How to make the Contraceptive Calendar Work for You: An Introduction to Using PMA data

PMA
PERFORMANCE MONITORING FOR ACTION

JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

BILL & MELINDA GATES INSTITUTE *for*
POPULATION *and* REPRODUCTIVE HEALTH

jhpiego
Saving lives. Improving health.
Transforming futures.

IPUMS
PMA

Agenda

- Overview of PMA
- IPUMS's role
- Introduction to contraceptive calendars
- How to re-format the string calendar data
- Run the model exercise
  - Two breakout rooms: one for R, one for Stata
  - Self-select which breakout room you'd like to be in
- Q&A
- Conclusion

Performance Monitoring for Action (PMA) Overview

KEY ACHIEVEMENTS UNDER PMA AND PMA2020

2013

PLATFORM LAUNCHED

71 ROUNDS OF DATA COLLECTION COMPLETED

SURVEYS IN **11** COUNTRIES IN AFRICA AND ASIA
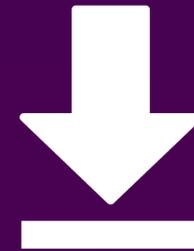
6 NEW SURVEY MODULES

2019

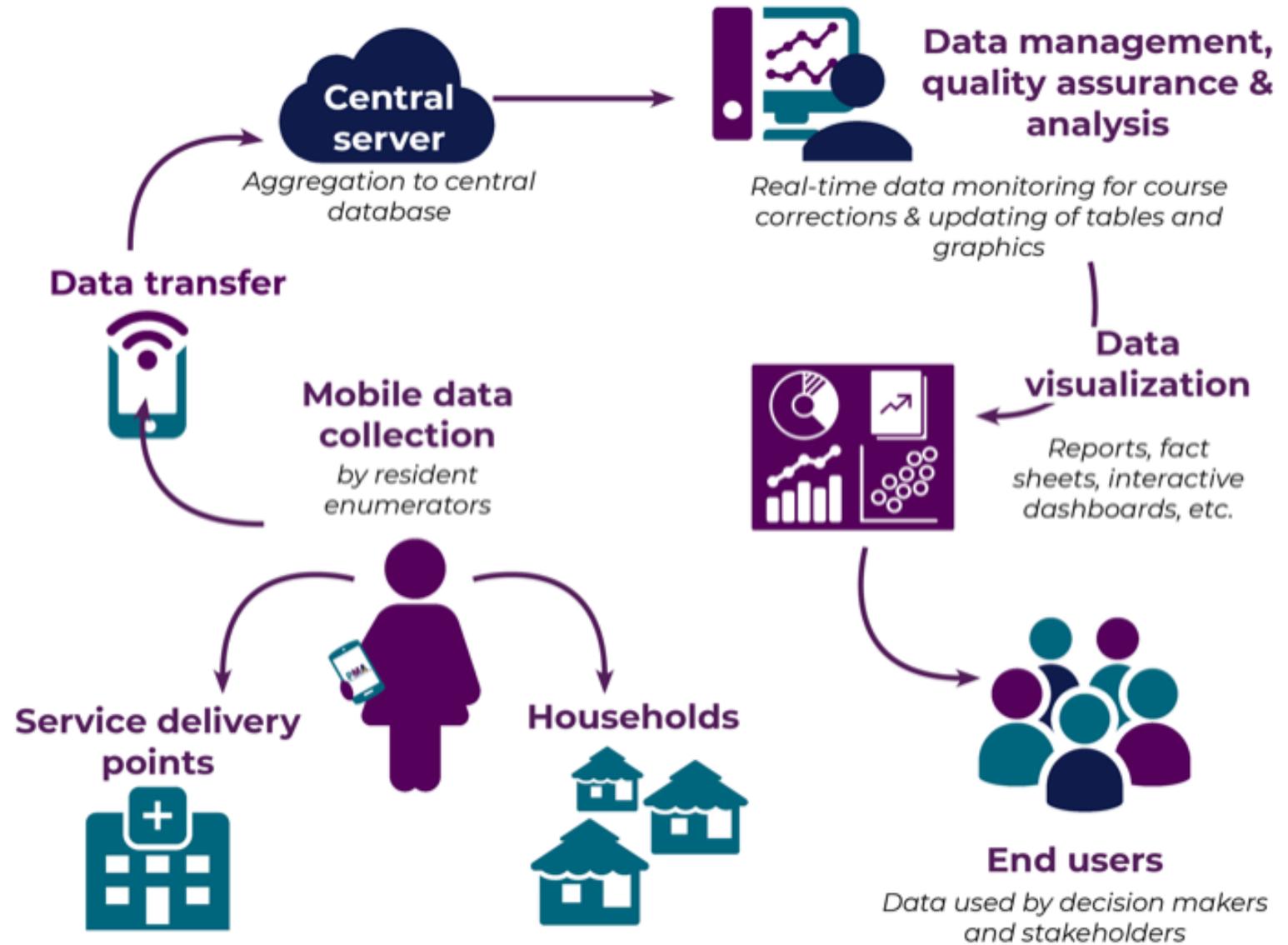PHASE 2 LAUNCHED

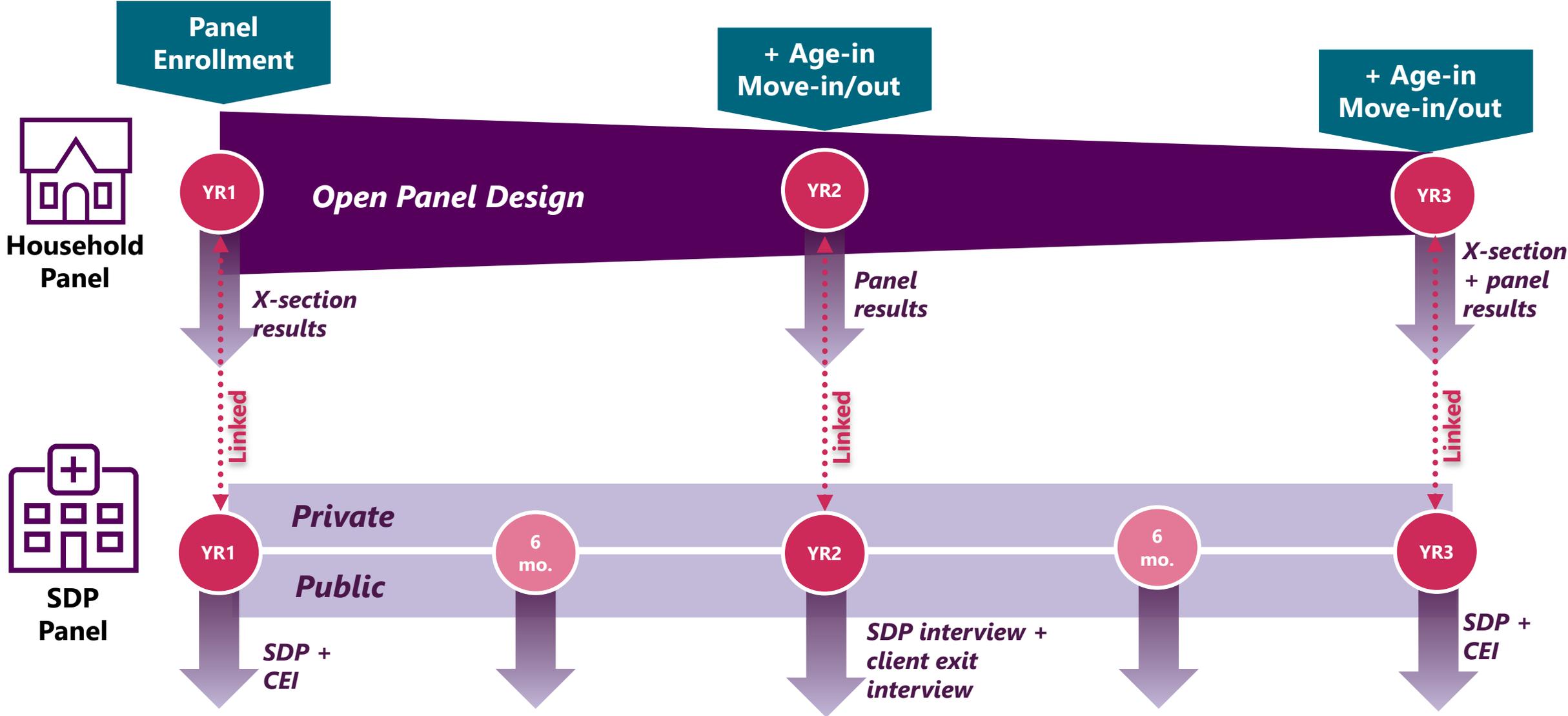**3,000+** LOCAL DATA COLLECTORS TRAINED

750,000+ INTERVIEWS CONDUCTED

13,500+ DATASETS DOWNLOADED

How PMA Works

Central server — Aggregation to central database

Data management, quality assurance & analysis — Real-time data monitoring for course corrections & updating of tables and graphics

Data transfer

Mobile data collection — by resident enumerators

Data visualization — Reports, fact sheets, interactive dashboards, etc.

Service delivery points

Households

End users — Data used by decision makers and stakeholders

PMA adds Panel Feature to Cross-Section

Panel Enrollment

+ Age-in Move-in/out

+ Age-in Move-in/out

Household Panel

Open Panel Design

YR1 | YR2 | YR3

X-section results

Panel results

X-section + panel results

Linked | *Linked* | *Linked*

SDP Panel

Private

Public

YR1 | 6 mo. | YR2 | 6 mo. | YR3

SDP + CEI

SDP interview + client exit interview

SDP + CEI

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Where We Work

Countries/Partners	
DR Congo	University of Kinshasa
Uganda	Makerere University
Kenya	International Centre for Reproductive Health
Nigeria	CRERD
Burkina Faso	ISSP/University of Ouagadougou
Niger	National Statistical Institute (INS)
India	Indian Institute of Health Management Research
Côte d'Ivoire	ENSEA
Ethiopia*	Addis Ababa University School of Public Health

Under a separate grant

What is PMA Ethiopia?

PMA Ethiopia is a five-year project implemented in collaboration with Addis Ababa University, Johns Hopkins University, and the Federal Ministry of Health.

- Nationally representative survey measuring key Reproductive, maternal and newborn health (RMNH) indicators including:
  - o Antenatal, delivery, and postnatal care
  - o Vaccination attitudes and coverage
  - o Modern contraceptive prevalence
  - o Reproductive empowerment, fertility intention, and community norms
  - o Health facility readiness and quality of care

Conceptual Framework for PMA Contraceptive Dynamics Panel
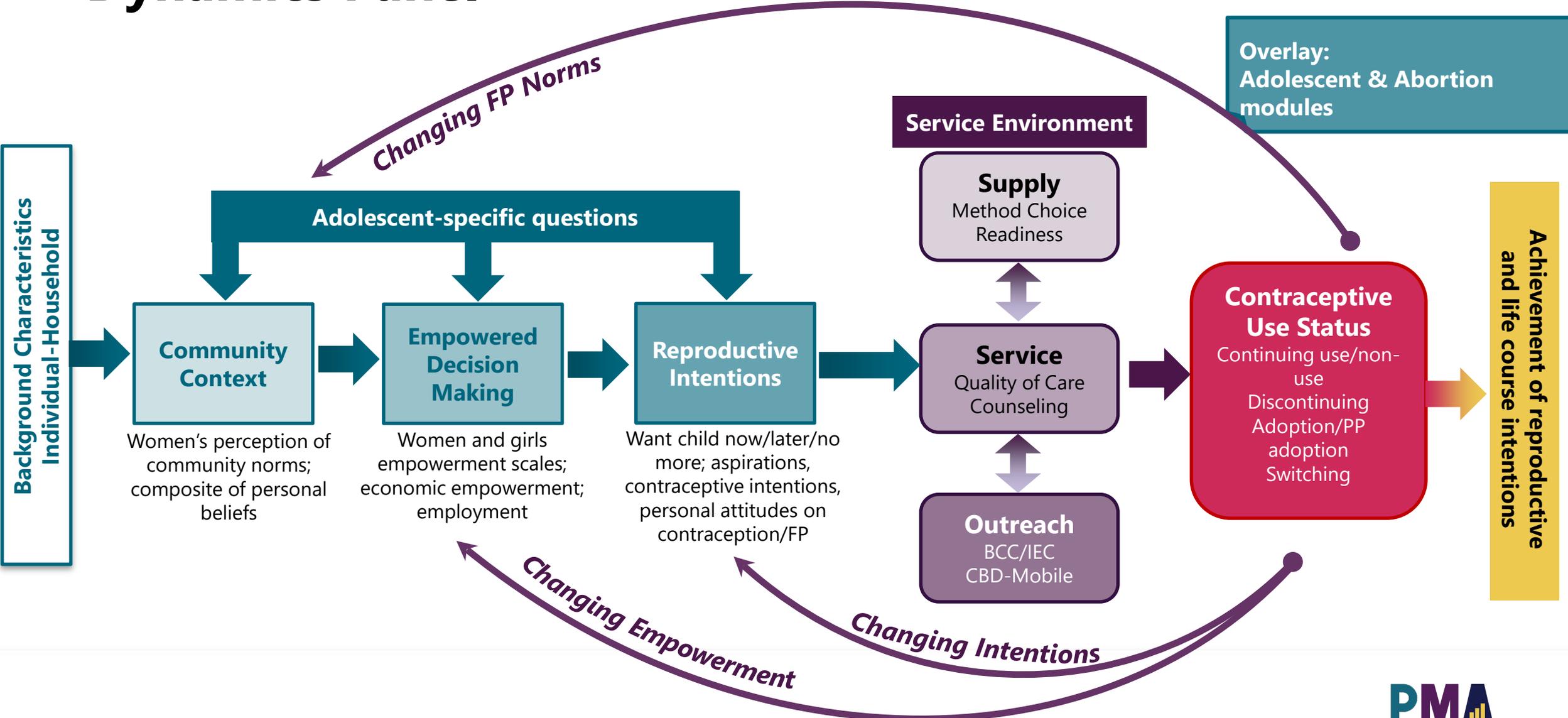
New Content since PMA2020

- Women and girls empowerment migration

- **2 year contraceptive calendar (!!)**

- Personal attitudes and community norms

- Adolescent/early adulthood questions

- Client exit interview

IPUMS: WHAT WE DO

What is IPUMS?

IPUMS provides census and survey data from around the world integrated across time and space. IPUMS integration and documentation makes it easy to study change, conduct comparative research, merge information across data types, and analyze individuals within family and community context. Data and services available free of charge.

IPUMS USA

U.S. Census and American Community Survey microdata from 1850 to the present.

VISIT SITE

IPUMS CPS

Current Population Survey microdata including basic monthly surveys and supplements from 1962 to the present.

VISIT SITE

IPUMS INTERNATIONAL

Census microdata covering 82 countries from 1960 to the present. IPUMS NAPP offers microdata from the 19th and early 20th centuries.

VISIT SITE

IPUMS GLOBAL HEALTH

Health survey data for Africa and Asia, including harmonized data collections for DHS and PMA2020.

VISIT SITES

IPUMS NHGIS

Tabular U.S. Census data and GIS boundary files from 1790 to the present.

VISIT SITE

IPUMS TERRA

Integrated data on population and the environment from 1960 to the present.

VISIT SITE

IPUMS TIME USE

Historical and contemporary time use data from 1965 to the present.

VISIT SITES

IPUMS HEALTH SURVEYS

Historical and contemporary U.S. health survey data from NHIS (1963-present) and MEPS (1996-present).

VISIT SITES

IPUMS HIGHER ED

Survey data on the science and engineering workforce in the U.S. from 1993 to the present.

VISIT SITE

IPUMS PMA

PMA PERFORMANCE MONITORING FOR ACTION

IPUMS PMA

- Harmonize codes and variable names

- Document variables

- Disseminate custom data files in multiple formats

- Adds calculated fields

IPUMS PMA

ABOUT

PMA PROJECT

REGISTER

DONATE TO IPUMS

DATA

BROWSE AND SELECT DATA

DOWNLOAD OR REVISE MY DATA

SUPPLEMENTAL DATA

GEOGRAPHY & GIS

DOCUMENTATION

MONITORING KEY FAMILY-PLANNING INDICATORS

IPUMS PMA harmonizes the Performance Monitoring for Action (PMA) data series (it was formerly known as Performance Monitoring and Accountability 2020 - PMA2020). It provides an interactive web dissemination system for PMA data with variable documentation on thousands of harmonized variables on family planning, water and sanitation, and health. PMA is fielded by the Bill & Melinda Gates Foundation and Johns Hopkins University using streamlined and high-frequency data collection in 11 FP2020 pledging countries.

11 COUNTRIES ·· OVER 100 SAMPLES ·· OVER 2000 VARIABLES ·· OVER 1 MILLION RECORDS

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PERFORMANCE MONITORING FOR ACTION

HOME | SELECT DATA | MY DATA | SUPPORT

DATA CART
YOUR DATA EXTRACT

0 VARIABLES
0 SAMPLES

CURRENTLY BROWSING: "FAMILY PLANNING - PERSON"

CHANGE

SELECT SAMPLES	SELECT VARIABLES			DISPLAY OPTIONS	HELP ⤢ COUNTRY ABBREVIATIONS
	TOPICS ▾	A-Z ▾	SEARCH 🔍		

Select **samples** and **variables** to build a data extract.

DATA ANALYSIS HUB

April 15, 2021

Matt Gunther

FORMATTING MIGRATION RECALL DATA FOR LONGITUDINAL ANALYSIS

MIGRATION   DATA DISCOVERY   DATA MANIPULATION   PIVOT_LONGER

REGEX

Use tidyr::pivot_longer to reshape wide data into a long format.

April 2, 2021

Matt Gunther

UNMET NEED FOR FAMILY PLANNING AFTER INTERNAL MIGRATION

MIGRATION   PMA PUBLICATIONS   SVYGLM   BOOTSTRAPS

Summary and source code from a recent article using
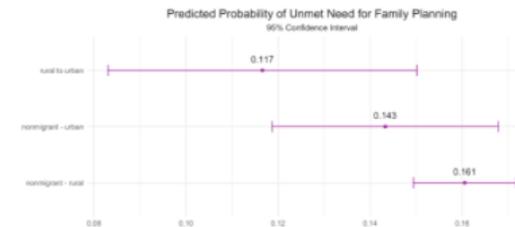
Articles (11)

across (1)

bootstraps (1)

Data Analysis (1)

Data Discovery (3)

Data Manipulation (5)

dotwhisker (1)

Importing Data (1)

Individuals in Context (6)

ipumsr (1)

join (2)

Mapping (1)

Migration (2)

New Data (1)

pivot_longer (2)

PMA Publications (1)

An Introduction to Contraceptive Calendars

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Background

History of event/reproductive calendars

First use of a calendar in reproductive health field

US National Fertility Survey, 1965

DHS started to incorporate calendar 1980s, most countries now include a 5-year calendar

PMA contraceptive calendar

- Piloted a 5-year calendar in 2017 and a 2-year calendar in 2018
- Incorporated a 2-year version into longitudinal design in 2019

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PMA contraceptive calendar

- PMA calendar is populated from questions during the survey and a drop-down menu at the end of the interview to account for women's reproductive status during each month
- Utilize a visual aid

PMA contraceptive calendar

COL. 1			O	O	O	O	O	O	B	P	P	P	P	P	P	P	P	O	5																	5
COL. 2																			3																
	12	11	10	9	8	7	6	5	4	3	2	1	12	11	10	9	8	7	6	5	4	3	2	1	12	11	10	9	8	7	6	5	4	3	2	1
	DEC	NOV	OCT	SEP	AUG	JUL	JUN	MAY	APR	MAR	FEB	JAN	DEC	NOV	OCT	SEP	AUG	JUL	JUN	MAY	APR	MAR	FEB	JAN	DEC	NOV	OCT	SEP	AUG	JUL	JUN	MAY	APR	MAR	FEB	JAN
					2020													2019											2018							

Calendar string

What can be done with calendar data?

Discontinuation rates

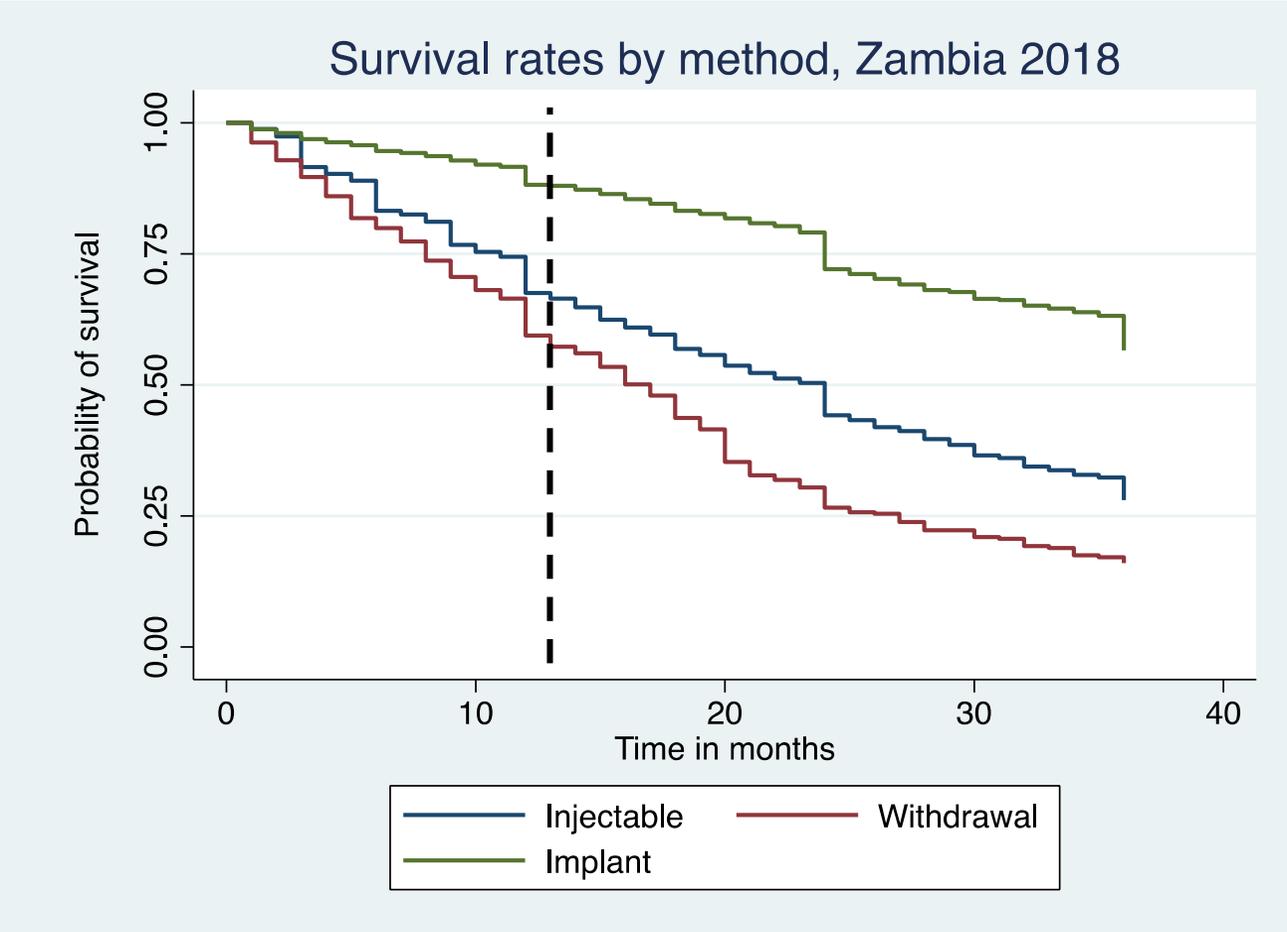**Table 7.10 Twelve-month contraceptive discontinuation rates**

Among episodes of contraceptive use experienced within the 5 years preceding the survey, percentage of episodes discontinued within 12 months, according to reason for discontinuation and specific method, Sierra Leone DHS 2019

Method	Method failure	Desire to become pregnant	Other fertility-related reasons[1]	Side effects/ health concerns	Wanted more effective method	Other method-related reasons[2]	Other reasons	Any reason[3]	Switched to another method[4]	Number of episodes of use[5]
Injectables	0.3	11.1	1.3	21.8	1.5	3.1	3.0	42.0	1.2	2,356
Implants	0.1	3.6	0.0	11.2	0.1	1.0	1.2	17.3	0.6	1,476
Pill	1.6	13.4	2.9	14.3	3.2	2.8	3.8	42.1	3.3	1,072
Other[6]	0.6	7.2	4.7	1.1	6.1	6.5	4.4	30.7	4.7	340
All methods	0.5	9.3	1.5	15.9	1.8	2.7	2.8	34.5	1.7	5,244

Note: Figures are based on life table calculations using information on episodes of use that occurred 3-62 months preceding the survey.

Source: Statistics Sierra Leone (Stats SL) and ICF. 2020. *Sierra Leone Demographic and Health Survey 2019.* Freetown, Sierra Leone, and Rockville, Maryland, USA: Stats SL and ICF.
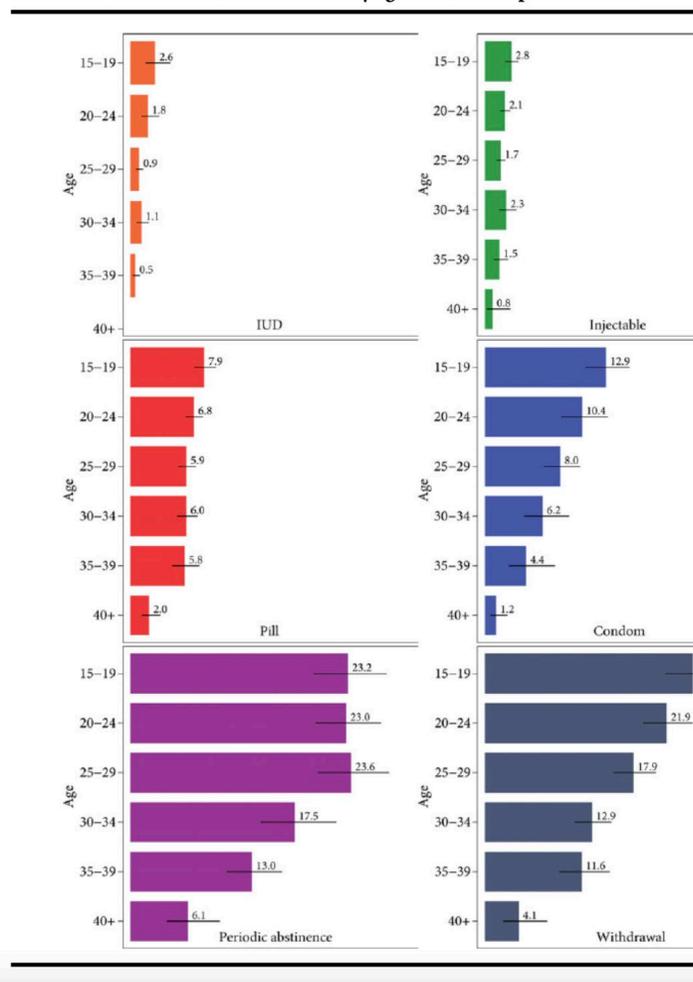
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Discontinuation rates come from survival curves

Survival rates by method, Zambia 2018

Source: DHS Zambia 2018

Failure rates

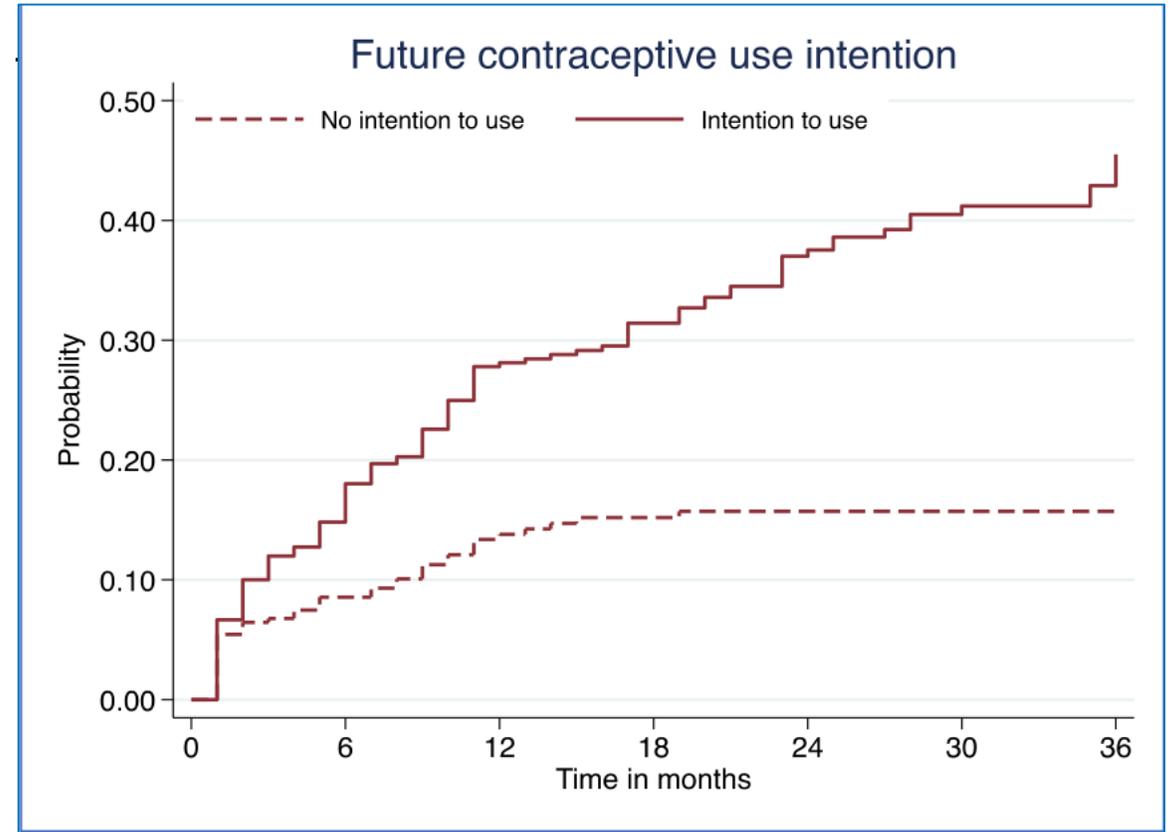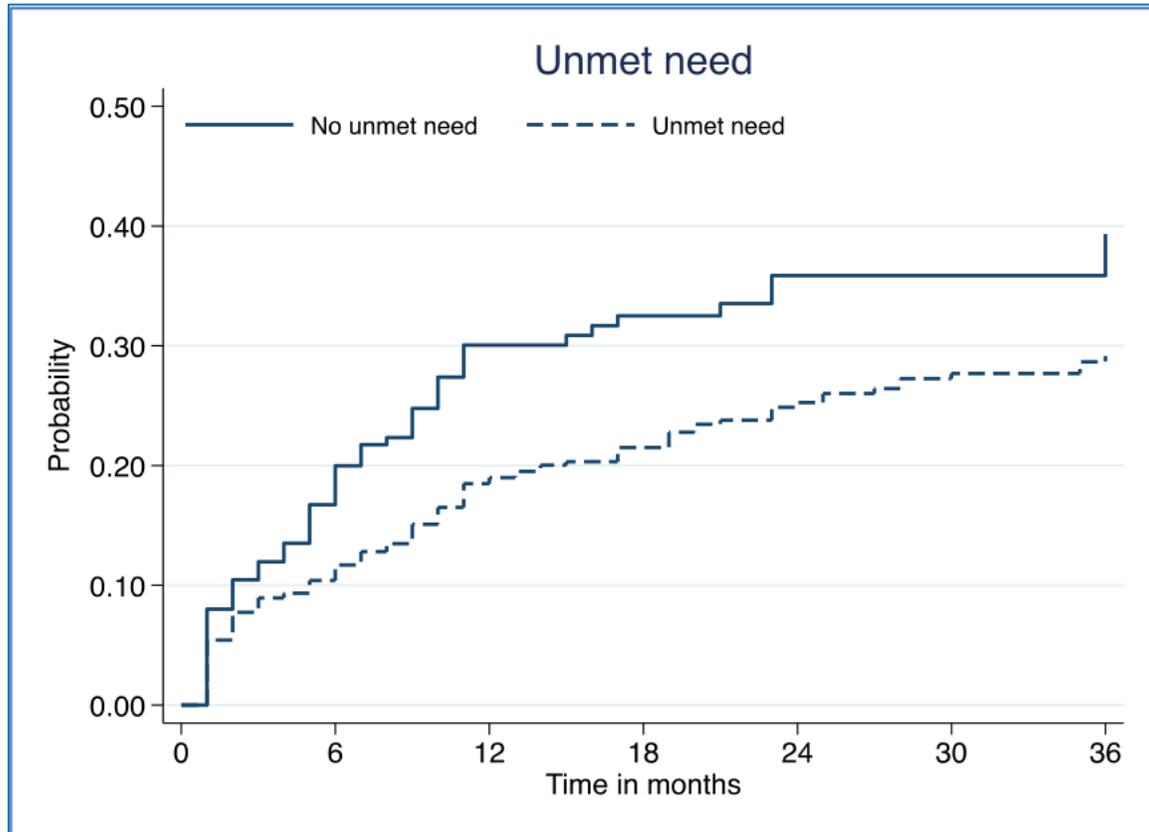FIGURE 2 Twelve-month failure rates by age and contraceptive method

Source: Bradley, S.E., Polis, C.B., Bankole, A. and Croft, T. (2019), Global Contraceptive Failure Rates: Who Is Most at Risk?. Studies in Family Planning, 50: 3-24. https://doi.org/10.1111/sifp.12085

https://www.prb.org/use-dynamics/

Preview:
PMA Longitudinal + calendar data

Time to adoption

Source: Sarnak D, Tsui A, Makumbi F, Kibira SPS, Ahmed S. The predictive utility of unmet need on time to contraceptive adoption: a panel study of non-contracepting Ugandan women. Contracept X. 2020 Mar 18;2:100022. doi: 10.1016/j.conx.2020.100022. PMID: 32550537; PMCID: PMC7286181.

Data quality

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PMA
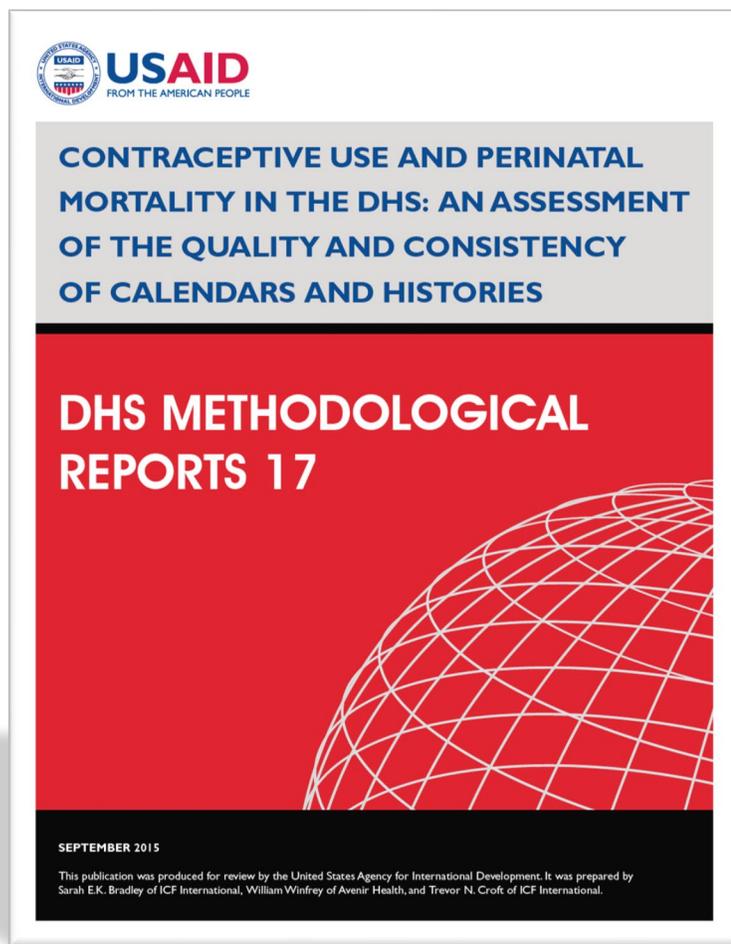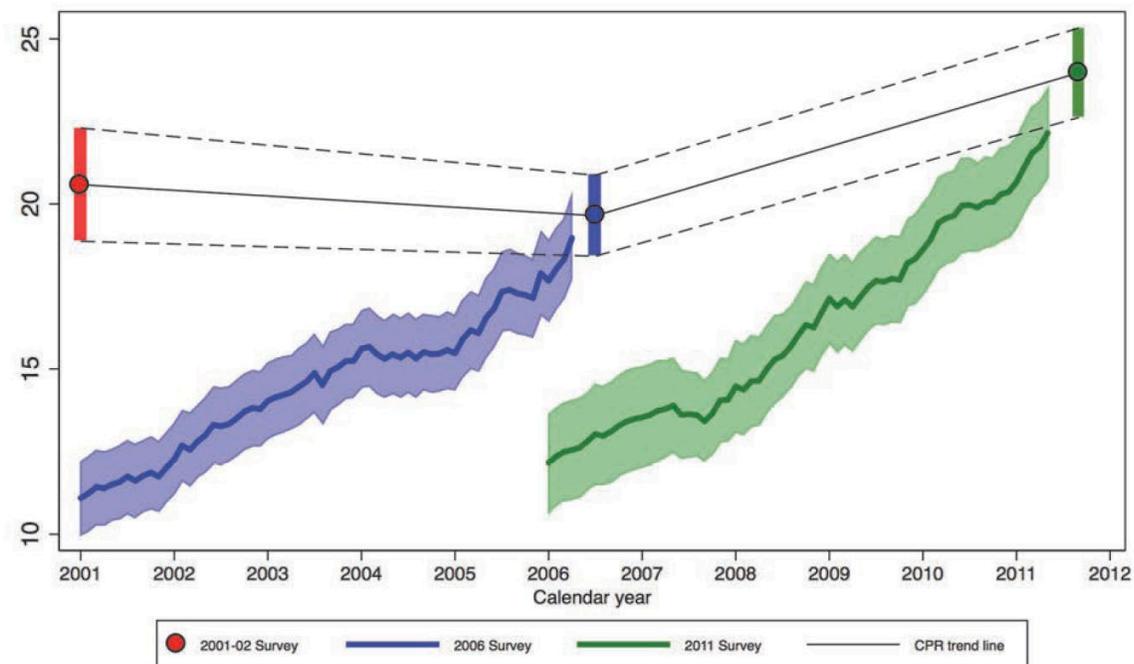PERFORMANCE MONITORING FOR ACTION

Aggregate level

Figure 16. Total contraceptive prevalence rate among women 15-43, Uganda

Individual level

The Reliability of Calendar Data for Reporting Contraceptive Use: Evidence from Rural Bangladesh

Rebecca L. Callahan and Stan Becker

Table 5 Crude and adjusted odds ratios predicting reliable reporting of contraceptive use, pregnancy, and pregnancy outcomes between report at baseline and report for the baseline interview month from the follow-up survey, Rural Bangladesh

Covariate	Odds Ratio	
	Crude	Adjusted
Age	1.00	1.04
Parity	0.84**	0.73**
Household asset index	1.02	1.02
Ever attended school	0.84	0.75
Number of methods used in lifetime		
0 (r)	1.00	1.00
1	0.86	1.11
2	0.40*	0.48*
3	0.50*	0.61
4+	0.26*	0.30*
Use of long-term method at baseline [a]	2.99	3.07

*Significant at $p \leq 0.05$; ***$p \leq 0.01$.
[a]Long-term methods include female and male sterilization, IUD, and implants.
Note: Adjusted for sample design.

The Reliability of Reporting of Contraceptive Behavior in DHS Calendar Data: Evidence from Morocco

Jennifer A. Strickler, Robert J. Magnani, H. Gilman McCann, Lisanne F. Brown, and Janet C. Rice

Table 6 Comparison of reasons reported for contraceptive discontinuation for matched segments, 1992 and 1995 DHS, Morocco

Reason reported in 1995	Reason reported in 1992						
	Censored by interview	Contraceptive failure	Wanted to become pregnant	Side effects/ health problems	Partner-related reasons	Other	Total (Percent)
Censored by interview	411	3	4	21	10	7	456 (62.7)
Contraceptive failure	3	36	8	2	0	5	54 (7.4)
Wanted to become pregnant	9	10	62	11	4	8	104 (14.3)
Side effects/ health problems	17	3	8	29	0	6	63 (8.7)
Partner-related reasons	6	0	3	2	17	1	29 (4.0)
Other	4	3	2	7	2	3	21 (3.9)
Total	450	55	87	72	33	30	727
(Percent)	(61.9)	(7.6)	(12.0)	(9.9)	(4.5)	(4.1)	(100.0)

Notes: Full table: off-diagonal proportion = 29.8 percent; Kappa = .75. Partial table (excluding censored segments): off-diagonal proportion = 36.7 percent; Kappa = .51.

Today's Goal

Model "survival" for use of family planning methods

Kaplan-Meier survival estimate: All Methods
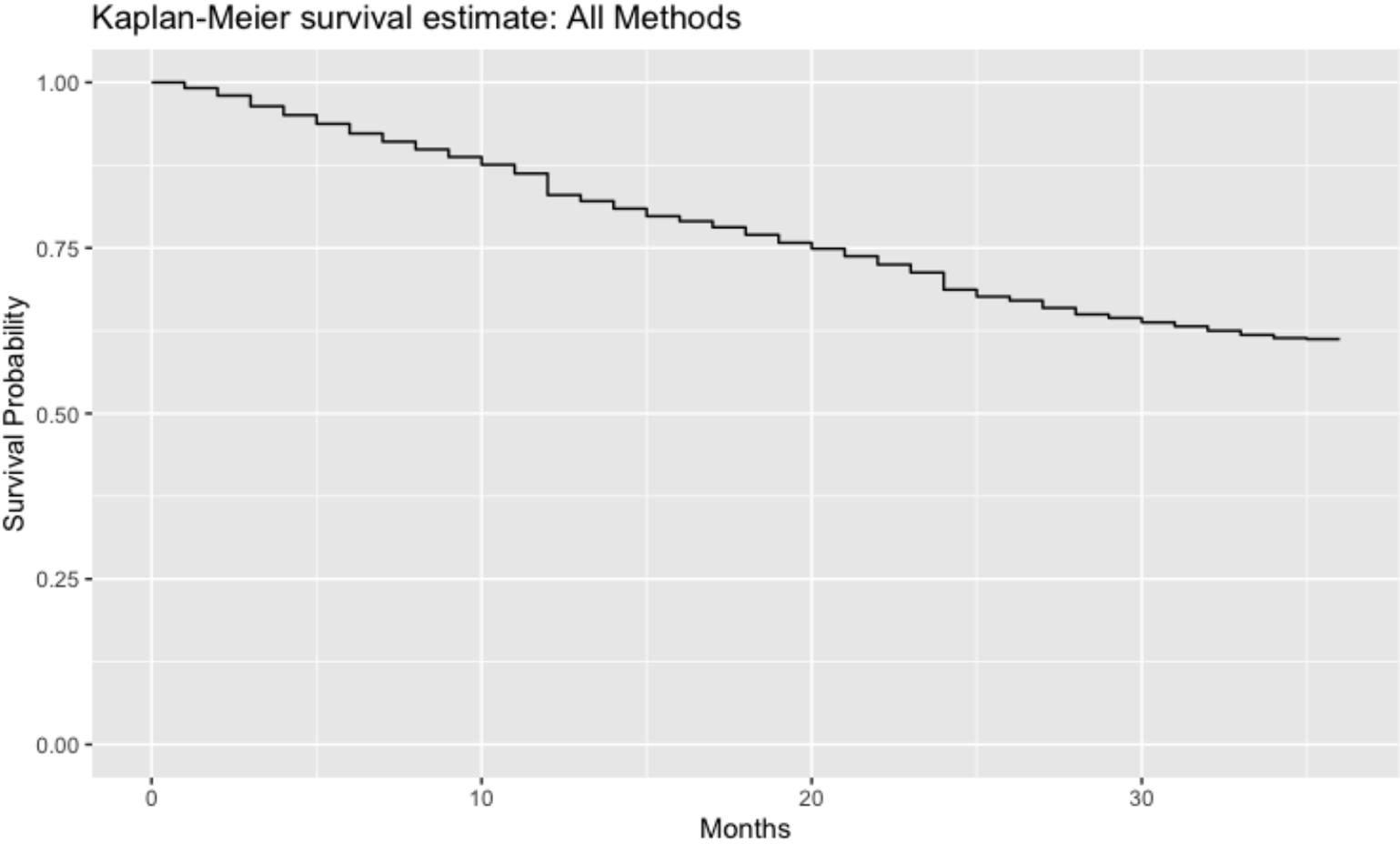
PMA Calendar Data

- Reads right to left chronologically

- Comma-delimited

- Starts January 2017
  - Nigeria, Kenya

- Starts January 2018
  - DRC, Burkina Faso

PMA Calendar Data

Person ID	Calendar variable
00000001	,,,,,,,,,,,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8,8,7,7,7,7,7
00000002	,,,,,,,,,,,3,3,3,3,0,0,0,0,0,0,0,0,0,B,P,P,P,P,P,P,P,P,0,0,0
00000003	,,,,,,,,,,,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

Codes

B = Birth
P = Pregnant
T = Pregnancy ended
0 = No family planning method used
1 = Female Sterilization
2 = Male Sterilization
3 = Implant
4 = IUD
5 = Injectables
7 = Pill

8 = Emergency Contraception

9 = Male Condom
10 = Female Condom
11 = Diaphragm
12 = Foam / Jelly
13 = Standard Days / Cycle beads
14 = LAM
30 = Rhythm method
31 = Withdrawal
39 = Other traditional methods

Parsing the String Data
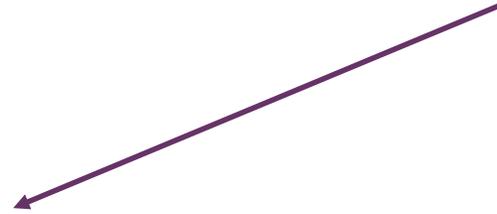
Stata

```
split calendarke,
p(,) gen(cal_ke)
```

R

```
dat %>%
    separate(
        col = CALENDARKE,
        into = paste0("cal_ke", 36:1),
        fill = "left"
    )
```

After Split/Separate

,,,,,,,,,,,3,3,3,3,0,0,0,0,0,0,0,0,0,B,P,P,P,P,P,P,P,P,0,0,0

cal_ke25	cal_ke26	cal_ke27	cal_ke28	cal_ke29	cal_ke30	cal_ke31	cal_ke32	cal_ke33	cal_ke34	cal_ke35	cal_ke36
B	P	P	P	P	P	P	P	P	0	0	0

Changing Format

Wide form

cal_ke25	cal_ke26	cal_ke27	cal_ke28	cal_ke29	cal_ke30	cal_ke31	cal_ke32	cal_ke33	cal_ke34	cal_ke35	cal_ke36
B	P	P	P	P	P	P	P	P	0	0	0

cal_ke	Month
B	25
P	26
P	27
P	28
P	29
P	30
P	31
P	32
P	33
0	34
0	35
0	36

Long form

Changing from Wide to Long

Stata   R

```
reshape long cal_ke,
i(personid) j(month)
```

```
dat %>%
  pivot_longer(
    starts_with("cal_ke"),
    names_pat = "cal_ke(.*)",
    names_to = "MONTH",
    values_to = "FP"
  )
```

Survival Analysis

- Statistical analysis of duration of time before an event ("fail")

- Women using FP in month 1 (fp_use == 1)

- Estimating time until stop (fp_use == 0)

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Recoding Key Variables

Stata

```
recode numcal_ke
(0=0) (90/92=0)
(else=1), gen(fp_use)
```

R

```
dat %>%
  mutate(
    FP_USE = !FP %in% c(
      "B", "P", "T", "0"
    ),
    MONTH = as.integer(MONTH)
  )
```

Survival Curve

Stata

```
stset month,
id(personid)
failure(fp_use==0)

sts graph
```
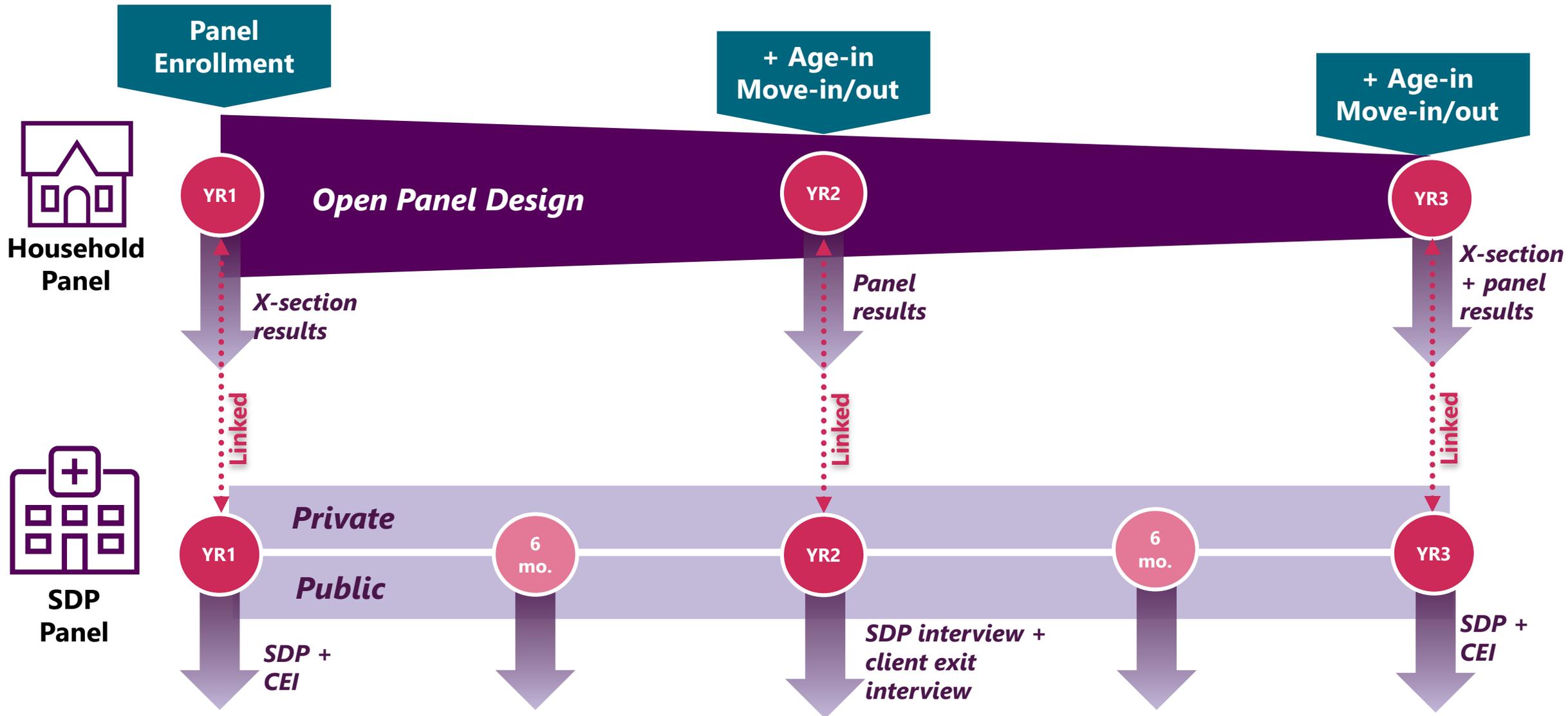
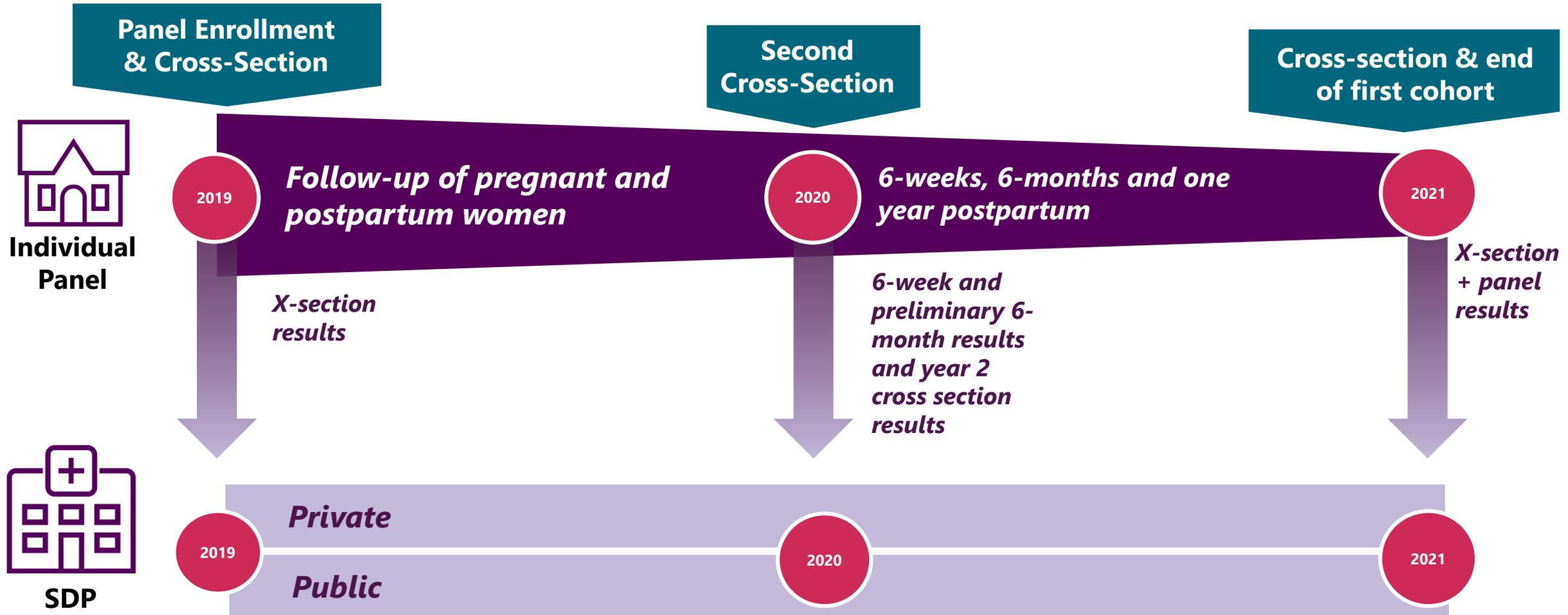## R

```
autoplot(dat)
```

Questions?

Coming soon:
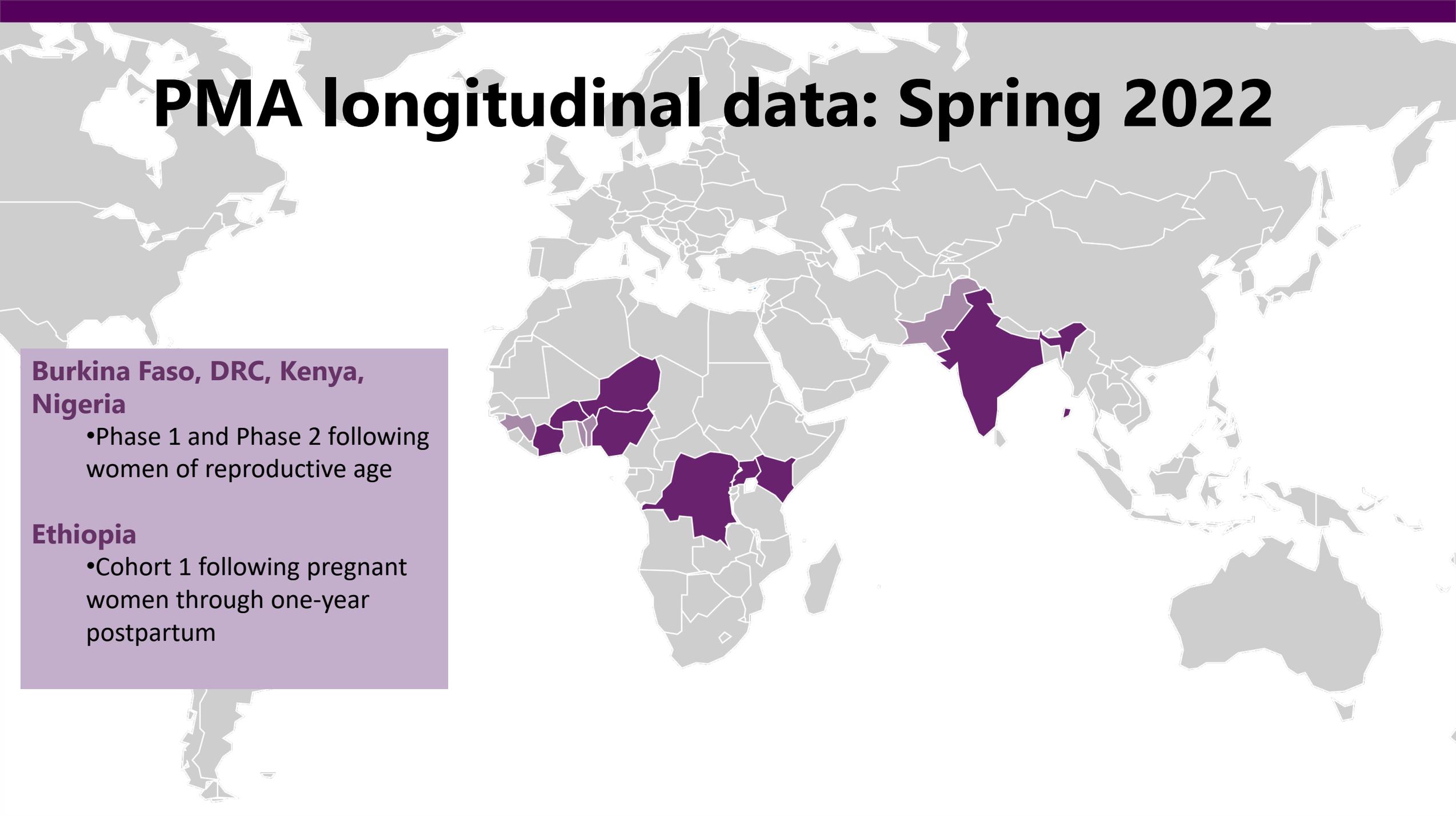Public access of PMA longitudinal data

PMA Panel Design

Panel Enrollment

+ Age-in Move-in/out

+ Age-in Move-in/out

Household Panel

YR1 · Open Panel Design · YR2 · YR3

X-section results

Panel results

X-section + panel results

Linked

Linked

Linked

Linked

SDP Panel

Private

YR1 · 6 mo. · YR2 · 6 mo. · YR3

Public

SDP + CEI

SDP interview + client exit interview

SDP + CEI

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PMA Ethiopia Panel Design

Panel Enrollment & Cross-Section

Second Cross-Section

Cross-section & end of first cohort

Individual Panel

2019 — *Follow-up of pregnant and postpartum women*

2020 — *6-weeks, 6-months and one year postpartum*

2021

X-section results

6-week and preliminary 6-month results and year 2 cross section results

X-section + panel results

SDP

Private

Public

2019   2020   2021

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PMA longitudinal data: Spring 2022
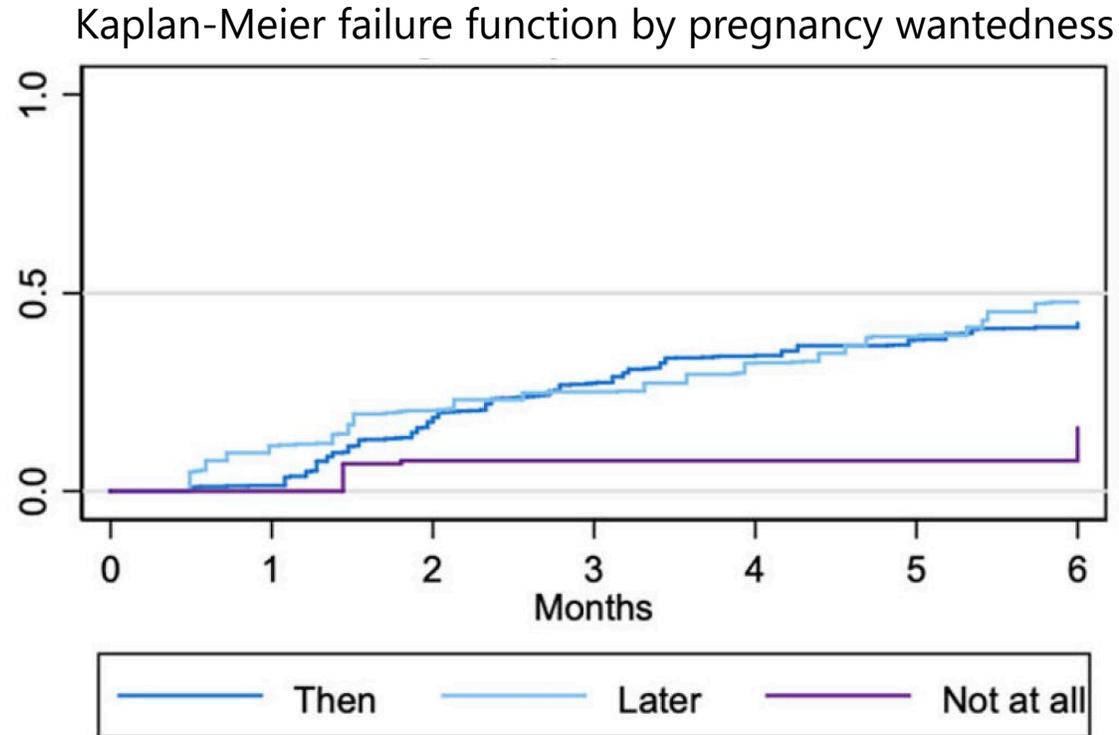
Burkina Faso, DRC, Kenya, Nigeria
- Phase 1 and Phase 2 following women of reproductive age

Ethiopia
- Cohort 1 following pregnant women through one-year postpartum

PMA Ethiopia: Uptake of a contraceptive method over the six month postpartum period

Kaplan-Meier failure function by pregnancy wantedness

Legend: Then — Later — Not at all

Source: Zimmerman L, Yuanyuan Y, Yihdego M, Abrha S, Shiferaw S, Seme A, Ahmed S. Effect of integrating maternal health services and family planning services on postpartum family planning behavior in Ethiopia: results from a longitudinal survey. BMC Public Health (2019) 19, 1448. https://doi.org/10.1186/s12889-019-7703-3

Thank you!

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📷 @pm4action