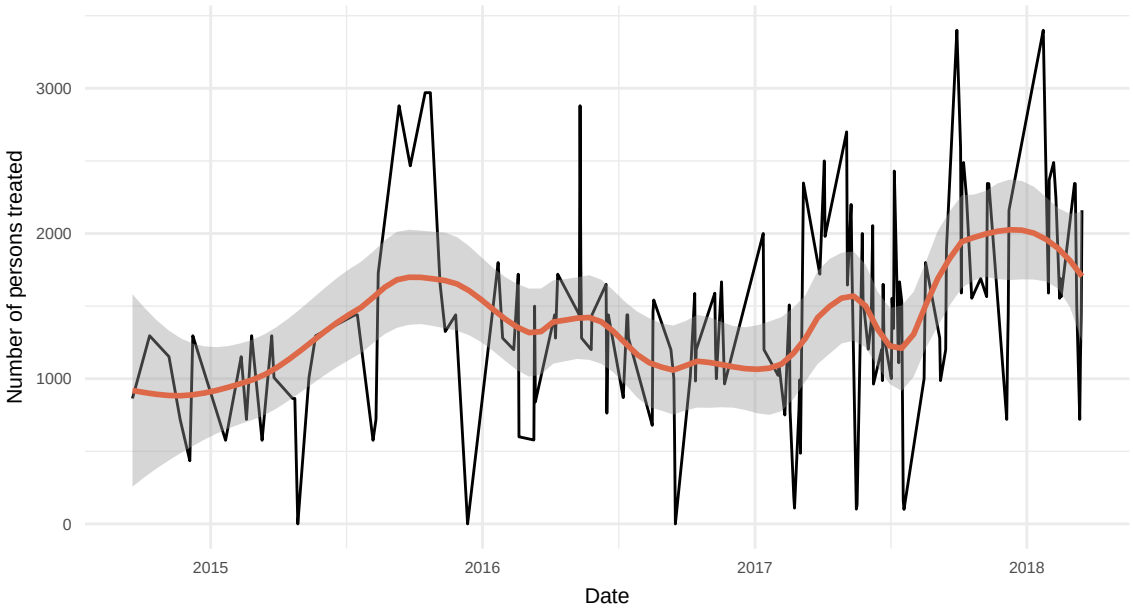

Figure 5: Simple time series of condom delivery with LOESS curve (Dandelion: 2014 - 2018)

Smoothing should be interpreted carefully though, as it uses a *sliding window* to calculate the best fit, and we can use the size or span of this window to affect how smooth or wiggly we want the curve to be. Figure 6 uses delivery of HIV testing to demonstrate this by plotting a curve with a large span (in orange) and one with a narrower span (green):

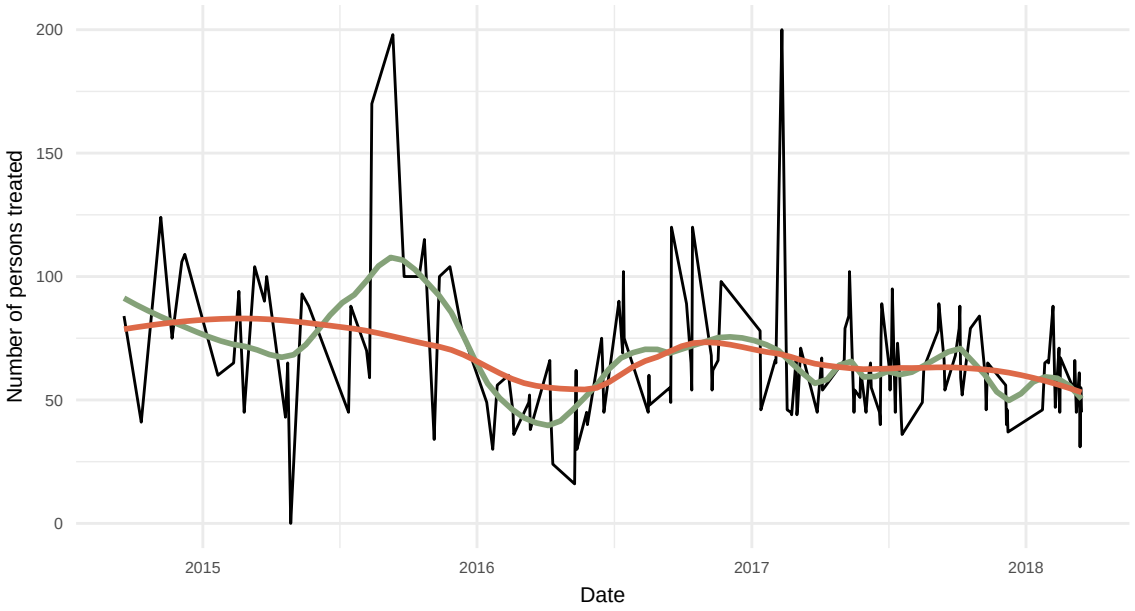

Figure 6: Simple time series of HIV test delivery with LOESs curve (Dandelion: 2014 - 2018)

3.2 Aggregated time series

Due to the nature of the data collection it might be more reasonable to group the clinics together into *funding rounds*, which are groups of 3-15 clinics that are recorded as being funded from a single grant. For example we can compare the total recipients of long term (red) and short term contraceptives (blue) across all the funding periods in Figure 7.

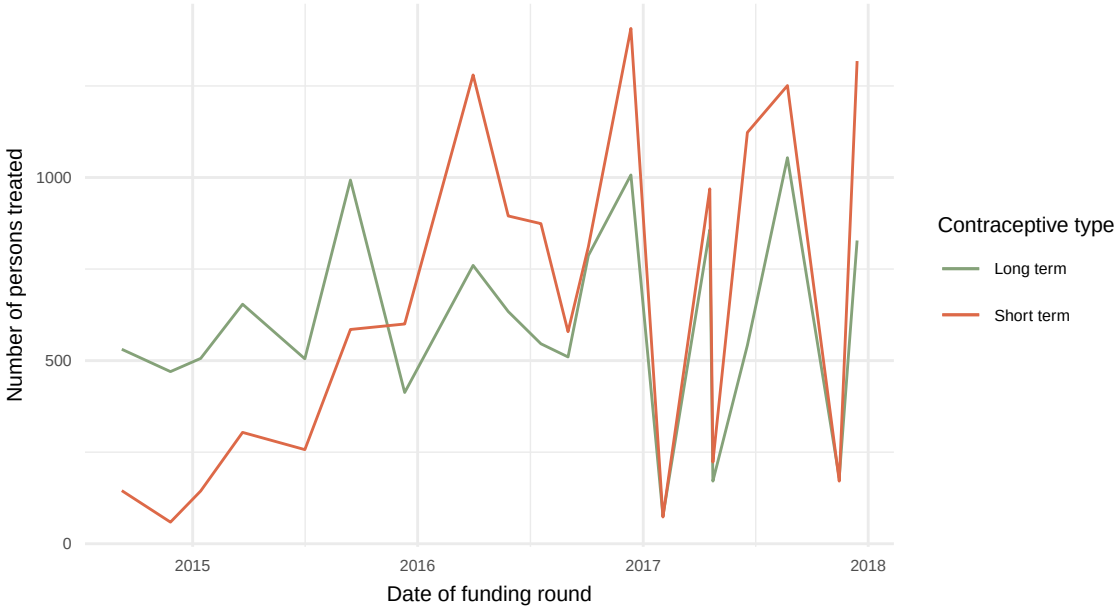

Figure 7: Aggregated time series of recipients of long term and short term contraceptives (Dandelion: 2014 - 2018)

However the problem with this chart, as with the previous simple time series ones, is that clinics and funding periods are not regularly spaced, so the charts don't give a reliable overview of the overall trends. Using the funding rounds makes sense for when we look at rates anda at costs though, so we will return to them in the next section.

But looking at overall trends perhaps the best option is to look at annual changes. Figure 8 summarises the same data as Figure 7 on recipients of long and short term contraceptives, this time looking at the data annually. A quick overview of the individual family planning methods is shown in Figure 9. [2]

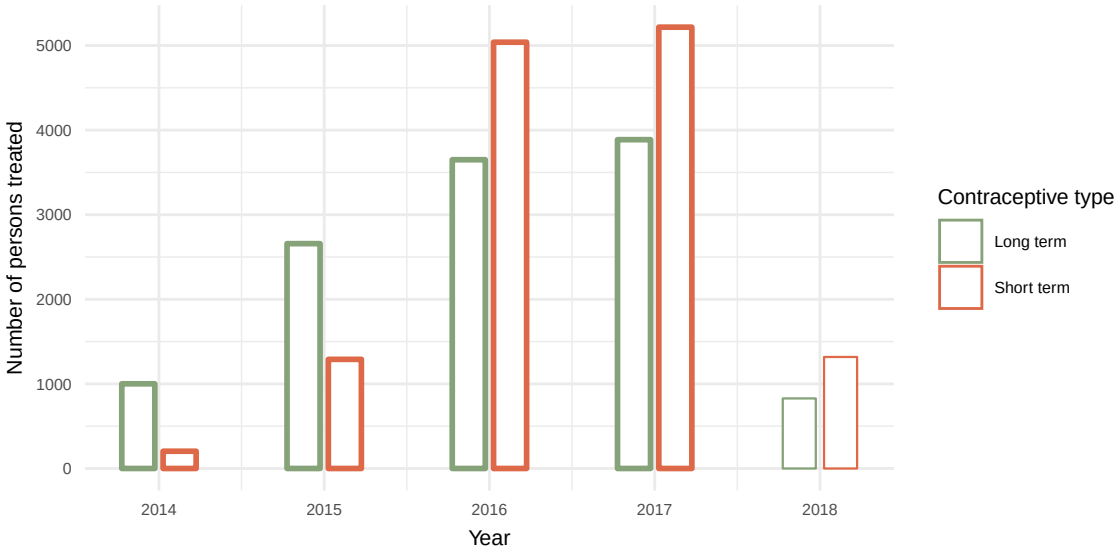

Figure 8: Annualy aggregated time series of recipients of long term and short term contraceptives (Dandelion: 2014 - 2018)

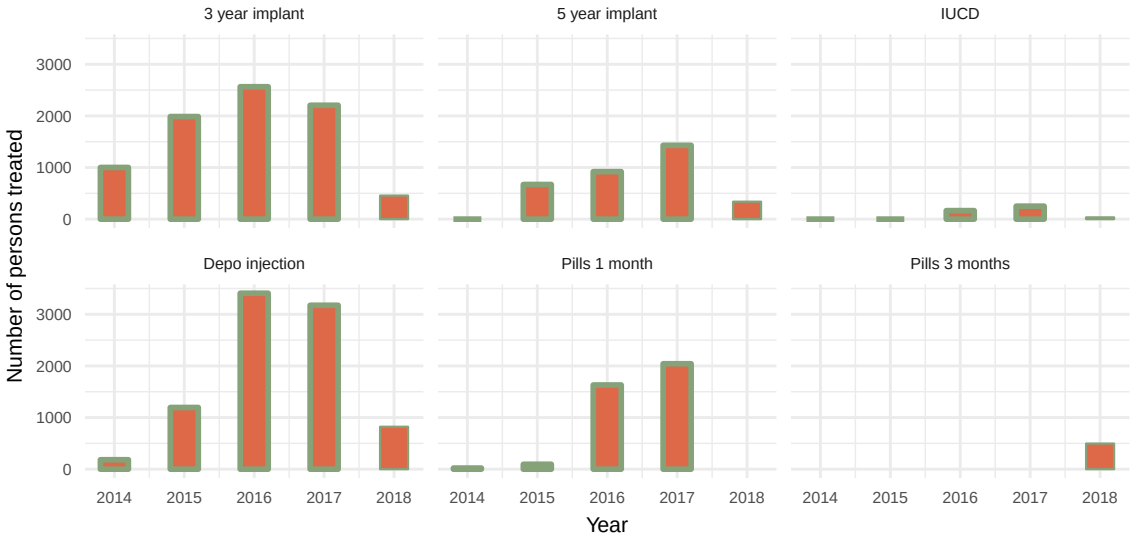

Figure 9: Annualy aggregated time series of recipients of all family planning services (Dandelion: 2014 - 2018)

[2]Because the 2018 data is still incomplete, last two bars are drawn thinner to make that clear.

3.3 Rates

If instead of looking at totals we look at rates i.e. relative numbers instead of absolute ones, we can observe trends over time at the more granular levels of individual clinics wihtout worying about their spacing. For example we can calculate the ratio of recipients of long term vs short term contraceptives, as we do in Figure 10. There is naturally still a lot of noise, so we have added a LOESS curve to smooth the variation out a little bit.

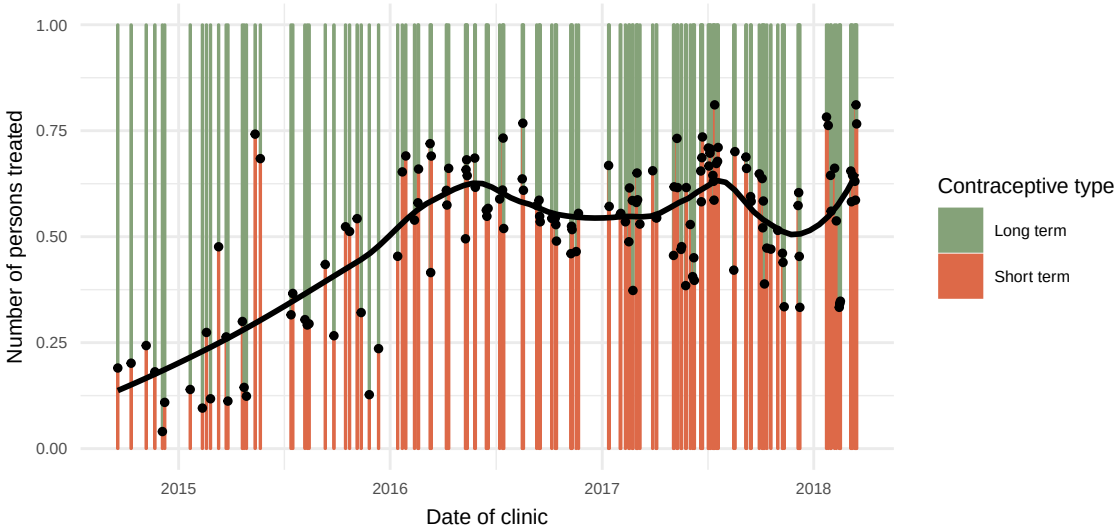

Figure 10: Ratio of recipients of long term and short term contraceptives in each clinic (Dandelion: 2014 - 2018)

We can also aggregate these rates, for example see how the ratios vary from one funding round to another, which is less noisy as can be seen in Figure 11.

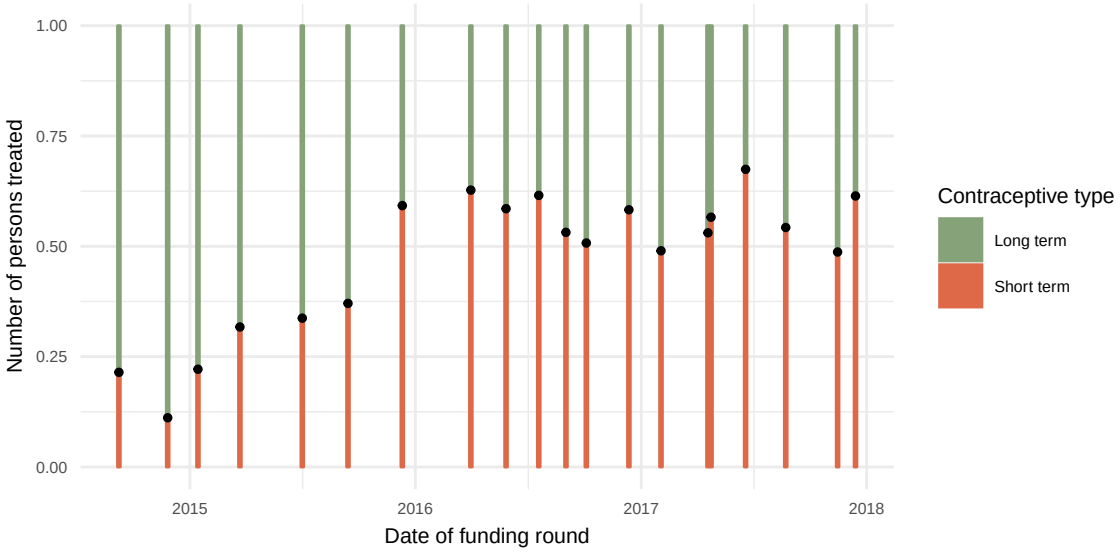

Figure 11: Time series of ratio of recipients of long term and short term contraceptives if each funding round (Dandelion: 2014 - 2018)

Other rates that could be of interest are e.g. rates of HIV positive tests as in figures 12 and 13

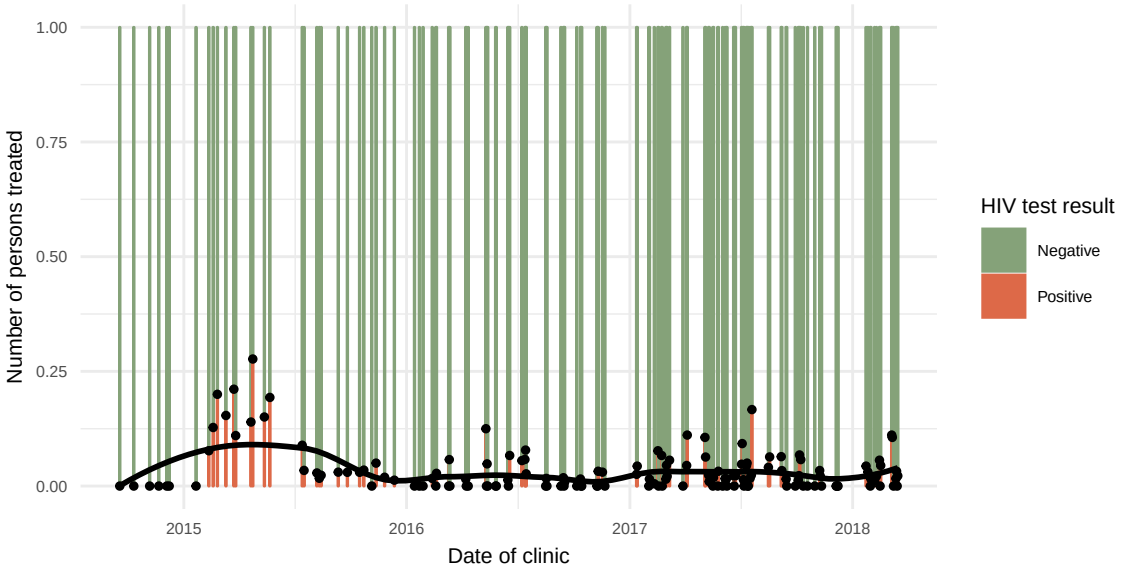

Figure 12: Proportion of positive HIV test results in each clinic (Dandelion: 2014 - 2018)

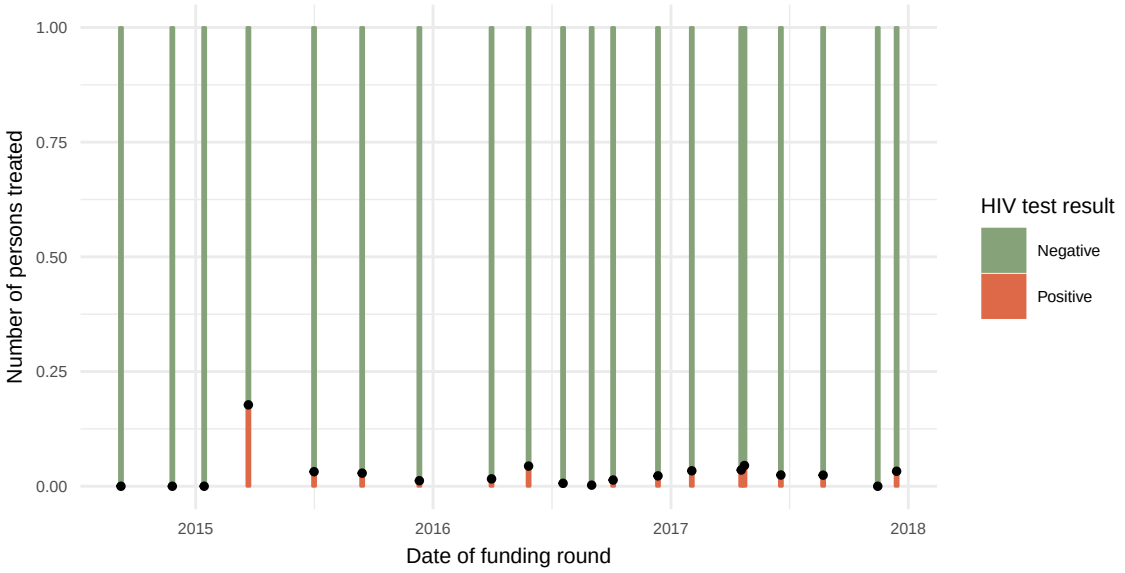

Figure 13: Proportion of positive HIV test results in each funding round (Dandelion: 2014 - 2018)

3.4 Couple Years of Protection Analysis

Using the amounts of funding for each funding period and the standard conversion factors for each type of contraceptive we can calculate the cost of *Couple years of protection* (in GBP) and see how it has varied over the funding rounds in Figure 14.

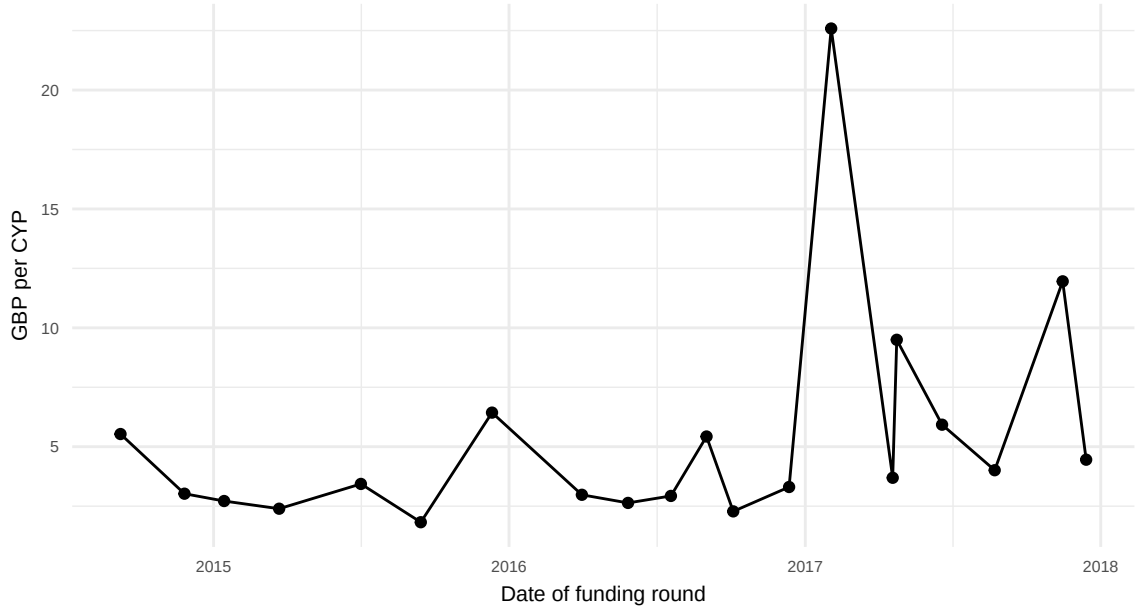

Figure 14: Cost (in GBP) of couple year of protection provided (Dandelion: 2014 - 2018)

Using CYP we can also investigate how the shares of different type of contraceptives have changed over time in terms of how many CYPs they provide:

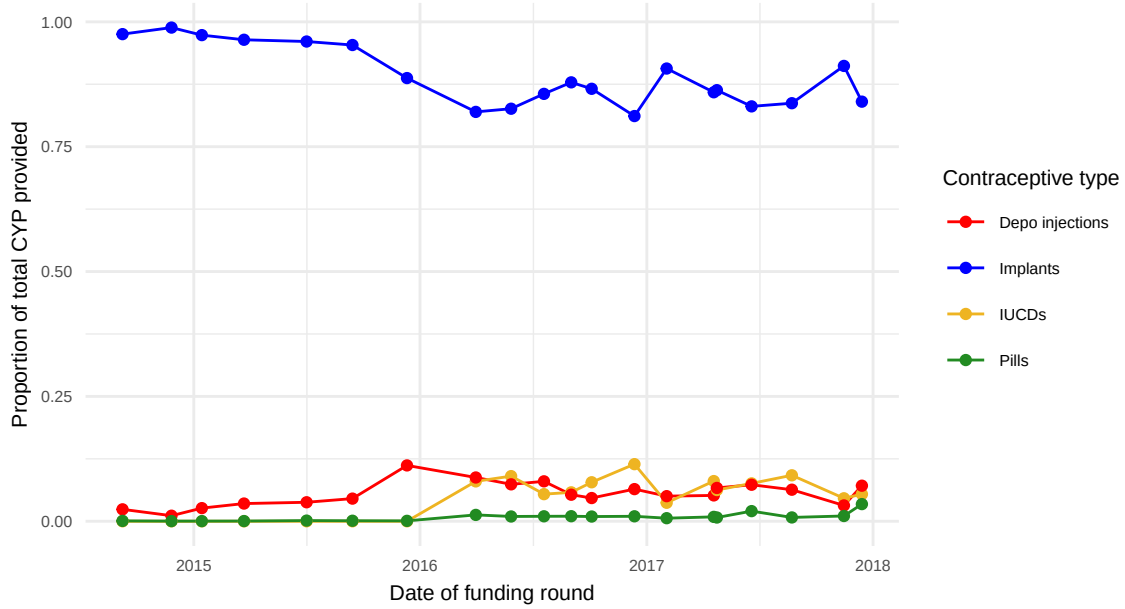

Figure 15: Contribution to total CYP provided by each contraceptive type (Dandelion: 2014 - 2018)

Appendix

The variables fall into the following categories:

- `id` variables such as `date`, and `venue`
- `fund_` variables have been extracted from the single column in the excel files relating to the funding round, amounts and dates.
- `fp_` variables are to do with family planning provision and are further split into `fp_lt_` and `fp_st_` for long and short term contraception.
- `ihs_` variables refer to integrated health care services
- `der_` are variables derived from the basic variables listed above (if they had already been calculated in the original excel files, they are still re-calculated).

var_name	source	description
ID		
date	original	Date of clinic
venue	original	Location of clinic
Family Planning - Long Term		
fp_lt_iucd	original	IUCD
fp_lt_5yr_1st	original	5 year implant, 1st
fp_lt_5yr_rep	original	5 year implant, repeat
fp_lt_3yr_1st	original	3 year implant, 1st
fp_lt_3yr_rep	original	3 year implant, repeat
Family Planning - Short Term		
fp_st_depo_1st	original	Depo injection, 1st
fp_st_depo_rep	original	Depo injection, repeat
fp_st_pills_6mth	original	Pills, 6 months
fp_st_pills_3mth	original	Pills, 3 months
fp_st_pills_1mth	original	Pills, 1 months
fp_st_pills_1st	original	Pills, 1 months, 1st
Family Planning - Ohter		
fp_condoms	original	Condoms
fp_under18	original	FP recipients under 18
fp_over18	original	FP recipients over 18
lt_iucd_remove	original	removal of IUCD
disabled_fp	original	FP recipients disabled
Integrated Health Care		
ihs_primary_hc	original	Primary health care provided
ihs_deworming	original	Deworming
ihs_immunization	original	Immunization
ihs_hiv_test	original	HIV/AIDS test
ihs_hiv_poz	original	HIV positive result
ihs_malaria_test	original	Malaria test
ihs_malaria_poz	original	Malaria positive result
ihs_cancer_test	original	Cancer screening
ihs_cancer_poz	original	Cancer positive result
ihs_hepB_test	original	Hepatitis B test
ihs_hepB_poz	original	Hepatitis B positive result
disabled_ihc	original	IHS recipients disabled
Funding Information		
fund_round	original	Funding round
fund_date	original	Funding date

fund_gbp	original	Funds in GBP
fund_ksh	original	Funds in KSH
fund_category	original	Funding category
Numbers of recipients		
der_fp_lt_total	derived	Recipients of long term contraceptives
der_fp_st_total	derived	Recipients of short term contraceptives
der_fp_total	derived	FP recipients in total
der_ihs_total	derived	IHS recipients total
der_total	derived	All recipients total
Couple Years of Protection		
der_fp_lt_iucd_cyp	derived	CYPs from IUCDs
der_fp_lt_5yr_1st_cyp	derived	CYPs from 5 year implants, 1st
der_fp_lt_5yr_1rep_cyp	derived	CYPs from 5 year implants, rep
der_fp_lt_3yr_1st_cyp	derived	CYPs from 3 year implants, 1st
der_fp_lt_3yr_1rep_cyp	derived	CYPs from 3 year implants, rep
der_fp_st_depo_1st_cyp	derived	CYPs from Depo injections, 1st
der_fp_st_depo_1rep_cyp	derived	CYPs from Depo injections, rep
der_fp_st_pills_6mth_cyp	derived	CYPs from pills, 6 months
der_fp_st_pills_3mth_cyp	derived	CYPs from pills, 3 months
der_fp_st_pills_1mth_cyp	derived	CYPs from pills, 1 months
der_fp_st_pills_1st_cyp	derived	CYPs from pills, 1 months, 1st
der_fp_implants_tot_cyp	derived	CYPs from all implants
der_fp_depo_tot_cyp	derived	CYPs from all injections
der_fp_pills_tot_cyp	derived	CYPs from all pills
der_fp_lt_tot_cyp	derived	CYPs from all long term methods
der_fp_st_tot_cyp	derived	CYPs from all short term methods
der_fp_tot_cyp	derived	CYPs from all methods
Costs		
der_gpb_per_person	derived	Cost per person in GBP
der_gpb_per_cyp	derived	Cost per CYP in GBP
der_ksh_per_person	derived	Cost per person in KSH
der_ksh_per_cyp	derived	Cost per CYP in KSH