Using Logistics Data to Estimate CPR for Short-Acting Family Planning Methods

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Background

- Updates to CPR estimates often needed more frequently than population-based surveys can provide
- Alternative approaches for estimating CPRs are being explored
- Related work includes:
  - Linking logistics data, including at a subnational level in Rwanda
  - Showing the impact of stockouts in Malawi
  - Estimating additional CPR if no stockouts

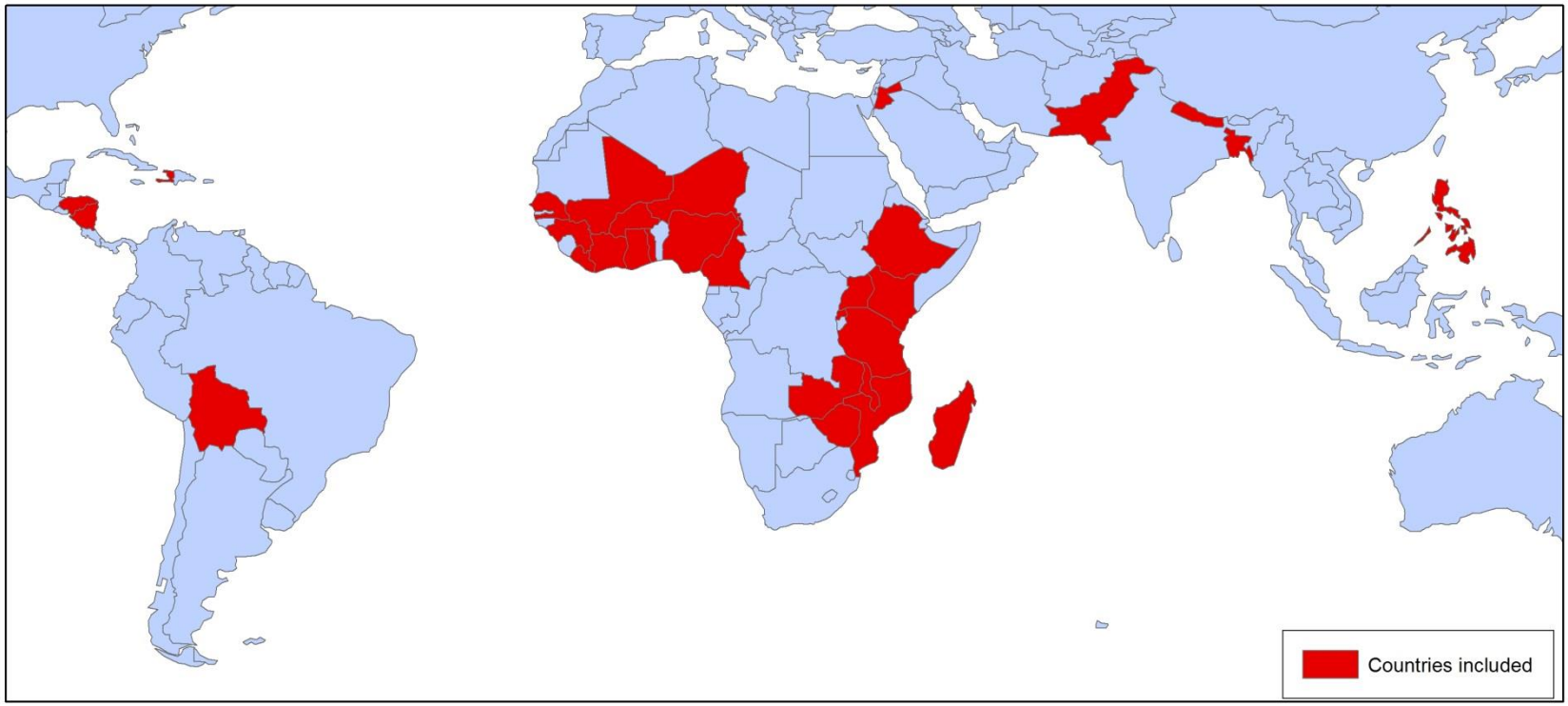
Data Used

- Examined the relationship between public-sector:
  - logistics distribution data (PPMR, PipeLine)
  - CPRs (DHS)

- FP methods included:



Countries Included (30)



Models

- Tested **3 models** to generate country-level public sector CPR estimates:
  1. direct estimation through existing couple-years of protection (**CYP**) conversion factors
  2. **bivariate** linear regression
  3. **multivariate** linear regression
     - including historic data (previous DHS-based CPR)

- Used natural log transformations to meet the assumptions for linear regressions (due to a skewed dataset)

Association Findings

Strong, significant relationships between public-sector contraceptive logistics data and public-sector prevalence rates for short-acting methods.

→ validates quality & accuracy of logistics data

Association Between Referent Public-Sector Prevalence Rates and Average Monthly or Quarterly Logistics Distribution Data, by Contraceptive Type and Model Type

Model and Contraceptive Type	N	β_0	β_1	β_2	R^2-adj
Bivariate Model					
Injectable contraceptives	30	−4.11	0.72***	NA	.90
Oral contraceptives[a]	27	−4.46	0.45***	NA	.48
Male condoms	28	−6.49	0.44***	NA	.28
Multivariate Model					
Injectable contraceptives	28	−4.21	0.62***	5.7	.91
Oral contraceptives[a]	25	−4.97	0.23*	34.93***	.72
Male condoms	26	−6.66	0.19	171.93***	.48

[a] The analysis was restricted to countries with <20 average monthly distribution per 100 women of reproductive age.

*P<.05, ** P<.01, *** P<.001.

Model Accuracy Findings

Comparison of the model-generated CPRs with the DHS CPRs:

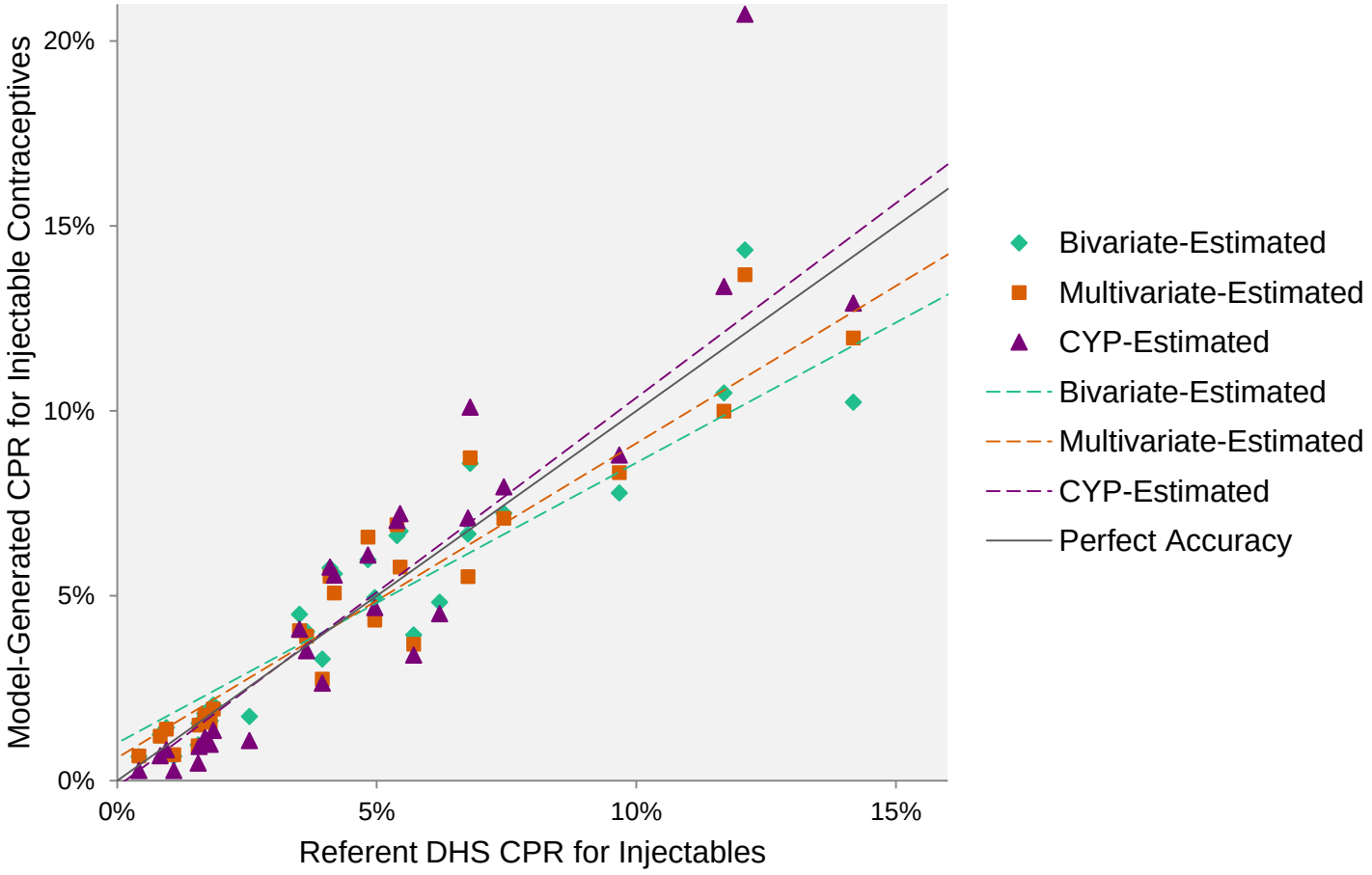
TABLE 4. Evaluation of Model Accuracy and Precision

Model	Difference Between Model Estimates and DHS Referent Values			Proportion of Model-Estimated Values Within 1, 2, and 5 Percentage Points of the DHS Value		
	Maximum Absolute Error (%)	Mean Absolute Error (MAE) (%)	Median Absolute Error (%)	1 Percentage Point (%)	2 Percentage Points (%)	5 Percentage Points (%)
Injectables						
Multivariate	3.8	1.0	0.6	57	89	100
Bivariate	7.0	1.1	0.7	57	90	97
CYP	8.6	1.4	0.8	54	86	93
Oral Contraceptives						
Multivariate	2.9	0.6	0.4	84	92	100
Bivariate	3.0	0.9	0.6	67	89	100
CYP	3.4	1.0	0.8	60	92	100
Condoms						
Multivariate	1.3	0.3	0.2	92	100	100
Bivariate	1.9	0.4	0.3	93	100	100
CYP	14.4	2.4	0.6	62	77	85

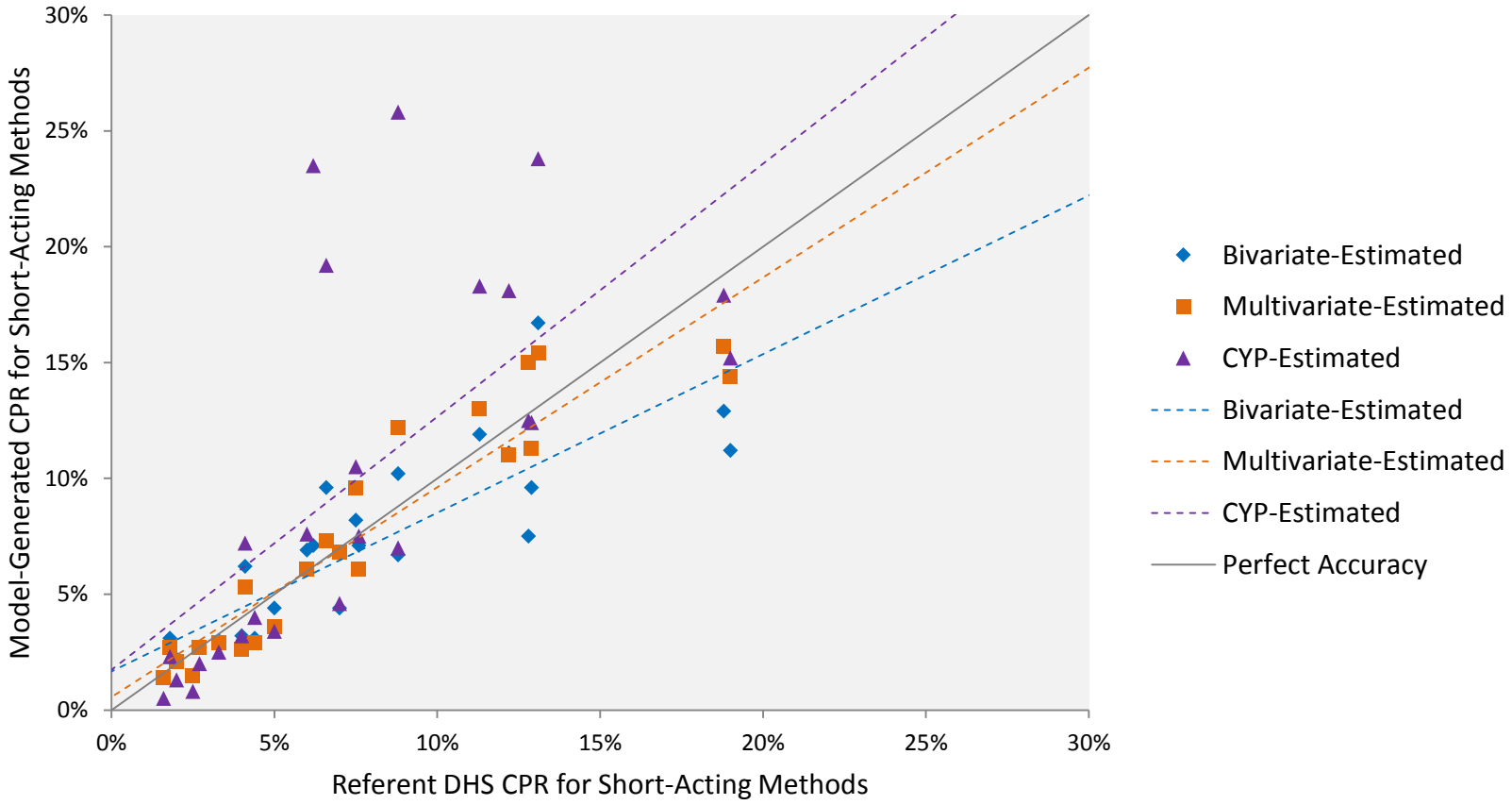
- All models except CYP-based condoms model estimated public-sector prevalence of short-acting methods to within 2 percentage points in at least 85 percent of countries
- Regression models = most accurate

CPR Estimates for Injectable Contraceptives

Model-generated prevalence estimates were generally more accurate for injectables than for other methods.



CPR Estimates for Short-Acting Methods
(3 methods combined)



Limitations

- Product-specific issues (condoms)
  - May not be used immediately
  - Dual use
- Variations in logistics data available
  - Issues data
  - Forecast data
  - Dispensed-to-user data
- Small sample size

Conclusions

- Most models able to provide relatively accurate prevalence estimates

- Potential for using logistics data to provide low-cost interim CPR estimates for injectables and orals when timely survey data are unavailable

- CYP-based model is easiest to use and interpret

  → we recommend using it for estimating national prevalence rates for injectables and orals

Future Research Recommendations

- Develop similar models for:
  - long-acting methods
  - beyond the public sector
  - at the subnational level
- Refine models when more data (and more dispensed-to-user data) become available
- Consider reexamining CYP conversion factors for condoms, and/or incorporating dual use in CYP models

Thank You

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