TITLE
Revisiting Supply-Side Versus Demand-Side Unmet Need: A Global Analysis

SHORT RUNNING HEAD
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I declare that no competing interests exist, and all errors are my own.

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Abstract
Unmet need for family planning, which has long been used to inform programs and policies, has undergone several modifications over the years. Most recently, Senderowicz and Maloney (2022), SM 2022, proposed an extension of the indicator by classifying women's reasons for not using contraception as either being driven by lack of access or other supply-side factors ("supply-side unmet need") or by a lack of demand ("demand-side unmet need"). I update the SM 2022 analysis to a global sample of 52 Demographic and Health Surveys from 50 countries. Under the most expansive SM 2022 definition of supply-side reasons for non-use, I find the proportion of women reporting demand-side factors to be the predominant reason for non-use in 34 surveys (65.4 percent), whereas the proportion of women reporting supply-side factors were the predominant reason for non-use in 18 surveys (34.6 percent). In the pooled global sample, however, the proportion of women reporting supply-side unmet need (67.9 percent) is larger than the proportion of women reporting demand-side unmet need (65.9 percent). I reconcile these contrasting findings against the evidence on the reasons for contraceptive non-use and discuss the limitations of these indicators, and the data that generated them, for informing programs and policy.

Introduction
Unmet need for family planning has long been used to inform programs and policies aimed at increasing access to contraception and addressing gaps between women's reproductive intentions and their contraceptive use (1–3). The indicator has faced many critiques, mainly for oversimplifying complex reproductive behaviors by focusing solely on fertility intentions and by assuming that all women who wish to avoid or delay pregnancy would also prefer to use contraception (4–7). Over the years, researchers and policymakers have proposed various modifications to indicator to improve its relevance and strength of inference. Revisions have sought to better capture women's personal and social reasons for non-use, clarify different types of fertility preferences, and account for contraceptive use for non-fertility-related reasons, such as menstrual regulation or STI prevention (6,8). Despite these adjustments, unmet need remains a debated concept, with ongoing discussions about how best to measure and respond to the diverse reasons behind contraceptive behaviors.

In a recent study, Senderowicz and Maloney (2022), hereafter referred to as SM 2022, proposed a modified approach which disaggregates the unmet need indicator into two mutually exclusive measures that capture women's reasons for non-use of contraception as either being identified by a reported lack of access, cost, or other supply-side factors ("supply-side unmet need") or by a reported lack of demand for contraception ("demand-side unmet need") (9). Using Demographic and Health Survey (DHS) data from seven Sub-Saharan African countries, the authors initially estimated that supply-side unmet need accounted for at most a quarter of overall unmet need even under the most expansive definitions of access, with the bulk of unmet need attributed to demand-side factors. Moreover, demand-side unmet need exceeded supply-side unmet need in all seven countries. However, after correcting for coding and estimation errors in the initial analysis, updated findings from the authors show that under the broadest definition of access (and therefore most conservative estimates for demand-side non-use), supply-side unmet exceeded demand-side unmet need in five out of seven countries (10); these findings align more with an independent effort to replicate the original SM 2022 analysis and correct for the estimation errors (11).

Data and Methods

I extend the SM 2022 analysis to a global sample. I pool DHS data from 52 surveys that were conducted between 2010 and 2016 across 50 countries, yielding an analytic sample of 847,738 women of reproductive age (12). Appendix Table 1 presents the list of countries and surveys included in the sample. I then follow the SM 2022 approach to calculating demand-side reasons for contraceptive non-use and three classifications of supply-side reasons for non-use among the subsample of women who are identified to have an unmet need. I estimate the individual reasons for non-use and collapse these estimates into the demand- and three supply-side classifications as specified in SM 2022. I present estimates for the pooled global sample as well as for each survey separately.

Results

Table 1 presents weighted descriptive statistics of unmet need for the global analytic sample. Among 818,290 women who did not have missing data, 10.1 percent of women were identified to have an unmet need for spacing a birth for at least 2 years, while 5.7 percent of women were identified to have an unmet need for limiting births.

Table 2 presents the distribution of reasons given for contraceptive non-use among women who were identified to have an unmet need for either limiting or spacing in the global sample; Appendix Table 2 presents survey-level disaggregated statistics. Since women could report multiple reasons for non-use, the proportions in the table do not add up to 100 percent, and some calculations exceed 100 percent when aggregating across reasons. In the global sample, the proportion of women reporting supply-side reasons (67.9 percent) under the broadest definition (version 3) is larger than the proportion of women reporting demand-side reasons (65.9 percent) when taking multiple reasons reported into account.

In contrast, the disaggregated analysis in Appendix Table 2 indicates that in the majority of surveys (65.4 percent), the proportion of demand-side reasons for non-use exceed the proportion of supply-side reasons for non-use even when using the broadest supply-side classification. The proportion of demand-side reasons for not using contraception ranged from 25.7 percent in Nepal to over 100 percent in Pakistan. In contrast, between 0.8 to 30.4 percent of women were classified to have a supply-side reason for their non-use under the strictest conception of supply-side unmet need; when using the broadest conception, between 17.8 and 76 percent of women reported a supply-side reason for their non-use.

Discussion and Conclusions

Reconciling Contrasting Evidence
I build on recent work to calculate the proportion of women who report "demand-side" versus "supply-side" reasons for their non-use of contraception in a global sample. I find significant heterogeneity in the reasons given across surveys and in the pooled global sample. In contrast to the original SM 2022 findings, where demand-side unmet need significantly exceeded supply-side unmet need in all countries, I find that a majority of women reported demand-side unmet need more than supply-side unmet need in two-thirds of surveys, while supply side unmet need exceed demand-side unmet need in the remaining one-third of surveys. On the other hand, I find a larger proportion of women in the pooled global sample to report supply-side reasons for non-use relative to demand-side reasons, which align with the corrected SM 2022 estimates (10). These results imply that the gap between supply-side unmet need and demand-side unmet need is larger in surveys where access barriers may be more prevalent relative to the same gap in surveys where demand-side reasons for non-use prevail.

The contrasting evidence from the pooled global analysis and the disaggregated analysis warrants further investigation to identify the reasons for the observed variation in these indicators both across and within surveys. More broadly, the findings call for a discussion of the extent to which these indicators are, in fact, informative for programs and policy, which was a stated objective for their development. A fundamental limitation of these indicators lies in their inability to account for the (endogenous) simultaneous identification of supply-side unmet need and demand-side unmet need, in which supply-side determinants of non-use cannot be effectively decoupled from demand-side determinants with static, cross-sectional data. As a result, analyses that separate supply-side reasons from demand-side reasons inherently assume that they are independent of (and therefore separable from) one another, when *stated* demand-side reasons for non-use might, in fact, be driven by latent supply-side determinants, and vice versa. Programs that naïvely respond to a binary classification of non-users without accounting for the dynamic conditions under which latent reasons for (non-)use are generated would likely misclassify a significant proportion of non-users who would have benefitted from a demand-side, supply-side, or combined programmatic effort. A more extensive discussion of this limitation, and its implications for interpreting the findings from this analysis, has been presented elsewhere (11).

Respondents and their Data
Another source of misplaced inference (of many) is noted in the problematic framing under which the DHS question on reasons for non-use is posed. Specifically, the DHS asks women: "You have said that you do not want (a/another) child soon. / You have said that you do not want any (more) children. Can you tell me why you are not using a method to prevent pregnancy?" (12). The fact that the question directly links not wanting a child to needing to use a contraceptive method to prevent pregnancy creates an immediate negative framing effect, where a respondent may interpret her non-use of contraception while also not wanting a child soon / wanting no more children as a shortcoming, no matter how justified or confident she may have initially been about her reasons for non-use (13,14). One can imagine how this framing, as a result, can induce supply-side and/or demand-side bias, where a woman's response this question may, in part, include an effort to minimize perceptions of judgment in either direction. On the one hand, women who may harbor a latent supply-side reason for non-use (e.g. they cannot afford to access contraception) might state a demand-side reason (e.g. they do not want to use contraception) if they feel embarrassed about their real reason for non-use. By the same token, women who have a demand-side reason (e.g. they are personally opposed to contraception) may state a supply-side reason (e.g. their preferred method is not available) if they do not wish to disclose their lack of demand to an enumerator who, up to this point in the DHS questionnaire, has repeatedly interrogated her as to why she has not been using a method.

This example highlights a broader challenge that empirical researchers face when assessing the scope of inference of a question or data collection approach and the interpretability of its corresponding responses. On the one hand, it is important for researchers to acknowledge that the responses elicited from most well-intentioned data collection efforts seek to reflect the realities and experiences of the subjects in the study. As a result, there is good reason to take respondents' data and testimonies at face value. At the same time, there may also be good reason to be skeptical of the data generation process itself, which may yield biased inference, particularly when that inference subsequently will inform programmatic responses that rely on the data being presented. Both of these reasons can be true at the same time (15).

In the context of these indicators, it seems likely that women are responding about their reasons for non-use in the best way that they know how at the time when they were asked, and there is little cause, in this case, to doubt women's *ex ante* incentives or latent motivations when answering this question. Where there is scope for doubt is whether women's **true** reasons for non-use, which have external implications on programs that seek to be demand-responsive, can be elicited with the current static question that was posed and the manner in which the survey posed it. The constraints to inference that are noted above highlights how we, as researchers, are at risk of coming to potentially incorrect conclusions by: 1) simplifying responses to limited questions; and 2) drawing conclusions based on oversimplified responses from limited data. The fact that studies have found stark differences between what women **say** and what they **do** in terms of their contraceptive behavior in spite of being identified as having an unmet need (which is not necessarily a surprising finding in and of itself) would leads us to conclude that the information from these questions around contraceptive non-use has little to do with women's true latent (lack of) demand for contraception. Women are simply giving their best answers to a limited and problematic question.

Taken together, we as researchers risk putting our respondents in the (unfair) position of appearing as if they are unreliable narrators of their own lived experiences, when our limited ability to capture their realities fail to allow them to be so. Relatedly, there is a risk of creating a false equivalence between the data that respondents provide and the integrity of the respondents themselves. By equating skepticism about what we can(not) say about the data with a claim that respondents' lived experiences are being invalidated, we re-orient the source of debate over what the data can and cannot say to one where data and its corresponding generating process cannot be critically examined, irrespective of whether the potential source of bias is data-driven (e.g. biased survey design, etc.), researcher-driven (e.g. biased inference), respondent-driven (e.g. where respondents have incentive to have their data not reflect their realities), or driven by other means.

Final Thoughts
Given the persistent issues with the concept of unmet need and its many iterations, the family planning field must reconsider how best to measure the gap between what women want and what they actually do—and, importantly, whether their actions reflect their true preferences. Traditional indicators have overlooked the dynamics of contraceptive behaviors and have failed to effectively capture these dynamics for informing policy and practice. Relatedly, it is crucial for the field to recognize the limitations of data sources like the DHS, which, while invaluable for research and policy, are not designed to answer every question. These surveys provide critical insights but have constraints in scope, depth, and sensitivity to individual experiences, making it risky to rely on them for inferences beyond their capacity. Overburdening these data sources risks generating conclusions that may not be fully supported by the data, underscoring the need for new approaches and data generation methods that can more accurately reflect the contraceptive and reproductive dynamics of interest.

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Tables and Figures

Table 1: Unmet need, global analytic sample

	Weighted Prop.	Unweighted *N*
Never had sex	0.133	109,585
Unmet need for spacing	0.101	84,488
Unmet need for limiting	0.057	46,920
Using for spacing	0.149	118,728
Using for limiting	0.174	138,527
No unmet need	0.199	165,940
Not married and no sex in last 30 days	0.070	57,343
Infecund, menopausal	0.116	96,185
Refused	0.001	574
Observations	**818,290**	

Note: Proportions are weighted by sampling weights. Data for this variable was missing for 29,448 (3.47 percent) of the total analytic sample.

Table 2: Reasons for not using contraception among women with an unmet need, global analytic sample

Reason Not Using	ALL	
	Weighted Prop.	N
Not married	0.026	2310
Not having sex	0.093	8263
Infrequent sex	0.145	12883
Menopausal/hysterectomy	0.001	89
Subfecund/infecund	0.029	2577
Postpartum amenorrheic	0.076	6753
Breastfeeding	0.157	13950
Fatalistic	0.078	6930
Respondent opposed	0.080	7108
Husband/partner opposed	0.087	7730
Others opposed	0.008	711
Religious prohibition	0.029	2577
Knows no method	0.028	2488
Knows no source	0.024	2132
Health concerns	0.177	15727
Fear of side effects/health concerns	0.190	16882
Lack of access/too far	0.019	1688
Costs too much	0.030	2666
Inconvenient to use	0.020	1777
Interferes with body's processes	0.031	2754
Preferred method not available	0.006	533
No method available	0.004	355
Other	0.064	5686
Don't Know	0.015	1333
Panel A: Proportions among women with an unmet need (multiple reasons)		
Demand side reasons, V3 (black)	0.659	58553
Supply side reasons, V1 (red)	0.111	9862
Supply side reasons, V2 (red + blue)	0.261	23190
Supply side reasons, V3 (red + blue + green)	0.679	60330
Observations, Women with Unmet Need		**88851**
Panel B: Proportions among women with an unmet need (reporting at least one reason)		
Demand side reasons, V3 (black)	0.391	51381
Supply side reasons, V1 (red)	0.065	8542
Supply side reasons, V2 (red + blue)	0.155	20368
Supply side reasons, V3 (red + blue + green)	0.298	39160
Observations, Women with Unmet Need		**131408**

Notes: Statistics are weighted by sampling weights. Multiple reasons could be provided, so proportions do not add up to 100 percent. Supply-side reasons for non-use that follow the strict definition of access (Version 1) are highlighted in red. The additional reasons for non-use under the more expansive definition of access (Version 2) are highlighted in blue. Additional reasons for non-use that make up the broadest definition of supply-side access (Version 3) are highlighted in green. Ambiguous reasons ("other", "don't know") are not included in the calculations of demand-side or supply-side reasons for non-use.

Appendix

Appendix Table 1: DHS surveys included in the global sample

Survey	Numeric ID	Survey Country and Year
AF7	1	Afghanistan 2015
AM6	4	Armenia 2010
AO7	5	Angola 2016
BD6	9	Bangladesh 2011
BF6	11	Burkina Faso 2010
BJ6	13	Benin 2012
BU6	16	Burundi 2010
CD6	18	DRC 2013-14
CG6	20	Congo 2011-12
CI6	22	Cote d'Ivoire 2011-12
CM6	24	Cameroon 2011
CO7	27	Colombia 2015
DR6	29	Dominican Republic 2013
EG6	32	Egypt 2014
ET6	34	Ethiopia 2011
ET7	35	Ethiopia 2016
GA6	36	Gabon 2012
GH6	39	Ghana 2014
GM6	40	Gambia 2013
GN6	42	Guinea 2012
GU6	43	Guatemala 2014-15
HN6	46	Honduras 2011-12
HT6	48	Haiti 2012
ID6	51	Indonesia 2012
JO6	53	Jordan 2012
KE6	56	Kenya 2008
KH6	58	Cambodia 2010
KM6	59	Comoros 2012
KY6	60	Kyrgyzstan 2012
LB6	62	Liberia 2013
LS6	64	Lesotho 2009
ML6	69	Mali 2013
MW7	73	Malawi 2015-16
MZ6	75	Mozambique 2011
NG6	77	Nigeria 2013
NI6	79	Niger 2012
NM6	81	Namibia 2013

Survey	Numeric ID	Survey Country and Year
NP6	83	Nepal 2011
PH6	86	Philippines 2013
PK6	88	Pakistan 2012-13
RW6	90	Rwanda 2010
SL6	92	Sierra Leone 2013
SN6	94	Senegal 2010-11
TD6	98	Chad 2014-15
TG6	99	Togo 2013-14
TJ6	100	Tajikistan 2012
TZ7	105	Tanzania 2015-16
UG6	108	Uganda 2011
YE6	109	Yemen 2013
ZM6	111	Zambia 2013-14
ZW6	113	Zimbabwe 2010-11
ZW7	114	Zimbabwe 2015