

Chase Africa

Preliminary Analysis

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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.

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*:

¹All 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.

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.

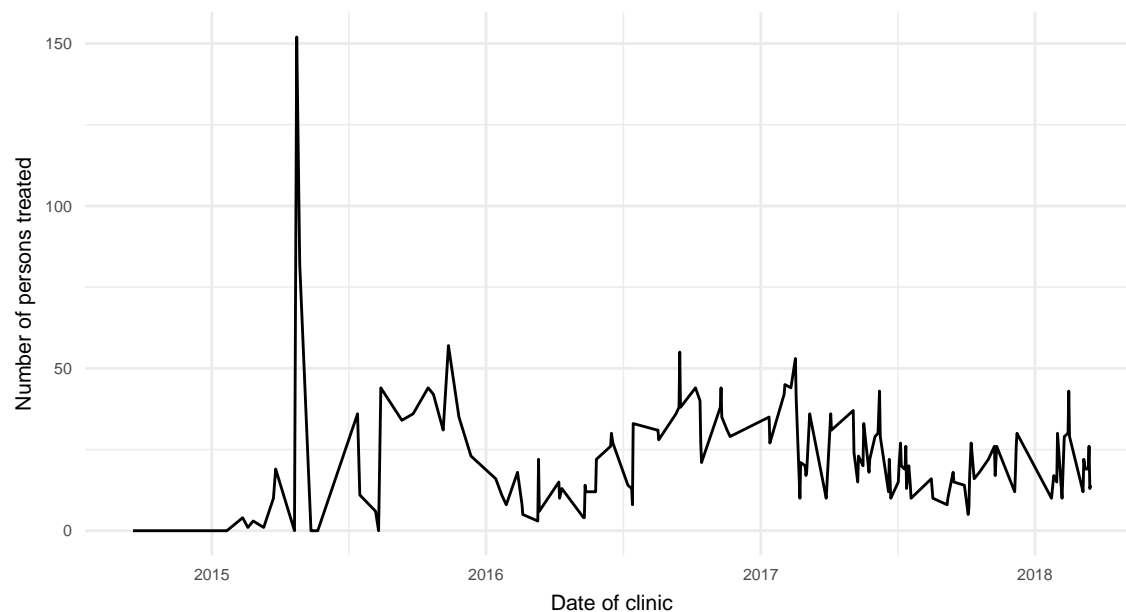


Figure 1: Simple time series of 5-year implant delivery (Dandelion: 2014 - 2018)

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: de-worming. Again the simple time series plots the number of recipients of each service in each clinic over time.

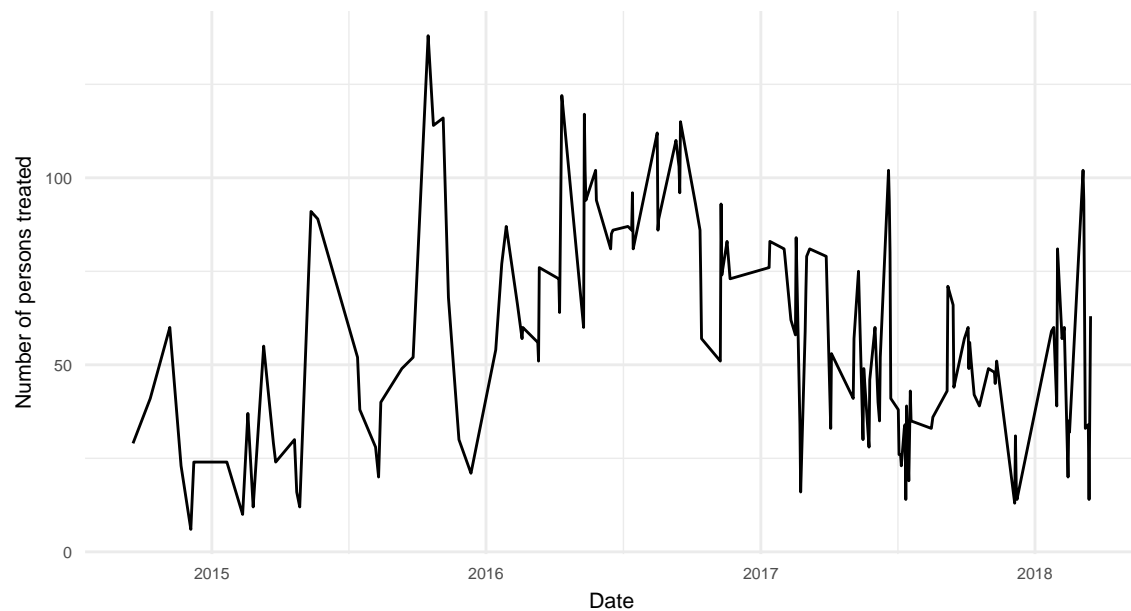


Figure 2: Simple time series of Depo injection delivery (Dandelion: 2014 - 2018)

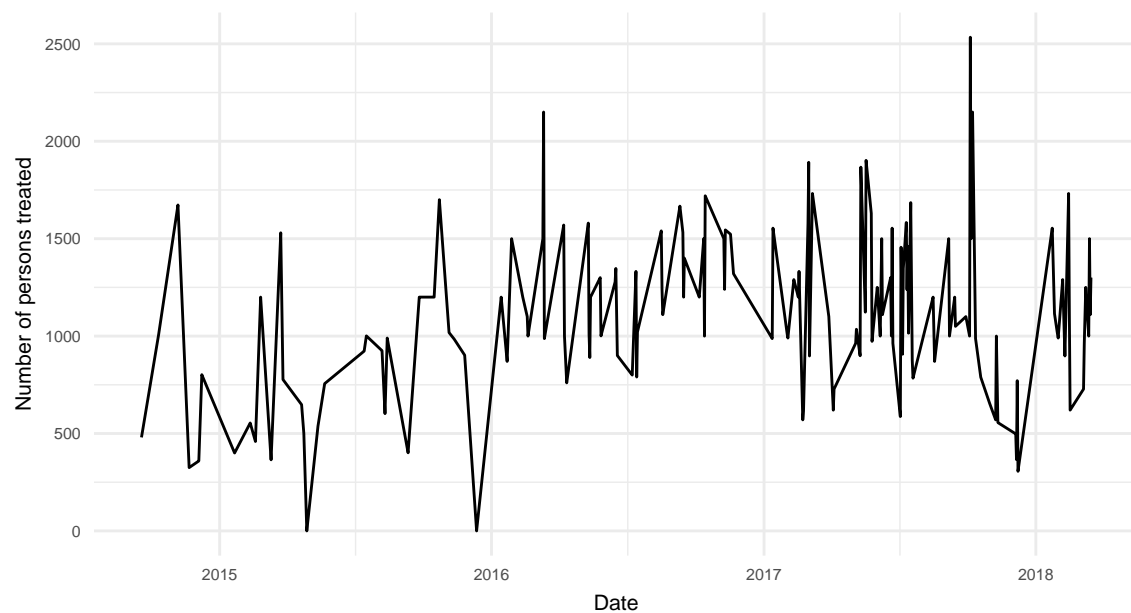


Figure 3: Simple time series of deworming

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.

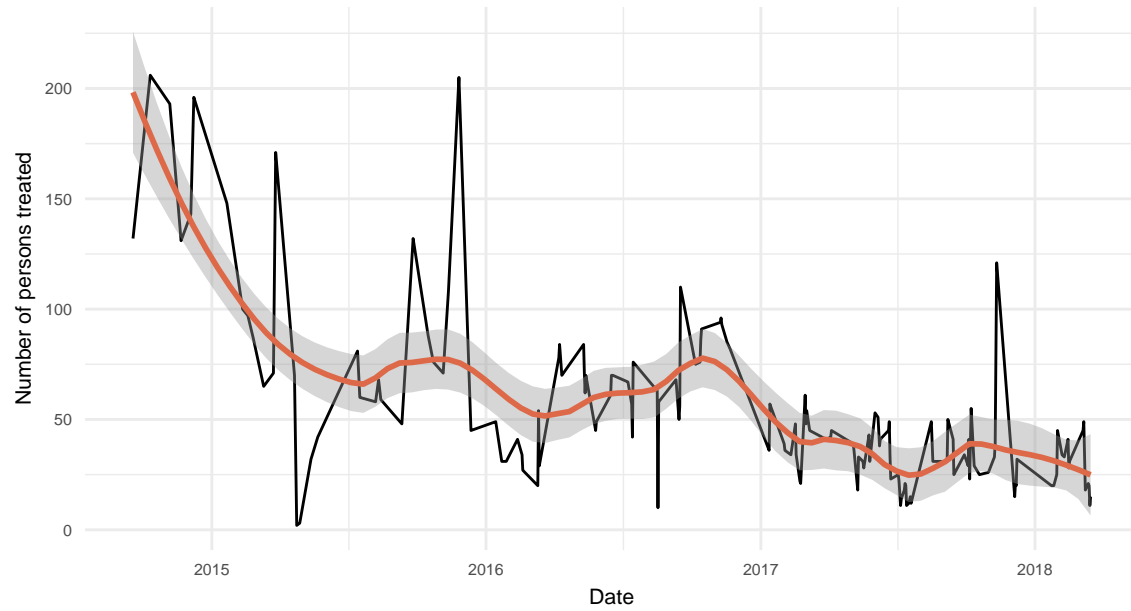


Figure 4: Simple time series of 3-year implant delivery with LOESS curve (Dandelion: 2014 - 2018)

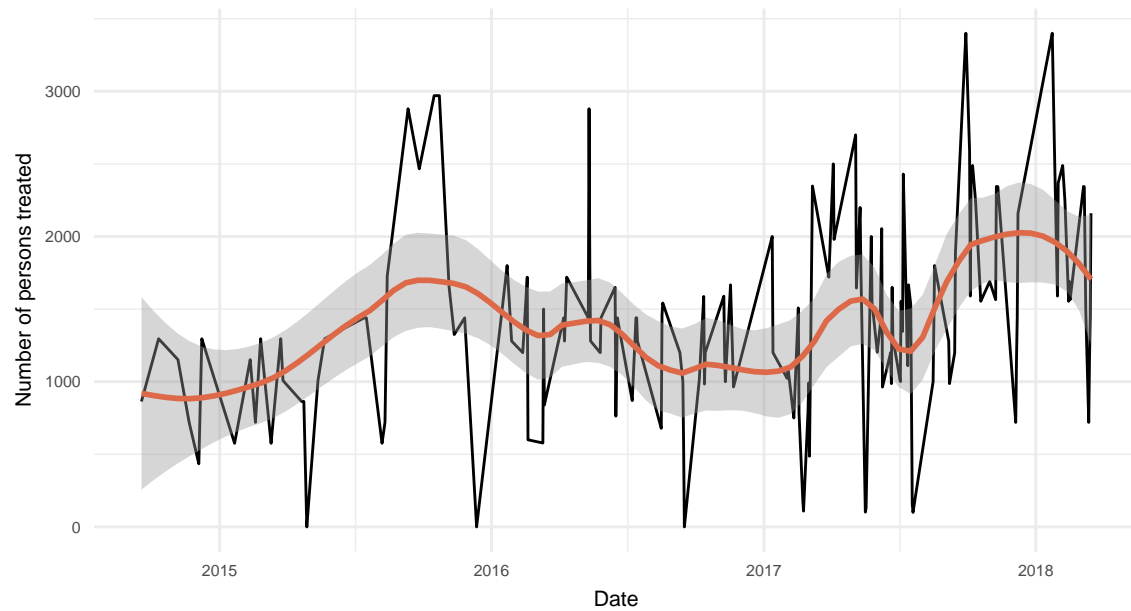


Figure 5: Simple time series of condom delivery with LOESS curve (Dandelion: 2014 - 2018)

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):

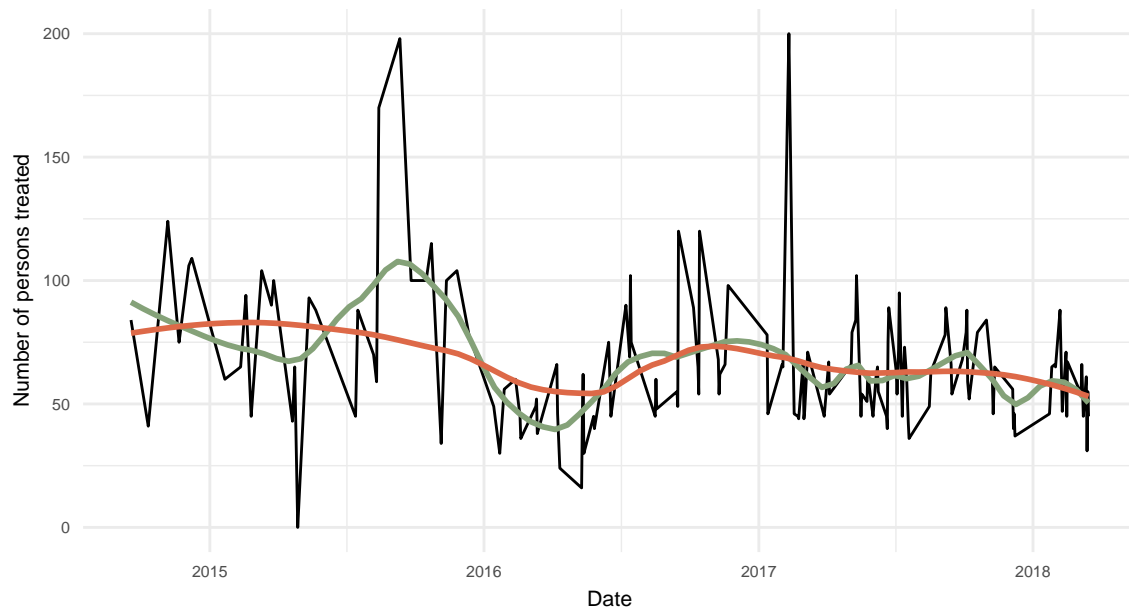


Figure 6: Simple time series of HIV test delivery with LOESs curve (Dandelion: 2014 - 2018)

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.

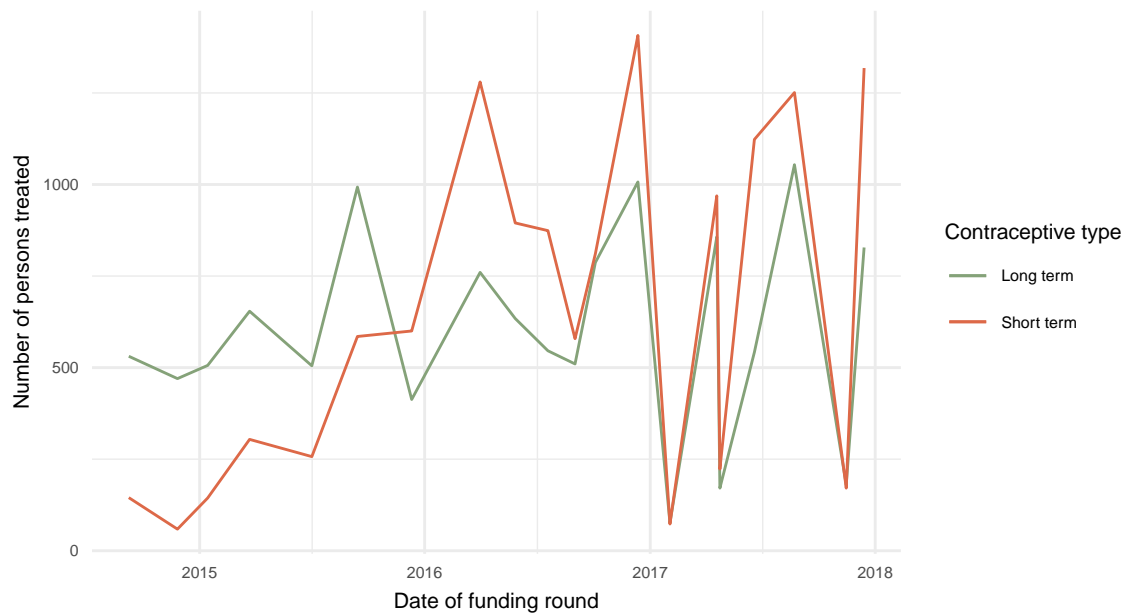


Figure 7: Aggregated time series of recipients of long term and short term contraceptives (Dandelion: 2014 - 2018)

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 and 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

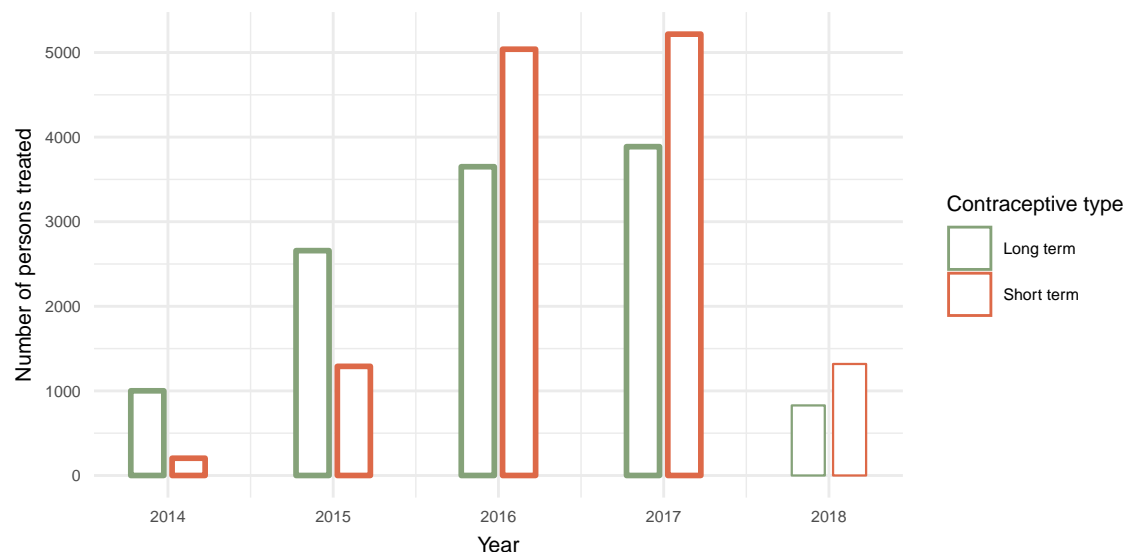


Figure 8: Annually aggregated time series of recipients of long term and short term contraceptives (Dandelion: 2014 - 2018)

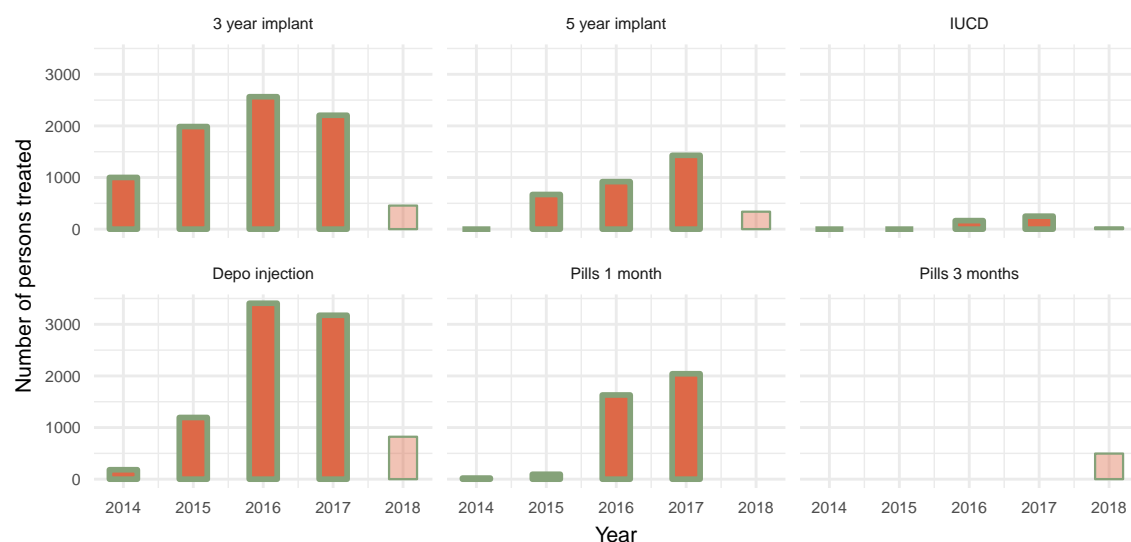


Figure 9: Annually aggregated time series of recipients of all family planning services (Dandelion: 2014 - 2018)

²Because the 2018 data is still incomplete, last two bars are drawn more lightly 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 without worrying 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.

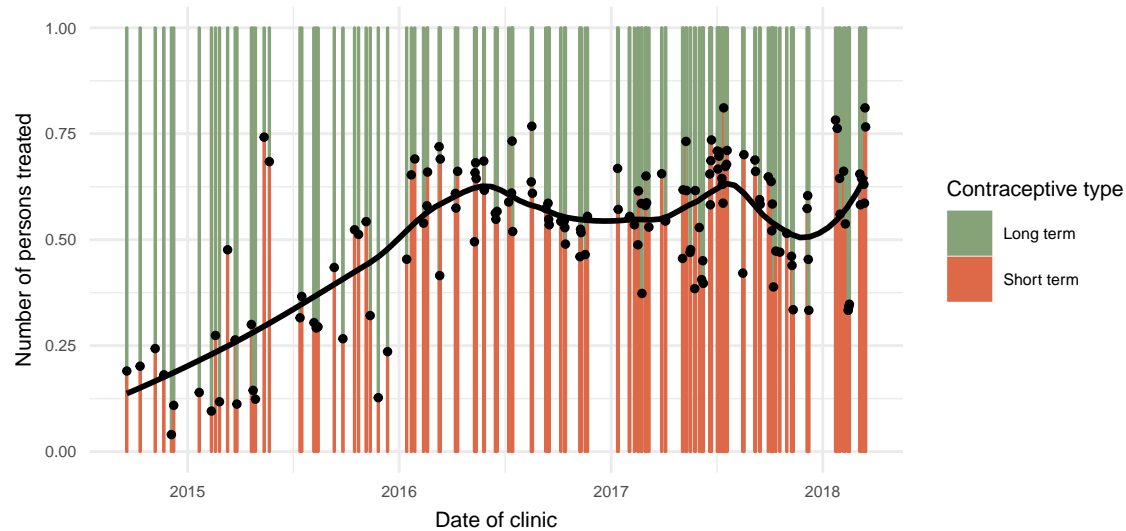


Figure 10: Ratio of recipients of long term and short term contraceptives in each clinic (Dandelion: 2014 - 2018)

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.

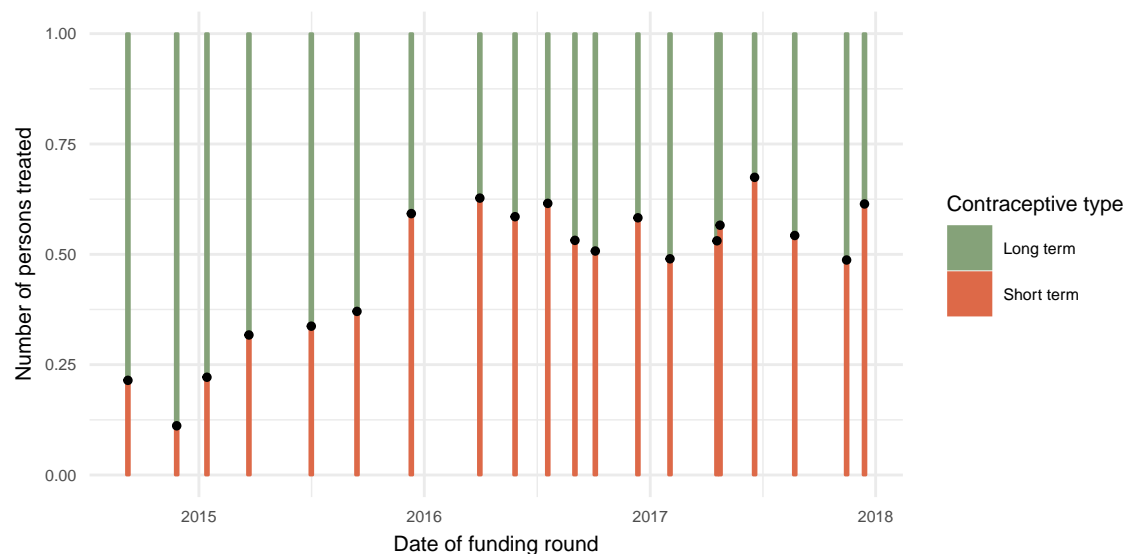


Figure 11: Time series of ratio of recipients of long term and short term contraceptives if each funding round (Dandelion: 2014 - 2018)

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

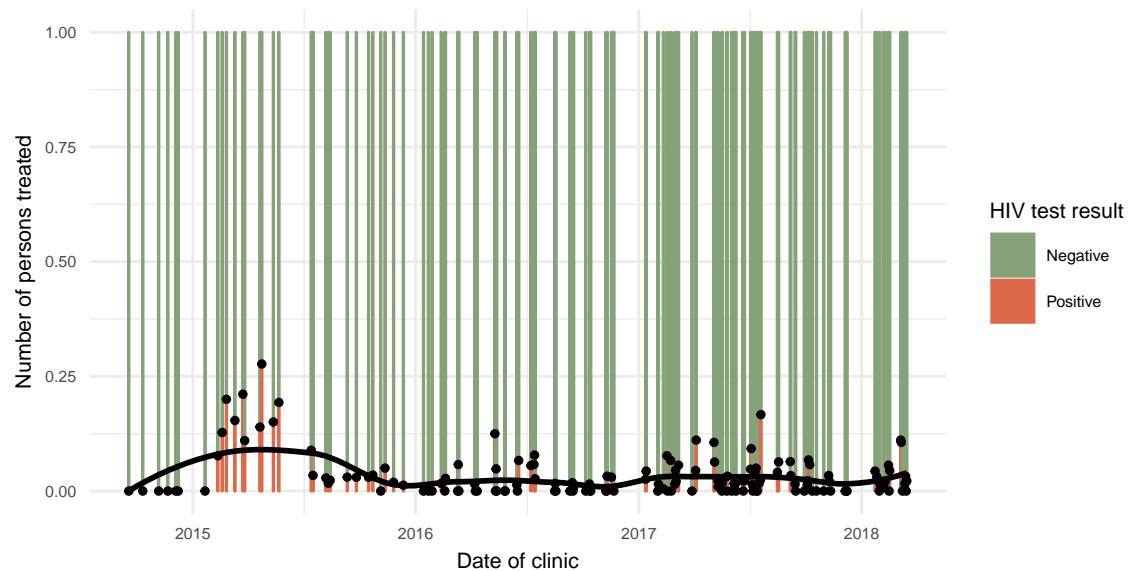


Figure 12: Proportion of positive HIV test results in each clinic (Dandelion: 2014 - 2018)

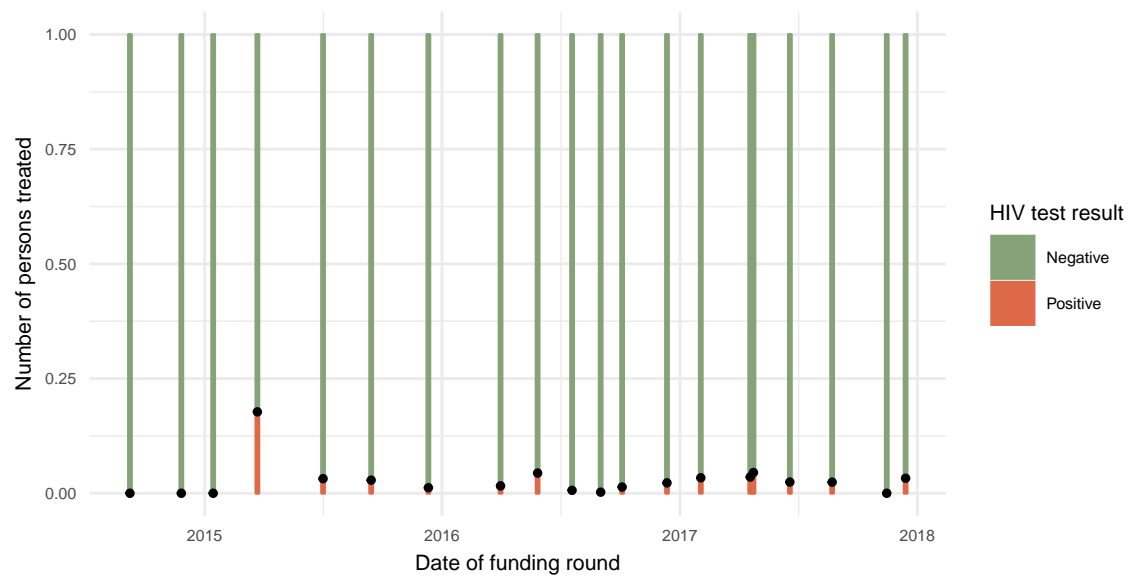


Figure 13: Proportion of positive HIV test results in each funding round (Dandelion: 2014 - 2018)

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.

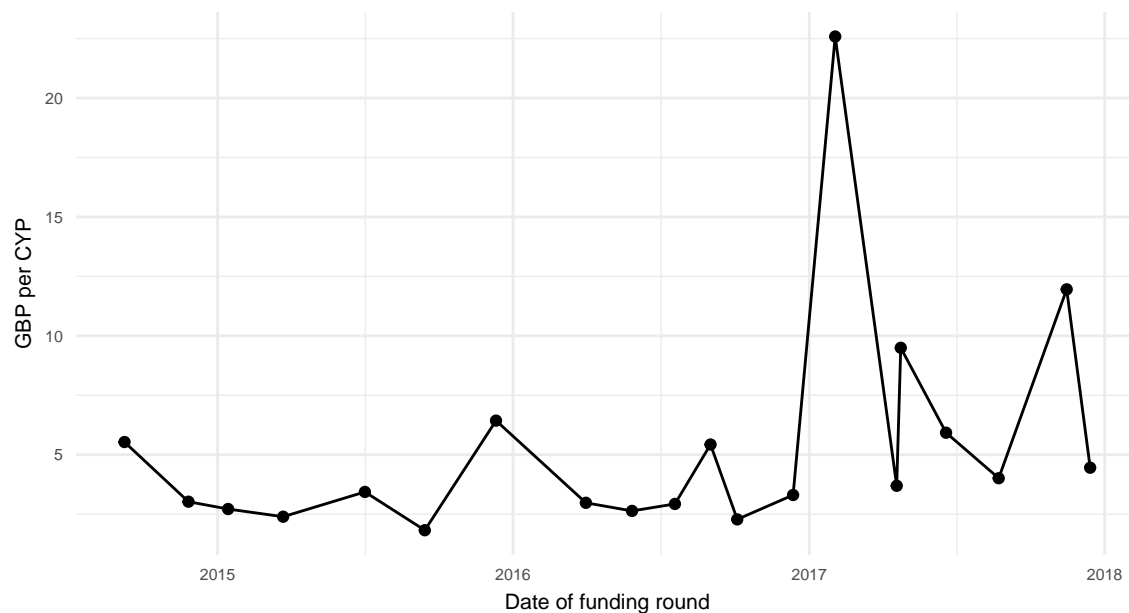


Figure 14: Cost (in GBP) of couple year of protection provided (Dandelion: 2014 - 2018)

Again, we can aggregate these data to remove the noise and look at how the cost of a couple year of protection has changed over the years, as we have in Figure 15:

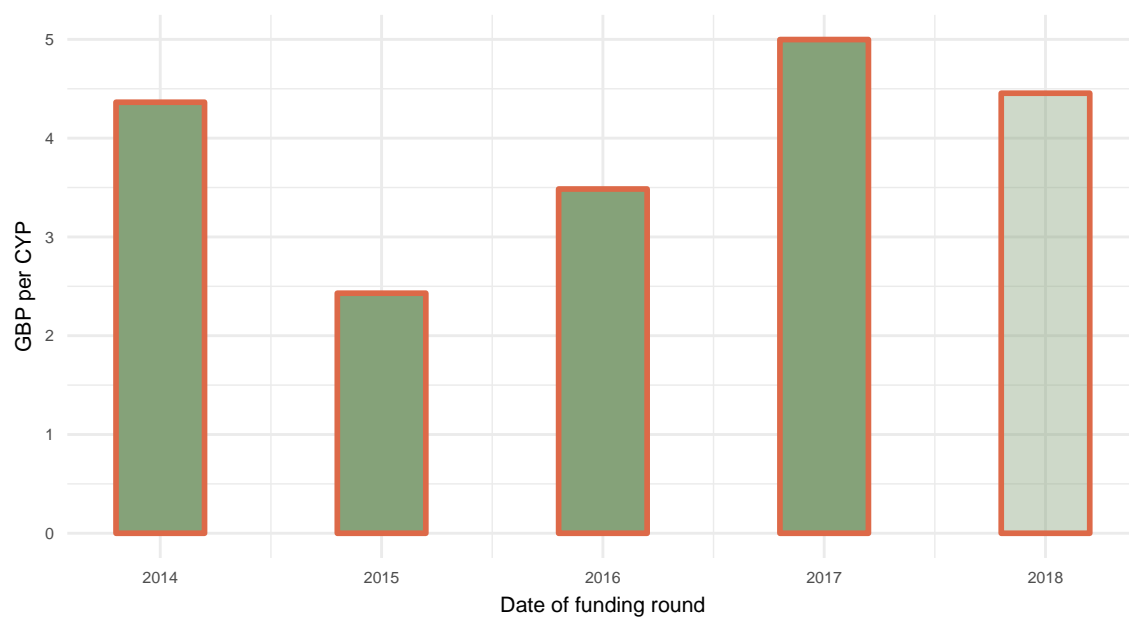


Figure 15: Cost (in GBP) of couple year of protection provided (Dandelion: 2014 - 2018)

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 are responsible for from all the contraception provided by the clinics:

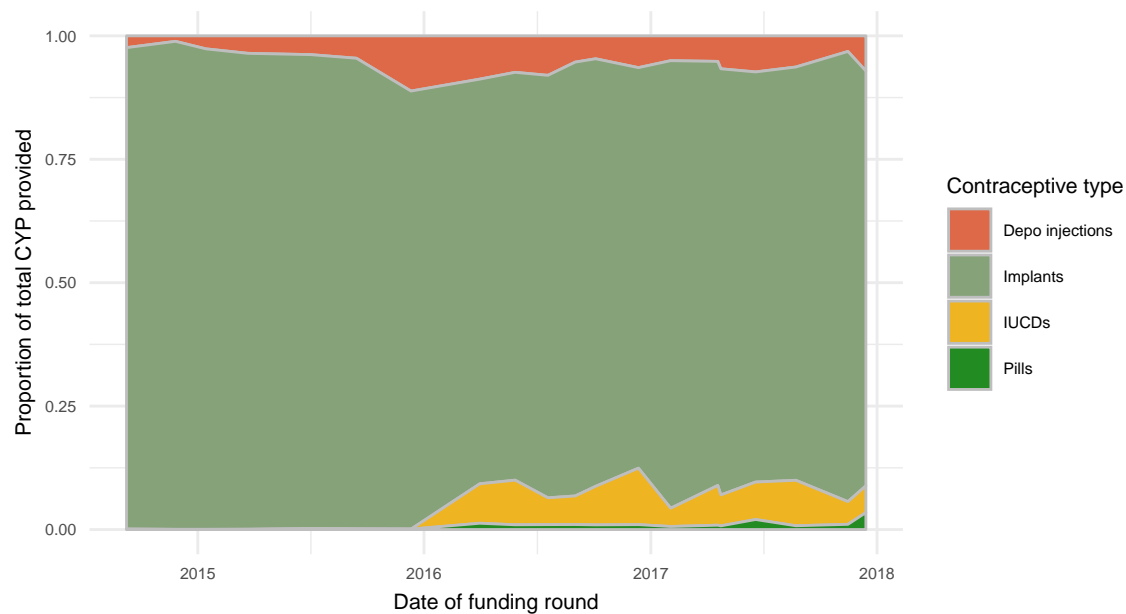


Figure 16: Contribution to total CYP provided by each contraceptive type (Dandelion: 2014 - 2018)

And as before, annual summaries of data are a less noisy way of observing the overall trends

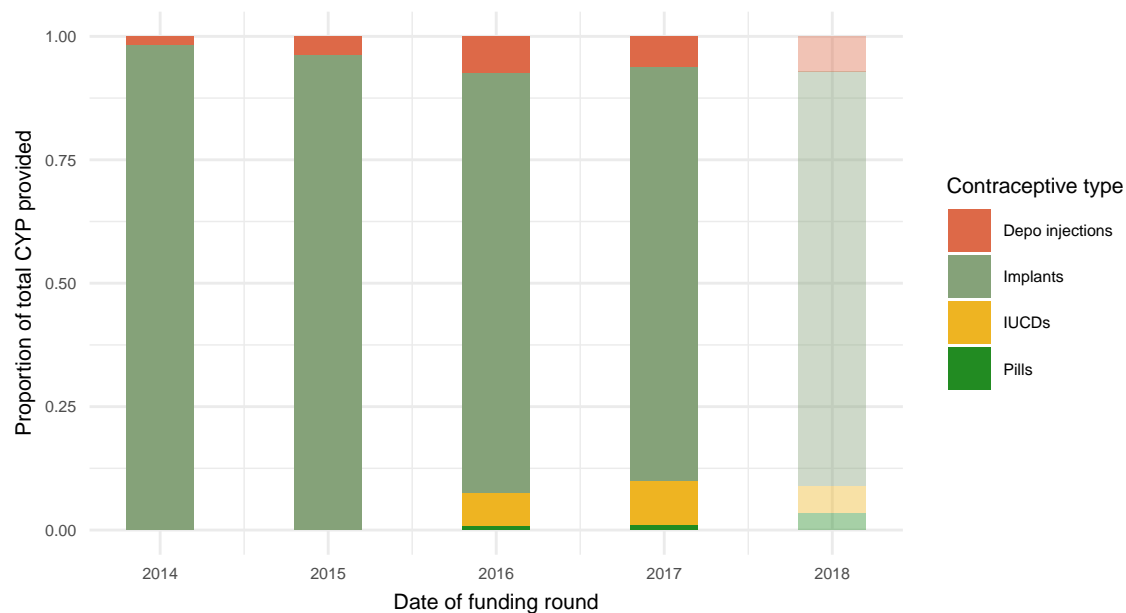


Figure 17: Contribution to total CYP provided by each contraceptive type - annually (Dandelion: 2014 - 2018)

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 |
