

Series: Who cares for women? Towards a greater understanding of reproductive and maternal healthcare markets

## Who, What, Where: an analysis of private sector family planning provision in 57 low- and middle-income countries

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### Abstract

**OBJECTIVE** Family planning service delivery has been neglected; rigorous analyses of the patterns of contraceptive provision are needed to inform strategies to address this neglect.

**METHODS** We used 57 nationally representative Demographic and Health Surveys in low- and middle-income countries (2000–2013) in four geographic regions to estimate need for contraceptive services, and examined the sector of provision, by women's socio-economic position. We also assessed method mix and whether women were informed of side effects.

**RESULTS** Modern contraceptive use among women in need was lowest in sub-Saharan Africa (39%), with other regions ranging from 64% to 72%. The private sector share of the family planning market was 37–39% of users across the regions and 37% overall (median across countries: 41%). Private sector users accessed medical providers (range across regions: 30–60%, overall mean: 54% and median across countries 23%), specialised drug sellers (range across regions: 31–52%, overall mean: 36% and median across countries: 43%) and retailers (range across regions: 3–14%, overall mean: 6% and median across countries: 6%). Private retailers played a more important role in sub-Saharan Africa (14%) than in other regions (3–5%). NGOs and FBOs served a small percentage. Privileged women (richest wealth quintile, urban residents or secondary-/tertiary-level education) used private sector services more than the less privileged. Contraceptive method types with higher requirements (medical skills) for provision were less likely to be acquired from the private sector, while short-acting methods/injectables were more likely. The percentages of women informed of side effects varied by method and provider subtype, but within subtypes were higher among public than private medical providers for four of five methods assessed.

**CONCLUSION** Given the importance of private sector providers, we need to understand why women choose their services, what quality services the private sector provides, and how it can be improved. However, when prioritising one of the two sectors (public *vs.* private), it is critical to consider the potential impact on contraceptive prevalence and equity of met need.

**keywords** family planning, method mix, quality of care, public providers, private providers, low- and middle-income countries

### Introduction

Public and non-governmental family planning programmes have existed in many low- and middle-income countries since as early as the 1950s, but contraceptive provision has been relatively neglected for nearly two

decades [1]. In 2012, commitment to address family planning coverage was reinvigorated, with US\$2.6 billion pledged by donors at the London Summit on Family Planning [2]. Stakeholders expressed the need for a range of approaches for delivering family planning services across all sectors, with a key research priority being the

‘effect of engaging [the] private sector to increase the equity in access to – and utilisation of – family planning products and services, by modalities such as franchising and social marketing’[3]. Describing the different public and private modalities currently contributing to family planning coverage, and comparing the equity and the content of services by provider type, is a fundamental first step in meeting this objective [4].

Among studies on family planning use across multiple countries [5–18], few have examined the sector in which women seek services. We identified eight peer-reviewed papers [19–26] and twelve grey literature reports [27–38] that examined provision by sector across multiple countries. The characteristics and findings of these studies are described in Table S1. The studies use between one and three subcategories of private sector providers, employing a variety of provider categories and definitions, with non-governmental organisations and ‘others’ in particular being grouped inconsistently. Six studies [19, 25, 27–31] use data entirely from before 2000, so their findings are dated. The remaining 14 studies include at least some data from 2000 onwards, with between 4 and 56 countries studied. Nine of these 14 studies include fewer than 15 countries; the remaining five studies [23, 33–35, 38] are large (25–56 countries), but are primarily tabulations, with little analysis or interpretation, and all but one [23] are grey literature. Thirteen studies assess socio-economic inequalities by sector [19, 20, 24, 26, 28–30, 32–37]: three proxy socio-economic status using residence and education [28–30], while two added employment [19] or wealth [35] to residence and education. The remaining eight studies look only at wealth quintiles for at least one sector or one country, and three of these use inequality metrics such as concentration indices or high-to-low equity ratios or differences. None of the population-based studies reviewed compared quality of services received by sector, probably because survey programmes contain few measures with which to assess quality of provision. The literature reporting on technical quality or client satisfaction differences is generally facility-based [39, 40] or uses bespoke data collection instruments in a limited number of settings [41].

In this study, we used the Demographic and Health Survey (DHS) to describe family planning use in 57 low- and middle-income countries in detail, with a focus on the relative roles of the public and private sectors. Results are presented in total and by socio-economic group (wealth quintile, urban/rural residence and education) and by world region and country. We went beyond previous literature to describe where women obtained contraception by sector (distinguishing between seven subtypes of public and private providers) as well as the types of contraceptive methods used. We also described whether

women were informed of side effects as a proxy for content and quality of care. This paper links to a Series on private sector provision of family planning and maternal/newborn services, including two in-depth papers on ante-natal [42] and delivery care [43], and an exploration of methodological issues [44].

## Methods

### Data

The DHS are cross-sectional, nationally representative household surveys [45]. Respondents are women of reproductive age (15–49 years), with men also interviewed in many surveys. The DHS measure household and individual characteristics, fertility and family planning, and maternal and child health and healthcare use. We used the most recent DHS (from 2000 to mid-2013); since 2000 the DHS improved how they captured sources of provision, particularly private provision.

### Populations and women in need of healthcare services

We looked at three populations of women: (i) all those surveyed, (ii) those ‘in need’ of family planning and (iii) those who used an ‘appropriate service type’, termed women with ‘met need’. Need and appropriate service types are defined below and in Table 1.

In eight countries, surveyed women were ‘ever-married’ rather than ‘all women’ of reproductive age (Table S2). We categorised women ‘in need’ of family planning according to a recently updated consensus definition [47]. Women not in need of family planning methods were those not using any modern methods (defined in Table 1) who either desired a birth within 2 years or were not at risk of pregnancy (have never had sex, are not having sex [not married/no sex within the last 30 days] or were infertile or menopausal). The remainder were women who needed family planning. These were further stratified into those who used traditional methods (defined in Table 1), used modern methods or were not using any method.

We considered women to have received an appropriate service (i.e. have met need for an appropriate family planning service) if they used a method broadly understood to be effective, though this does not imply that the actual quality of care received was appropriate or that the method was used correctly. All studies in our literature review defined family planning as use of modern contraceptive methods, irrespective of where they were obtained. We adopted this convention, as well as one that groups women using lactational amenorrhoea method (LAM) or fertility awareness methods with users

**Table 1** Classification of sources of family planning provision among women in need by appropriateness of the service type and by sector, with examples† of DHS response options

Classification	Definitions and examples
Did not use any service (unmet need)	Did not use any method but did not want a child in the next 2 years
Did not use an appropriate service type (unmet need)	Used a traditional method such as withdrawal, abstinence and folkloric methods (i.e. use of herbs), lactational amenorrhoea method (LAM) or fertility awareness methods
Used an appropriate service type	Used a modern contraceptive method <i>Permanent:</i> female or male sterilisation <i>Long-acting Reversible:</i> implants, intrauterine devices <i>Injectables:</i> Depo-Provera and other injectables <i>Short-acting Reversible:</i> male and female condoms, diaphragm, foam/jelly, oral contraceptive pills, emergency contraception
Used an appropriate service type; classifiable sector of provision	Used modern contraception and reported a service location other than: husband/ friend/ relatives, other providers, providers abroad or missing source of method
Used appropriate, classifiable service: <i>public sector</i>	Service location: All government/ public service locations <i>Public medical:</i> Public hospital, polyclinic, health centre, family doctor, women's health centres, family planning clinics, government pharmacy <i>Public non-medical:</i> Public community health worker, government distributor, government campaign
Used appropriate, classifiable service: <i>private sector</i>	Service location: All private providers <i>Private medical:</i> Private hospital/clinic, private doctor, private nurse/midwife, private health centre <i>Private specialised drug seller:</i> Private pharmacy, private drug store, private dispensary <i>Private retailer:</i> Shop/market, bar/disco, vending machine <i>Faith-based (FBO):</i> Mission hospital, health centre, mobile clinic, dispensary, church, mosque NGO: NGO health facility, mobile clinic, NGO field worker
Used an appropriate service type; sector of provision not classifiable	Used a modern method and reported a missing source location or obtained a method from husband/ friend/ relatives/other providers/providers abroad <i>Missing location of source</i> <i>Unclassifiable locations (sector not known):</i> Husband, friend/relative, peer educators, support group, school, hospital/clinic abroad, missing source

†There were 141 unique family planning provider response options across the 57 surveys, so only examples are shown.

of traditional methods, even if they obtained/learned of the method from a provider. Women using LAM, fertility awareness and traditional methods, together with women not using any method, were consequently deemed to have unmet need for modern contraception (Table 1).

### Categorisation of source and sector of provision

We classified the most recent source and sector of family planning provision as described in Table 1 and previously [44]. Across the 57 countries, when we collated all response options and removed duplicates, the surveys included 141 unique family planning provider types: 49 that were in the public sector, 64 in the private sector and 28 that could not be classified, namely women obtaining methods from husbands/relatives/friends, 'other sources', providers abroad or with a missing source. In

the public sector, providers were differentiated into public medical and public non-medical. In the private sector, they were differentiated into private medical, private specialised drug seller, private retailer, faith-based organisation (FBO) and non-governmental organisation (NGO). The first three private sector provider categories were assumed to be commercial. Not all countries' surveys listed provider response options in each of these five private sector categories.

### Content and quality: categorisation of types of methods and assessing advice on side effects

The DHS contains few questions with which to assess quality of care of family planning provision. We examined the types of contraceptive methods provided (method mix) and advice given on side effects as proxies

for assessing quality of care, by provider category, sector and method.

We sought expert advice from Marie Stopes International (who train providers and provide a complete range of contraceptives in many countries) on the skill level and amount of training required to provide different contraceptives, and the actual time (excluding counselling) needed to dispense/give each method to users. Using this information, we grouped contraceptives into method types: (i) 'easier' (no or minimal clinical skills required), (ii) 'medium' (some clinical skill required) and (iii) 'intensive' (clinical skill required) (Table S3). These also largely matched the categorisation of (i) 'short-acting', (ii) 'long-acting reversible' and (iii) 'permanent' methods [33, 47] (Table S3), differing only in the classification of injectables, which were in our (ii) 'medium' category but in the other classification's (i) 'short-acting' category. We ultimately decided on four subcategories, so that injectables could be viewed separately and considered with either 'short-acting reversible' or 'medium' (some clinical skill required) methods.

In each country, questions on whether women were advised on side effects differed in the range of methods inquired about and in the time elapsed since initiation of the method. We created a data set of 46 countries which maximised the number of countries available for analyses of side effect advice, while retaining comparable data (Table S2). These 46 countries all asked women who were currently using pills, injectables, implants, IUDs or sterilisation, where they first obtained their current method, and whether at the time of first use, they were informed of side effects or problems they might experience with the method, with yes or no response options. Many countries restricted these questions to women who had initiated their current methods in the 5 years preceding the survey, so we applied this 5-year cut-off to the entire subset of countries. We then categorised the first source of the current method by sector and provider subtype as shown in Table 1 and explored information about counselling on side effects by method, by source, and by method within provider subtypes with >1000 users for each of the five methods, while recognising that these responses may not reflect the women's most recent source of provision and may reflect practices up to 5 years previously.

### Missing data

The DHS generally has <1% missing data, but the Turkish survey only collected fertility preferences (which are required to classify unmet need status) on a random subsample of women. We assumed non-sampled women

were missing data completely at random and imputed their fertility preferences, applying the same response distribution as those who were sampled, within each wealth quintile. In all other surveys, missing data on need were negligible and classed as 'don't use, don't know need status', a category which was excluded when examining the subset of 'women in need'. There were no missing data on use of family planning among women in need. Users of modern methods whose provider was missing, or whose sector of provision was unclassifiable, were shown separately (Table 1). Users missing information on side effect advice (2% of analysis sample) were excluded from the denominator.

### Categorisation of socio-economic position

We stratified our data by three measures of socio-economic position: wealth quintiles derived by DHS using principal component analysis [48, 49], urban/rural residence and level of education. We used DHS classifications for wealth, women's highest achieved level of education ('no education', 'primary', 'secondary' and 'higher'), and urban/ rural residence.

### Categorisation of geographic regions and overall summary measures

Women in each DHS survey have individual sample weights used to calculate country-level population-representative summary statistics. We grouped countries into Sub-Saharan Africa, North Africa/ West Asia/Europe, South/ Southeast Asia, and Latin America & the Caribbean regions, adopting an approach used by others [50]. For simplicity, we refer to the regions as sub-Saharan Africa, Middle East/Europe, Asia and Latin America. We recognise that this categorisation is to some degree arbitrary, that there is considerable variation within regions, and that other possible groupings could have been used. In particular, the Middle East/Europe region, and to a lesser extent the Latin America and Caribbean region, includes very diverse countries. We also show data by individual country to enable others to generate alternative groupings (Table S4). We calculated region-level and overall (combining the 57 countries or 46 countries for analysis of side effect advice) summary statistics by applying weights that accounted for both the country-specific survey design and the country population (using 2008 UN Population Estimates [51]), to ensure that estimates represented the entire population residing in the study countries. Regional and overall summaries were thus weighted averages of country summaries. Nonparametric summary measures (medians and ranges across

included countries) are also presented to describe the variability in country profiles. The countries are listed in Table S2. Countries without DHS data were excluded from the regional weighting. Analyses were conducted in Stata/SE v13.

### Ethical approval

The DHS receives government permission, uses informed consent and assures respondents of confidentiality. The Research Ethics Committee of the London School of Hygiene and Tropical Medicine approved our analyses.

### Results

We obtained data on 865 547 women aged 15–49 years from 57 countries, representing a total population of 3 billion people (46 countries and 1.2 billion for advice given on side effects). The numbers of countries and the proportions of the regions represented are in Table 2.

### Patterns

*Need among all women.* Figure 1a illustrates need and family planning use status among all women, for each geographic region. Figure 1b–d shows the same results by wealth quintile, educational level and urban/rural residence. The percentages of women of reproductive age needing contraception were substantial, with 39% of women surveyed being in need in sub-Saharan Africa, compared to roughly 60% in the other three regions (Middle East/Europe 63%, Asia 58% and Latin America 60%). In sub-Saharan Africa, 26% wanted a child in the next 2 years, compared to 11% in Middle East/Europe, 14% in Asia and 6% in Latin America;

the overall mean was 16% and the median across countries was 13%. These data and the range across countries are also in Table 3; the remainder of women not in need were not at risk of pregnancy, either because they were not sexually active or because they were infecund/menopausal.

*Use among all women and met need (use among women who need services).* The percentages of all surveyed women using modern contraception were sub-Saharan Africa 15%, Middle East/Europe 40%, Asia 39%, Latin America 43% and overall 34% (median across countries: 23%). The percentages of women in need using modern contraception were sub-Saharan Africa 39%, Middle East/Europe 64%, Asia 67%, Latin America 72% and overall 63% (median across countries: 46%). Unmet need (100% minus the percentage of met need) for family planning was thus highest in sub-Saharan Africa (61%).

*Private sector use among women in need.* Figure 2a–d shows family planning by sector among women in need, for each region in total, and by measures of socio-economic position. The private sector served 14% of women in need of contraception in sub-Saharan Africa compared to about 25% in the other three regions (Middle East/Europe, 23%, Asia, 24%, Latin America, 27% and overall 22%; median across countries: 16%).

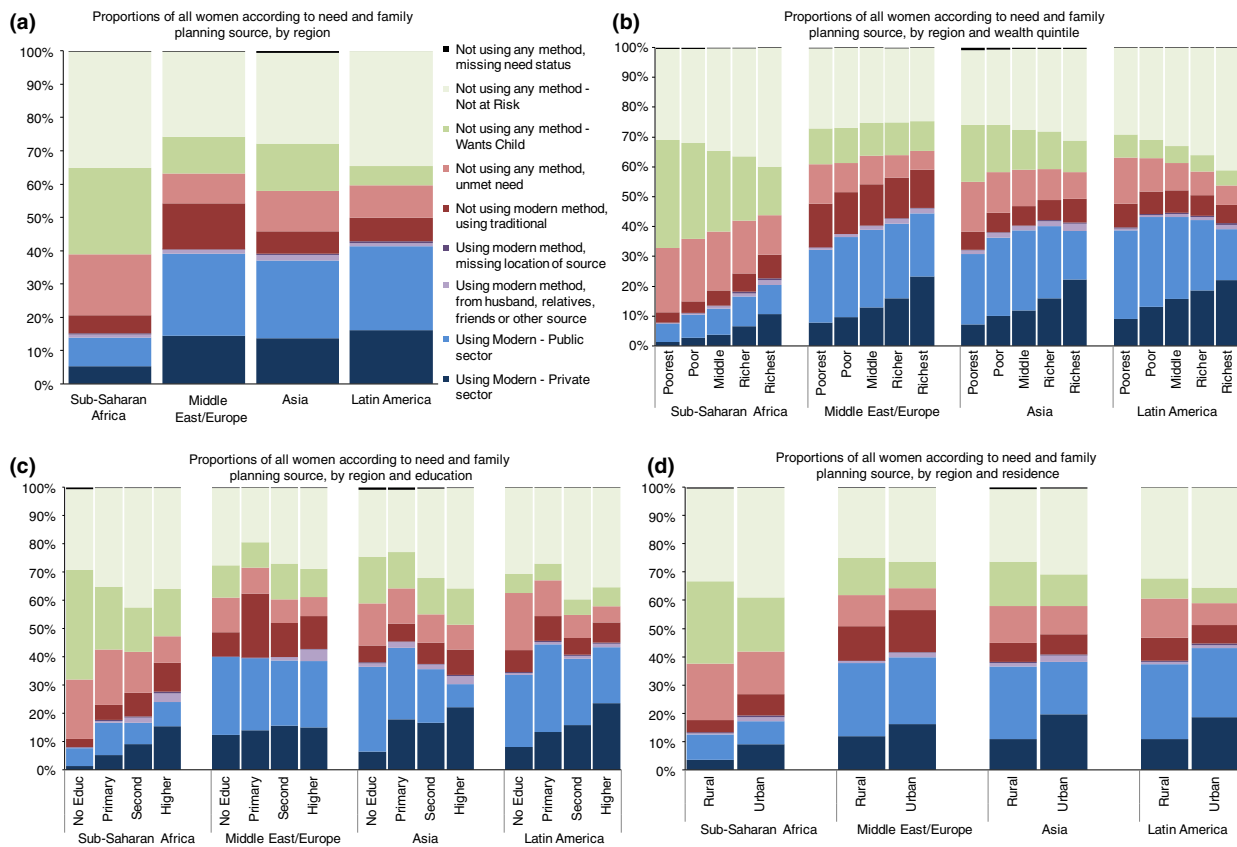
*Private sector use among classifiable service users.* Figure 3a–d shows the type of service provider among women using modern methods, for each of the four regions in total, and by socio-economic position. Among users of modern methods of contraception from classifiable sources, the percentages using private providers were

**Table 2** Geographic regions and percentage of their populations covered by the DHS surveys included in the analysis

Region	UN subregions included	Total population in region, 2008 (millions)†	% of population of region covered by DHS surveys‡ (for questions on side effect advice)	Number of countries in region	Number of countries covered (for questions on side effect advice)
Sub-Saharan Africa	Eastern Africa, Middle Africa, Southern Africa, Western Africa	788	83% (67%)	51	30 (24)
Middle East/ Europe	Northern Africa, Western Asia, Eastern Europe, Southern Europe	864	29% (21%)	51	9 (8)
Asia	Southern Asia, South-Eastern Asia	2220	88% (16%)	20	10 (6)
Latin America	Caribbean, Central America, South America	583	20% (20%)	48	8 (8)

†UN Population Estimates, 2008.

‡Assuming DHS is nationally representative for each country.



**Figure 1** (a) Proportions of all women according to need and family planning source, by region. (b) Proportions of all women according to need and family planning source, by region and wealth quintile. (c) Proportions of all women according to need and family planning source, by region and education. (d) Proportions of all women according to need and family planning source, by region and residence.

sub-Saharan Africa 38%, Middle East/Europe 37%, Asia 37%, Latin America 39% and overall 37%; median across countries: 41%.

*Types of providers within the public and private sectors.* Among women obtaining their methods from the public sector, nearly all obtained them from the public medical sector, with only <1% of women in sub-Saharan Africa, Middle East/Europe or Latin America, and 5% in Asia obtaining them from public sector non-medical providers (Table 3). Figure 4a–d shows provider subtypes among women using private providers to obtain modern contraception, for each of the four regions in total, and by socio-economic position. Among women obtaining their modern contraceptives from private sector providers, the percentage using private medical providers was sub-Saharan Africa 30%, Middle East/Europe 41%, Asia 60%, Latin America 45% and overall 54%; median across countries: 23%. Commercial sources (private med-

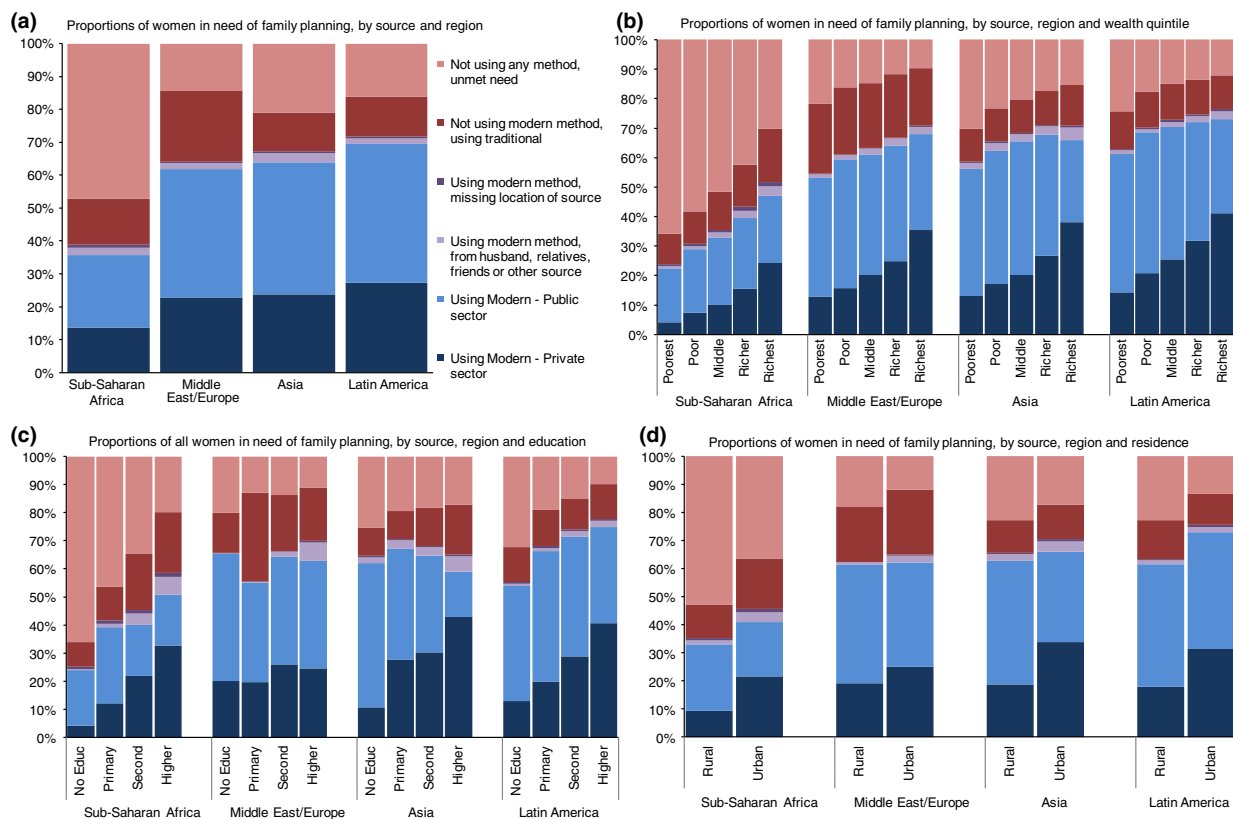
ical, private specialised drug sellers and private retailers combined) dominated private sector provision sub-Saharan Africa, 91%; Middle East/Europe, 97%; Asia, 96%; and Latin America, 96%; (overall 96%; median across countries: 99%).

**Inequalities**

Inequalities in risk of pregnancy, wanting children in the next 2 years and needing contraception among all women and inequalities in use (met need and private sector use among women in need) by wealth quintile are shown in Figures 1b–3b. In brief, there was a very slight gradient in need by wealth quintile in sub-Saharan Africa and in Middle East/Europe, whereby the richest expressed the greatest need. In Asia, the gradient was nearly flat, while in Latin America, the gradient was reversed, with the richest least in need of contraception (Figure 1b). Richer women were less likely to want a child soon, and

O. M. R. Campbell *et al.* **Private sector provision of family planning****Table 3** Summary of need, use, and sector of use for family planning services across regions (including overall weighted mean of regions) and countries (median and range)

Denominator (population) Percent of women by category	Sub-Saharan Africa	Middle East/ Europe	Asia	Latin America	Overall weighted mean of regions	Median (Range) across countries
<b>All women</b>						
Not using any method, missing need status	<1	<1	1	<1	1	0 (0–6)
Not using any method, not at risk of pregnancy	35	26	27	34	29	33 (11–52)
Not using any method, wants a child	26	11	14	6	16	13 (5–50)
Unmet need for family planning (not using any method or using traditional methods)	24	23	19	17	20	24 (11–49)
Use of appropriate family planning methods	15	40	39	43	34	23 (2–57)
Total	100	100	100	100	100	
<i>Selected categories</i>						
Need for family planning	39	63	58	60	54	50 (24–80)
Using public sector service	9	25	23	25	20	13 (1–46)
Using private sector service	5	14	14	16	12	8 (1–39)
<b>Women in need</b>						
Unmet need for family planning (not using any method or using traditional methods)	61	36	33	28	37	54 (16–94)
Use of appropriate family planning methods	39	64	67	72	63	46 (6–84)
Total	100	100	100	100	100	
<i>Selected categories</i>						
Using public sector service	22	39	40	42	37	28 (3–58)
Using private sector service	14	23	24	27	22	16 (2–55)
Using unclassifiable sector (husband, relatives, friends or other source) or missing location of service	3	2	3	2	3	2 (0–12)
<b>Women using appropriate service type</b>						
Using public sector service	57	61	60	59	60	56 (15–92)
Using private sector service	35	36	35	38	35	38 (6–72)
Using unclassifiable sector (husband, relatives, friends or other source) or missing location of service	8	3	5	3	5	4 (0–28)
Total	100	100	100	100	100	
<b>Women using appropriate services with a classifiable sector</b>						
Using public sector service	62	63	63	61	63	59 (20–94)
Using private sector service	38	37	37	39	37	41 (6–80)
Total	100	100	100	100	100	
<b>Women using public sector services</b>						
Public medical	99	100	95	100	96	100 (48–100)
Public non-medical	1	<1	5	<1	4	0 (0–52)
Total	100	100	100	100	100	
<b>Women using private sector services</b>						
Private medical	30	41	60	45	54	23 (3–84)
Private specialised drug seller	47	52	31	48	36	43 (0–97)
Private retailer	14	4	5	3	6	6 (0–85)
Faith-based (FBO)	6	1	1	0	1	0 (0–36)
NGO	3	2	3	4	3	0 (0–38)
Total	100	100	100	100	100	
<i>Combined categories</i>						
Private commercial	91	97	96	96	96	99 (27–100)
Private non-commercial	9	3	4	4	4	1 (0–73)
Total	100	100	100	100	100	



**Figure 2** (a) Proportions of women in need of family planning, by source and region. (b) Proportions of women in need of family planning, by source, region and wealth quintile. (c) Proportions of all women in need of family planning, by source, region and education. (d) Proportions of women in need of family planning, by source, region and residence.

less likely to be at risk of pregnancy, mostly because they were more likely to be sexually inactive (22% among the richest *vs.* 13% among the poorest). Gradients of met need by wealth were seen in all settings, with the richest women having the highest met need. The gradient was steepest in sub-Saharan Africa (Figure 2b). In all regions, the gradients in private sector provision of modern contraception by wealth quintile among women in need were in the same direction as those for overall use, but steeper. This indicates the public sector compensated to some degree for the inequalities in private provision, favouring the poor (Figure 3b). The exception was sub-Saharan Africa, where the overall service use and the private sector use gradients were equally steep.

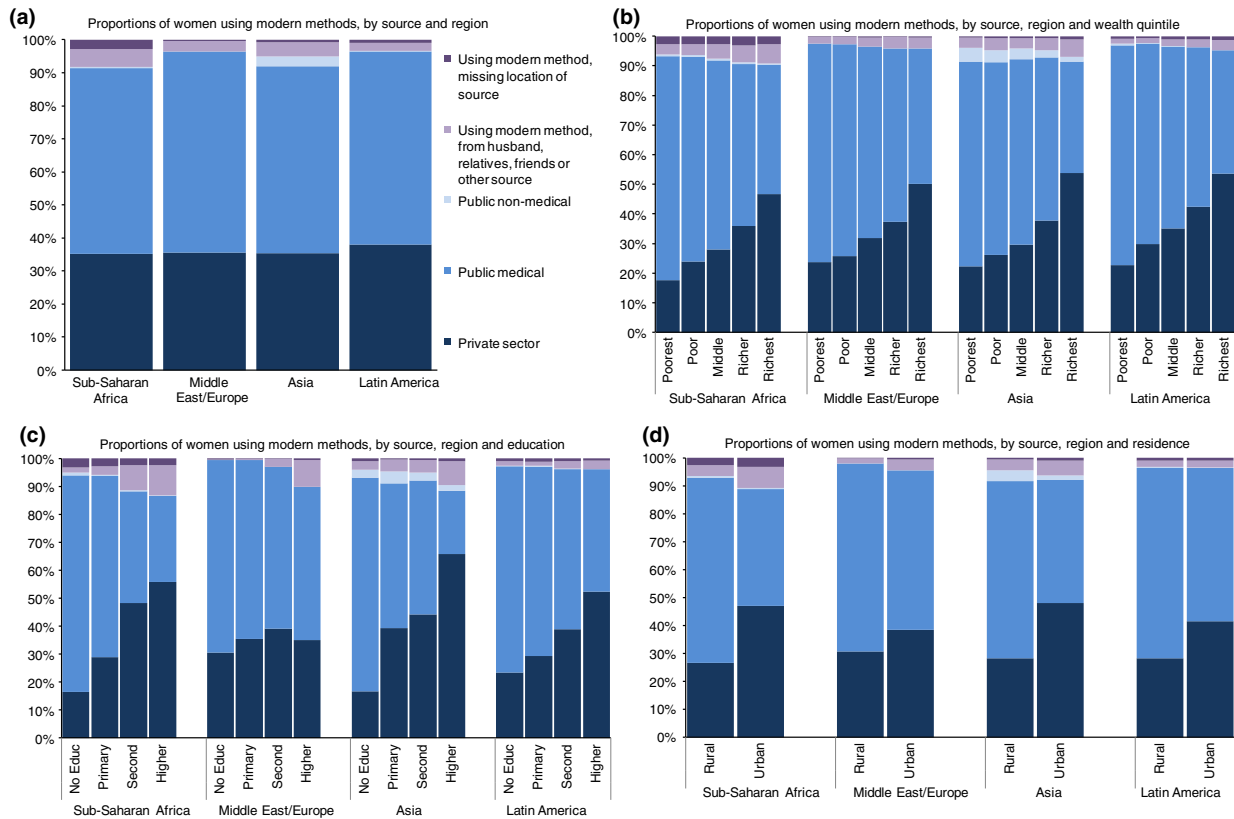
The patterns of association between wealth and need or use were echoed in the patterns seen for education and residence, with more privileged groups behaving in similar ways across the three measures of socio-economic position. The exceptions were as follows: first, that patterns of need among all women by educational level were erratic in Middle East/Europe, Asia and Latin America

(Figure 1c). Second, that the pattern in met need was flat in Middle East/Europe and Asia by education level and residence (Figure 2c,d). Third, the pattern of private sector use among women in need was flat in Middle East/Europe by education (Figure 2c). In all four regions, there was a steep gradient by privilege (greater wealth, education and urban residence) for private sector use among women using appropriate service types (Figure 3b–d), except for the Middle East/Europe for education, where the most and least educated had slightly less use compared to the two intermediate education categories.

#### Understanding the private sector: types of methods and advice on side effects

Figure 5 presents the methods used by type of provider and in total (for all providers), weighted for country populations and unweighted. The weighted graph shows that overall, 28% of the women used short-acting methods, 15% injectables, 14% LARCs and 43% permanent methods, with the high share of permanent methods in the





**Figure 3** (a) Proportions of women using modern methods, by source and region. (b) Proportions of women using modern methods, by source, region and wealth quintile. (c) Proportions of women using modern methods, by source, region and education. (d) Proportions of women using modern methods, by source, region and residence.

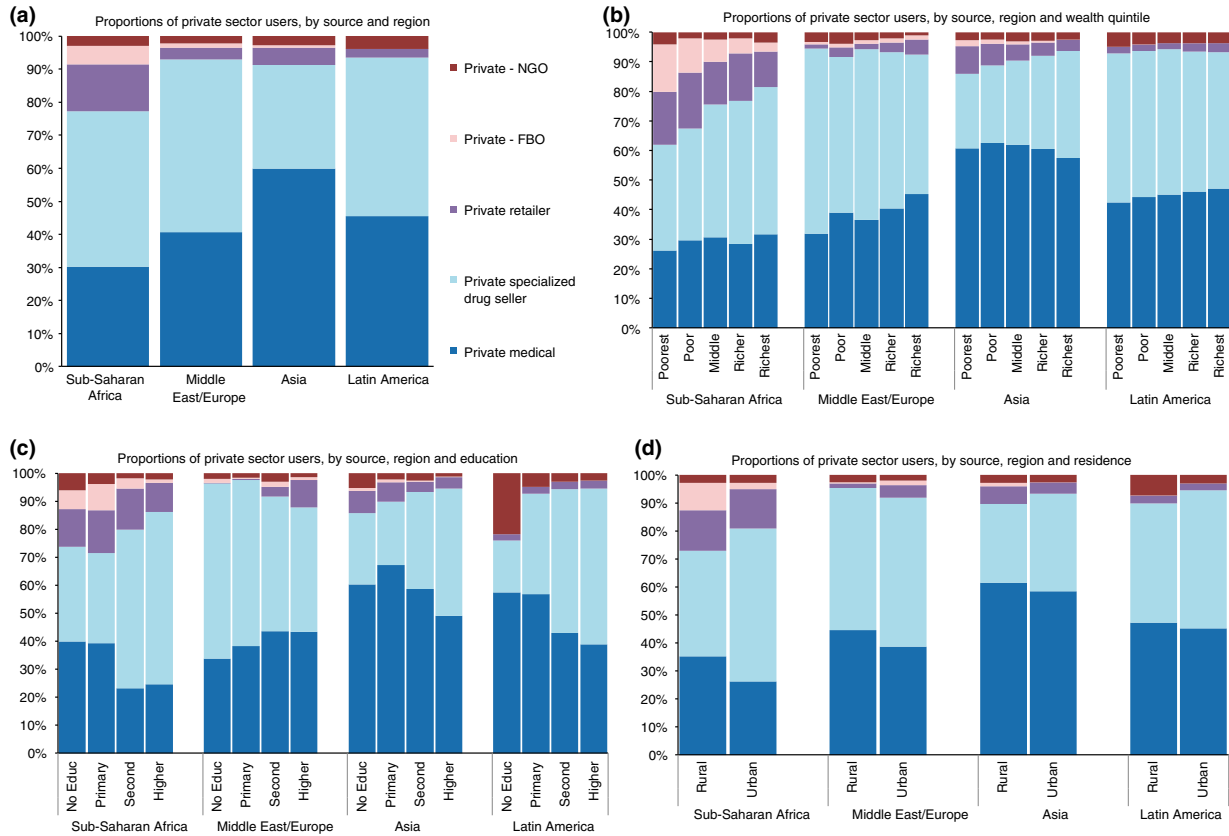
weighted compared to the unweighted analysis, reflecting the high levels of sterilisation in India and its large population. The method mix across providers appeared to be related to the methods' characteristics in terms of skill level required, the ease of training, the time needed to provide them and the extent of permanence. Private retailers and non-medical providers from both sectors provided mainly short-acting methods. Medical providers from both sectors provided the widest mix of the four method types. However, a higher share of clients served by private medical providers received short-acting methods and injectables compared to public medical providers in the weighted data, while these two provider subtypes were more similar (and in a slightly opposite direction) in the unweighted estimates, again reflecting India's contraceptive mix and high population weight.

For each method type, Figure 6 shows the breakdown by provider. Short-acting methods were provided by the widest range of provider subtypes. However, for other methods, the more long-acting or permanent they were, the more likely they were to be provided by public medi-

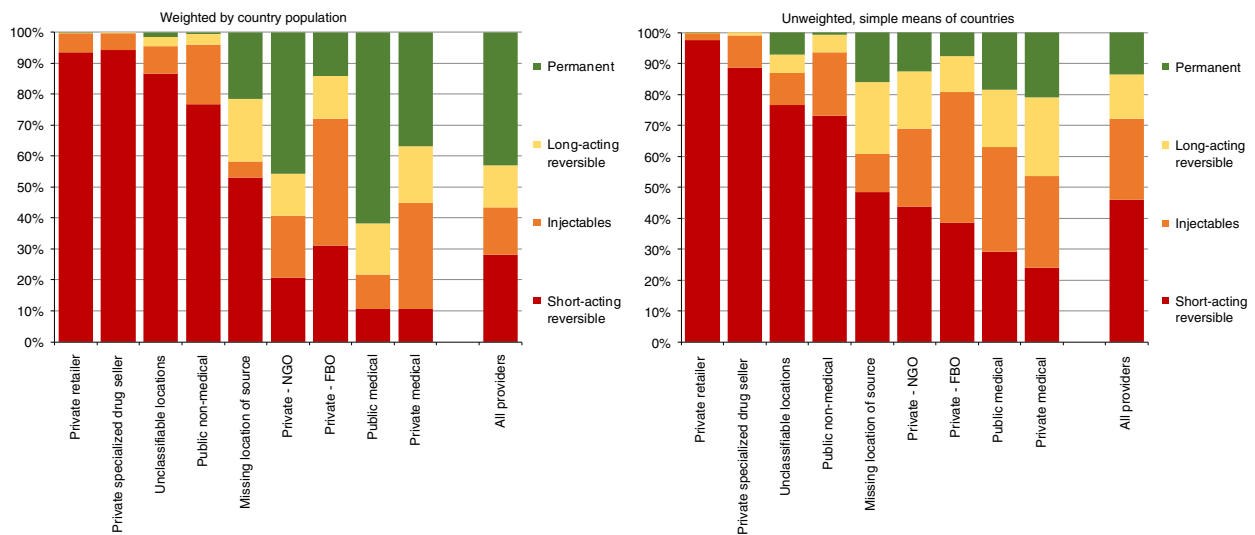
cal providers. NGOs and FBOs did not contribute appreciably to the provision of any method type; private retailers, private specialised drug sellers and unclassifiable sources (husband, relatives/friends or other sources) were important providers of short-acting reversible methods, and private medical providers together with private specialised drug sellers provided nearly half of injectables.

Figure 7 shows that in the 46-country analysis of current users of pills, injectables, IUDs, implants or sterilisation, 50% overall were informed of side effects when they first obtained their method, although the percentages varied by method (lowest for the pill at 44% and highest for IUDs at 66%) and by provider subtype. Advice on side effects was least likely to be provided by private retailers (16%) and private specialised drug sellers (34%). Figure 8 further compares public medical and private medical providers for the five methods. It shows comparable levels of information provision for pill, implants and IUDs, but some indication that public medical providers, although far from adequate, were better at informing women of side effects of injectables and female sterilisation.

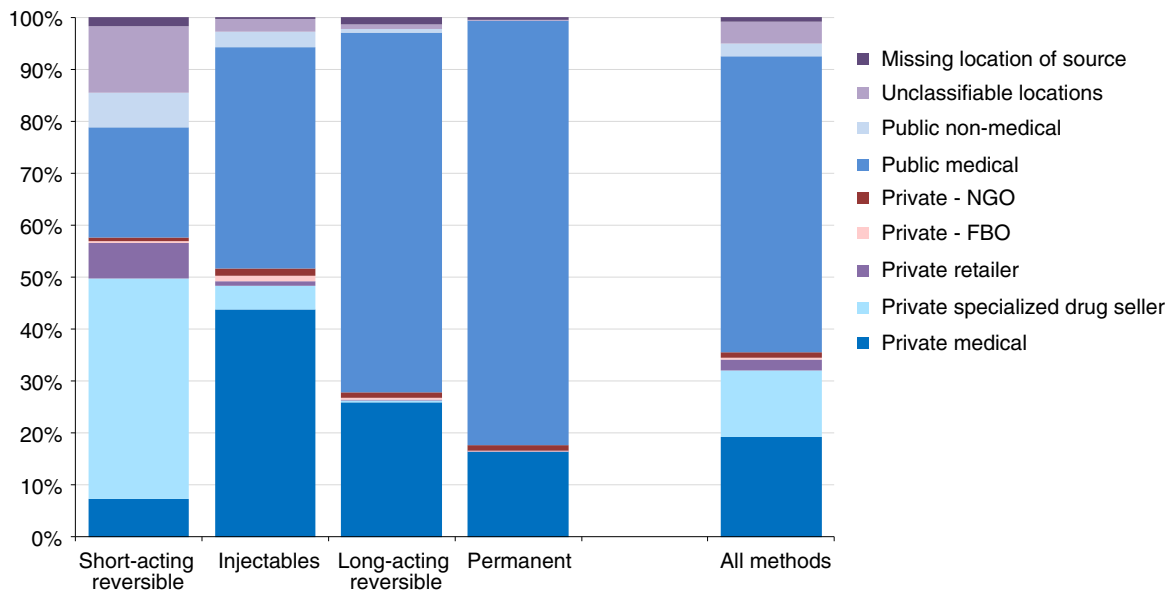
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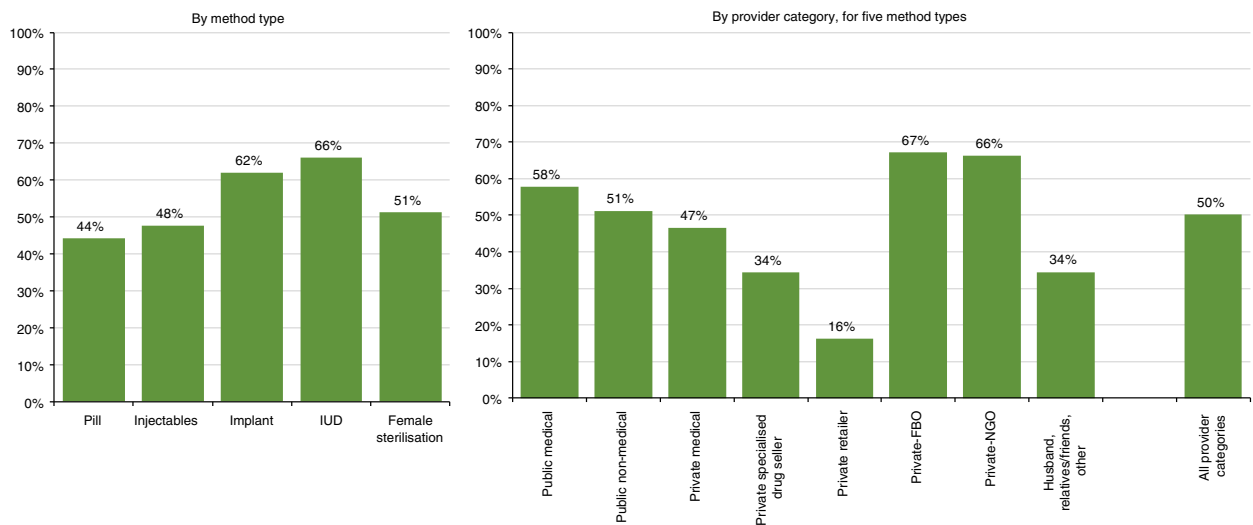
**Figure 4** (a) Proportions of private sector users, by source and region. (b) Proportions of private sector users, by source, region and wealth quintile. (c) Proportions of private sector users, by source, region and education. (d) Proportions of private sector users, by source, region and residence.



**Figure 5** Distribution of methods among women using modern methods by provider type.



**Figure 6** Distribution of provider types among women using modern methods, by method type and overall.

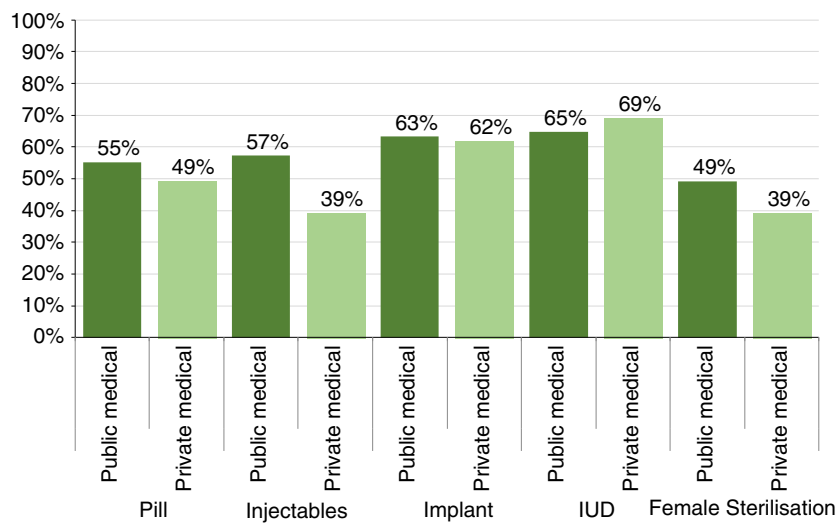


**Figure 7** Percentage of current modern method users who were told about method side effects by the first provider of current method, by method type and provider (first source of method).

**Discussion**

This analysis of where women obtained modern contraceptives by region, wealth quintile, residence and educational level, with its focus on the roles of the public and

private sectors, contributes to understanding of family planning service provision. It shows reasons for lack of need among some women, describes inequalities in service provision by education and residence in addition to wealth, presents provider subtypes in both sectors and



**Figure 8** Percentage of women who were told about side effects by the first source of current modern FP method, selected methods and provider categories.

examines quality by assessing method mix and side effect advice. Strengths compared to the literature are that we clearly delineate who needs services, and who is using them, transparently handle missing and unclassifiable data to indicate the implications of our assumptions, use several measures of central tendency (weighted means and nonparametric statistics) and include more countries than previous studies.

The modern contraceptive prevalence rate (use among all women) was lowest in sub-Saharan Africa (15%), while levels in the other regions were roughly comparable, with around two-fifths of women using modern contraceptives. The level of use among women in need was also lowest in sub-Saharan Africa (39%), while in the other regions ranged from 64% to 72%. These patterns are not new and have been reported elsewhere [11, 14]. We are the only multicountry comparative study to examine use among women in need of services. The majority of women using modern contraceptives obtained them from the public sector, but private sector provision was substantial, accounting for just under two-fifths of provision in all regions (37–39% across regions).

Many studies note that private provision of family planning is substantial and growing, although definitions of the private sector vary. We found strikingly similar levels of private sector use among current users in all regions, which differs from previous reports, particularly for sub-Saharan Africa. Berman and Rose [19] and Zellner *et al.* [33] both observe that among modern-method users, private sector sourcing was higher in Latin America than in other regions. Berman and Rose [19] attribute this to the influence of the Catholic Church which makes

Latin American governments reluctant to support family planning services, leaving non-government, private entities to fill the gap. Zellner *et al.* [33] describe countries with low private sector use (3–14% of users) as being either in the poorest regions of the world (i.e. sub-Saharan Africa), or transitioning from state-controlled to more open economies (Armenia, Kazakhstan and Vietnam). Gwatkin *et al.* [34], however, report the highest average private sector use in the Middle East and North Africa region (54%), followed by Latin America and the Caribbean (51%), East Asia Pacific (41%), sub-Saharan Africa (35%), Asia (28%) and Europe/Central Asia (10%). Our findings could differ from those of others because we used population weights within regions when calculating regional averages, examined a different subset of countries or excluded unclassifiable sources from our estimates, or because the private sector market share actually changed over time.

We examined provider subtypes in greater detail than previous studies. A previous review and estimate had indicated that faith-based provision is small [52]; our results concurred and also extend this finding to NGO provision. Considering the efforts by some donors to work outside the government sector, this is unexpected, but could have occurred if provider sources were misclassified as different provider types on surveys (potentially as a result of limited response options listed), or for example if NGOs were not strongly branded or were working through public or commercial providers (such as through social marketing or social franchising)[14]. The low NGO and FBO share in private sector provision meant that nearly all private sector provision was from private commercial providers (91–97% across regions).

The combination of private specialised drug sellers and private retailers accounted for the majority of private sector provision in Sub-Saharan Africa, whereas in the other three regions, private specialised drug sellers and private medical providers played the predominant role.

We also found that virtually all public sector provision was medical, with community-based workers making a negligible contribution ( $\leq 1\%$  of public sector services), except possibly in Asia, where they provided 5% of modern contraceptives. Cleland *et al.* [14] note this previously, explaining that scaling-up community-based workers to achieve wide geographical coverage poses logistical difficulties, because large numbers of workers have to be recruited, supplied with contraceptives and supervised.

The descriptive analyses on inequalities by socio-economic position (Figure 4b–d) need to be interpreted cautiously, particularly for education. For example, as we move from Figures 1c–4c, the sample size reduces each time, reducing the precision of our estimated proportions. This is not a problem *per se*, because the sample size in each category is sufficient to provide a reasonably precise estimate. However, when we look at country-level statistics, we can see that some countries have very few women educated to a higher level, while others have very few women with no education. This confounding effect means that rather than illustrating the differences in family planning provision across education levels, we illustrate the differences in family planning provision across countries with low and high levels of education. This effect is most marked in the Middle East/Europe region (Figure 3c), where the chart appears to show almost no difference in private coverage by education levels. However, inspecting the country-level detail (not shown) revealed that increased education was associated with increased private provision within each country in the region. The discrepancy between the country picture and the regional estimate by education arises because only Egypt and Morocco provide significant numbers of women to the sample in the lowest category of education, so the estimate of private coverage is based mainly on those two countries. Ukraine, on the other hand, provides a large number of highly educated women to the sample and has a very low proportion of private provision. The effect does not appear to be a problem when stratifying by wealth quintile because relative wealth is a within-country indicator, nor does it appear to be a problem when stratifying by residence because of the mix of methods and proportions of rural/urban residents within countries.

With these caveats in mind, the richest, urban and most educated women tended to be at less risk of preg-

nancy, which decreased need, but were also less likely to want a child soon, which increased it (Figure 1b–d). The lower need in richer women was because they were less likely to be sexually active than poorer women. The gradients in contraceptive use among women in need generally followed expected patterns of higher use and greater private sector use among the wealthier, urban and most educated women. These patterns have been reported by others [9–15, 19, 20].

In the Middle East/Europe, Asia and Latin America regions, we found that relatively privileged women used fewer public sector and more private sector services (Figure 2b–d). This finding was also recorded by Gwatkin *et al.* [34] and suggests that generally, public subsidies are benefitting the poor, despite evidence that in some settings, they benefit the wealthy [41, 53]. This relationship did not hold in sub-Saharan Africa, where we found that the proportion of women in need using the public sector was fairly constant across socio-economic groups. The reasons why the public sector failed to favour the poor in this region may relate to high absolute levels of poverty, where the poorest cannot afford the direct or indirect costs of access, even to public facilities, or where even the richest may not have incomes that enable them to purchase private services.

The optimal approach to assessing equity of use among women is to consider those who need contraception rather than measure the contraceptive prevalence rate among all women [20, 24]. If, for example, richer women have more need for contraception than poorer women because they desire fewer children, they could well have higher use, while still having equitable met need. Apart from our study, all research examining equity of private sector coverage has looked at equity of service use among all married women of reproductive age, rather than among those in need of services. We observe high levels of unmet need, even among the wealthiest women ( $>30\%$  of women in need). There is urgent need to redress this unmet need. In settings where population growth remains high, more women will need to receive services just to remain at the same modern contraceptive prevalence rate, and services will need to grow even more rapidly to cover unmet need, particularly if need for services is also increasing because of smaller desired family sizes.

The question of whether, and how, the private sector contributes to addressing these pressures is discussed in the literature from three main angles. It is argued that having more providers, including more private providers, can first, create demand for services (i.e. by introducing new methods, marketing and reducing stigma) and second, improve physical access by reducing average

distances [14, 54, 55]. However, the main argument revolves around the scarcity of resources and whether family planning should be free or subsidised for all women or only for the most economically vulnerable. Some authors argue that shifting wealthier women to pay for family planning from the private sector could free donor or government funding to intensify efforts to reach the poorest via public services [32, 56, 57]. The latter discourse revolves largely around substitution and not necessarily about increasing absolute coverage.

Governments certainly differ in how much they (or donors) are willing or able to invest in public services, as well as in their views about whether national health goals and universal health coverage are best promoted through predominately public, or deliberately pluralistic, family planning provision, including via contracting out to private providers. We have empirical findings on met need and equity of met need by sector but cannot comment on the underlying question of the extent to which the patterns observed stem from deliberate policies, unintended consequences of these policies or policy failures, and if so, what types of policies and what types of failures. Others who have examined the effects of expanding private sector provision show variable results by country: some decreasing inequity (Nigeria, Uganda, Morocco and Indonesia) [20, 24], some experiencing fluctuating or unchanging inequity (Bangladesh, Indonesia and Ghana) [20, 24], and one (Kenya) showing increasing inequity in rural areas and the opposite in urban areas [24]. The purposive selection of countries with high and growing commercial private sector market shares and high contraceptive prevalence rates (>20%) may have influenced their findings. The question on the effect of expanding private sector provision on equity merits further study on a wider subset of countries, using women in need as the study population. In the absence of public funding, a predominance of private sector provision may lead to high inequity, as documented in Paraguay [26]. However, there are also reports that targeting efforts are weak or ineffective, with, for example, the relatively richer benefitting from the expansion of government services in Egypt, or with the private sector market share being eroded by government expansion in Peru [26, 56].

A systematic review of studies comparing all types of private and public ambulatory health care in low- and middle-income countries found 80 studies which indicated that many services, irrespective of sector, scored <50% on infrastructure, clinical competence and practice. The formal private sector was better for drug availability, responsiveness and effort, but differences between sectors were modest and the authors concluded that the view that one sector is clearly better than another was not

supported by their review [58]. In terms of quality, we identified some evidence that reliance on the private sector may have meant less method choice, at least in sub-Saharan Africa, and to a lesser extent in Asia. When the poorest women sourced methods from the private sector, they were more likely to frequent 'lower' calibre providers, with lower levels of training, and more restricted potential for offering a wide method choice. We cannot tell whether women (or their partners) chose the method first and obtained it from their preferred provider, or whether their choices were constrained because their preferred methods and providers were not accessible, affordable or reliably stocked. On the other hand, non-medical private providers most often provided condoms, which may align with prevention strategies in high HIV prevalence settings [14], such as in sub-Saharan Africa, which accounts for nearly 70% of new HIV infections globally [59].

Private sector providers overall, and private retailers/specialised drug sellers in particular, were more likely to be the source of short-term methods, which have higher failure rates, and which are more demanding of users in terms of the need for adherence and the frequency of visits needed for resupply, thus posing higher time and travel costs on women. Zellner *et al.* [33] note that short-acting methods users (which largely overlap with our definition of 'short-acting reversible' methods) were more likely to rely on the private sector for their methods than long-acting reversible or permanent contraceptive users. They hypothesised that short-acting methods may be more accessible in terms of proximity to a source and availability of products in the private sector than they are in the public sector, or that the low costs of long-acting methods in the public sector may attract women who could not otherwise afford to pay the private sector prices. The high upfront costs of long-acting/permanent methods in the private sector *vs.* lower initial costs for short-acting methods may also deter women from using them. Some of these differences may stem from the nature of different subtypes of providers, because, for example, private retailers would be unable to provide LARCs or permanent methods. Health facility assessments in Tanzania, Kenya and Ghana comparing public to private (for-profit, NGO and FBO) facilities found that the public sector offered a broader method mix [39]. We compared private medical and public medical providers (who had similar qualifications and theoretically the same capacity to provide a similar method mix), and while we did not adjust for variations of method mix by country, we found that private medical providers were more likely to give injectables, and public medical providers were more likely to provide sterilisation (weighted). In the unweighted analysis, the

method mixes of private medical and public medical providers were more similar.

Quality was assessed by the percentage of women advised on side effects and was found to be suboptimal (50% overall), although it varied by method and provider subtype. Within public medical and private medical providers, side effect advice was slightly higher and comparable. Health facility assessments in Tanzania, Kenya and Ghana determined that technical quality of family planning provision (assessed by clinical history, examination, appropriate injection practice and length of consultation) was comparable between private and public facilities, while interpersonal quality (waiting time, privacy and confidentiality, client concerns noted, method use explained and injectable prescribed) was higher in private facilities. Client satisfaction (composite of 12 elements of perception) was considerably higher in private facilities [39]. The restriction of this study to facilities may explain differences with our study, where the private sector included commercial and non-health facility-based providers.

### Limitations

Our study has some limitations. Countries without DHS data were excluded, and representation of the Middle East/Europe and Latin America regions was low. The analyses of side effect advice further excluded eleven countries which did not collect these data. The surveys asked women about current need and use, but some provision, particularly for long-acting methods and some of the information on side effects, may have referred to a period of up to 5 years before the survey, and thus been subject to recall error. Some of the surveys included were from as early as 2000, and practices may have changed since then. We also draw attention to the respondents interviewed: most DHS interview all women of reproductive age, but some in the Middle East/Europe and Asia regions excluded never-married women, resulting in slightly inflated estimates of proportion of women in need.

Other limitations stem from using women's self-reports and the difficulties of working with questionnaires from 57 surveys, where response options were variably conflated, headings were inconsistent, or sector of provision was unclassifiable [44]. As early as 1996, Berman and Rose identified the inconsistent definitions of private providers across countries as problematic [19]; progress has been made in response options in recent survey tools, but improvements are still required to standardise groupings and terminology. There are also limits to what women can reasonably be expected to report, in terms of cor-

rectly classifying providers, for example, where NGO support is provided to private providers through franchising, or where private for-profits are hard to distinguish from not-for-profits, or public from FBOs. It seems necessary to validate women's recall of provider type and to give strong consideration to improving other non-survey data sources.

### Conclusion

To redress nearly two decades of neglect, there is now interest in exploring a range of approaches to deliver family planning services and to improve their quality, including by engaging with the private sector. Our analysis makes an important contribution by describing the different public and private modalities currently contributing to family planning coverage, and by comparing their equity, method mix and quality of advice given on side effects by provider type.

Key findings were that sub-Saharan Africa had the lowest levels of met need, but that there was still large unmet need in other regions. Moreover, all three indicators of socio-economic position examined showed inequalities in met need. Among family planning users, the main source of provision was the public sector – and almost entirely from medical providers as opposed to community-based health workers. However, the private sector's role was substantial, accounting for just under two-fifths of provision in all regions, with nearly all contraceptives obtained from private commercial, as opposed to NGO or faith-based, providers. The share of non-medical providers (i.e. retailers) among the private sector was highest in sub-Saharan Africa. By their nature, these providers are likely to offer the narrowest choice of methods, mainly condoms. We also found that women using short-acting methods were most likely to obtain them from private sector providers.

Given the magnitude and significance of private sector family planning provision in many countries, overall and even among the underprivileged, greater and more systematic efforts are needed to understand more about reasons why women choose the private sector, their quality of care and how this can be improved. There is also a need to carefully consider and assess the potential impact of the relative attention focused on public *vs.* private sectors on equity. The largest potential market for family planning is among the poor, where there is the greatest unmet need, while private sector services are generally more used by the rich. Both high levels of unmet need and the richest opting for more private use, suggest public services are not meeting at least some aspects users' expectations with respect to convenience, quality or cost.

A better understanding of the supply and use of private services, and the impact of private sector focused interventions, will help governments assess whether national health goals and universal health coverage are best promoted through predominately public, or deliberately pluralistic, family planning provision and how best to balance intervention across sectors.

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### References

- Bongaarts J, Cleland J, Townsend J, Bertrand J, Das Gupta M. *Family Planning Programs for the 21st Century: Rationale and Design*. The Population Council: New York, 2012.
- UNFPA. World Population Day Marked with Renewed Push to Expand Family Planning Access Around the Globe, 2012. (<http://www.unfpa.org/public/home/news/pid/11465>) [4 Jan 2014].
- Ali M, Seuc A, Rahimi A, Festin M, Temmerman M. A global research agenda for family planning: results of an exercise for the setting of research priorities. *Bull World Health Organ* 2014; **92**: 93–98.
- Patouillard E, Goodman C, Hanson K, Mills A. Can working with the private for-profit sector improve utilization of quality health services by the poor? A systematic review of the literature. *Int J Equity Health* 2007; **6**: doi:10.1186/1475-9276-1186-1117.
- Ross J, Winfrey W. Unmet need for contraception in the developing world and the former Soviet Union: an updated estimate. *Int Fam Plan Perspect* 2002; **28**: 138–143.
- United Nations. *World Contraceptive Use 2012*. Department of Economic and Social Affairs, Population Division: New York, 2012.
- Darroch JE, Singh S. Trends in contraceptive need and use in developing countries in 2003, 2008, and 2012: an analysis of national surveys. *Lancet* 2013; **381**: 1756–1762.
- Alkema L, Kantorova V, Menozzi C, Biddlecom A. National, regional, and global rates and trends in contraceptive prevalence and unmet need for family planning between 1990 and 2015: a systematic and comprehensive analysis. *Lancet* 2013; **381**: 1642–1652.
- Gakidou E, Vayena E. Use of modern contraception by the poor is falling behind. *PLoS Med* 2007; **4**: e31.
- Gillespie D, Ahmed S, Tsui A, Radloff S. Unwanted fertility among the poor: an inequity? *Bull World Health Organ* 2007; **85**: 100–107.
- Creanga AA, Gillespie D, Karklins S, Tsui AO. Low use of contraception among poor women in Africa: an equity issue. *Bull World Health Organ* 2011; **89**: 258–266.
- Ahmed S, Creanga AA, Gillespie DG, Tsui AO. Economic status, education and empowerment: implications for maternal health service utilization in developing countries. *PLoS One* 2010; **5**: e11190.
- Ortayli N, Malarcher S. Equity analysis: identifying who benefits from family planning programs. *Stud Fam Plann* 2010; **41**: 101–108.
- Cleland J, Bernstein S, Ezeh A *et al.* Family planning: the unfinished agenda. *Lancet* 2006; **368**: 1810–1827.
- Westoff C. *Unmet Need for Modern Contraceptive Methods*. MEASURE DHS, ICF International: Calverton, MD, 2012.
- Boerma JT, Bryce J, Kinfu Y, Axelson H, Victora CG. Mind the gap: equity and trends in coverage of maternal, newborn, and child health services in 54 countdown countries. *Lancet* 2008; **371**: 1259–1267.
- Barros AJ, Ronsmans C, Axelson H *et al.* Equity in maternal, newborn, and child health interventions in countdown to 2015: a retrospective review of survey data from 54 countries. *Lancet* 2012; **379**: 1225–1233.
- Victora CG, Barros AJ, Axelson H *et al.* How changes in coverage affect equity in maternal and child health interventions in 35 countdown to 2015 countries: an analysis of national surveys. *Lancet* 2012; **380**: 1149–1156.
- Berman P, Rose L. The role of private providers in maternal and child health and family planning services in developing countries. *Health Policy Plan* 1996; **11**: 142–155.
- Hotchkiss DR, Godha D, Do M. Effect of an expansion in private sector provision of contraceptive supplies on horizontal inequity in modern contraceptive use: evidence from Africa and Asia. *Int J Equity Health* 2011; **10**: 33.
- Nguyen H, Snider J, Ravishankar N, Magvanjav O. Assessing public and private sector contributions in reproductive health financing and utilization for six sub-Saharan African countries. *Reprod Health Matters* 2011; **19**: 62–74.



O. M. R. Campbell *et al.* **Private sector provision of family planning**

22. Chapman S, Jafa K, Longfield K *et al.* Condom social marketing in sub-Saharan Africa and the total market approach. *Sex Health* 2012; 9: 44–50.
23. Ross JA, Agwanda AT. Increased use of injectable contraception in sub-Saharan Africa. *Afr J Reprod Health* 2012; 16: 68–80.
24. Agha S, Do M. *Does an Expansion in Private Sector Contraceptive Supply Increase Inequality in Modern Contraceptive Use?*. Private Sector Partnerships-One Project, Abt Associates Inc: Bethesda, MD, 2008.
25. Hanson K, Kumaranayake L, Thomas I. Ends versus means: the role of markets in expanding access to contraceptives. *Health Policy Plan* 2001; 16: 125–136.
26. Sharma S, Gribble JN, Menotti EP. Creating options in family planning for the private sector in Latin America. *Rev Panam Salud Publica* 2005; 18: 37–44.
27. Bulatao R, Levin A, Bos E, Green C. *Effective Family Planning Programs*. World Bank: Washington, DC, 1993.
28. Ayad M, Wilkinson M, McNiff M. *Sources of Contraceptive Methods*. Macro International Inc: Calverton, MD, 1994.
29. World Bank. *Population and Development Implications: For the World Bank*. World Bank: Washington, DC, 1994.
30. Curtis S, Neitzel L. *Contraceptive Knowledge Use, and Sources Demographic and Health Surveys*. Macro International Inc: Calverton, MD, 1996.
31. Centers for Disease Control and Prevention, ORC Macro. *Reproductive, Maternal and Child Health in Eastern Europe and Eurasia: A Comparative Report*. Atlanta, GA (USA) and Calverton, MD (USA), 2003. Chapter 5 p.
32. Taylor P, Quesada N, Abramson W, Dayaratna V, Patykewich L. *Regional Report: Contraceptive Security in Latin America and the Caribbean*. John Snow, Inc./DELIVER, Futures Group/POLICY II, for the U.S. Agency for International Development: Arlington, VA, Washington, DC, 2004.
33. Zellner S, O'Hanlon B, Chandani T. *State of the Private Health Sector Wallchart*. PSP-One: Washington, DC, 2005.
34. Gwatkin D, Rutstein S, Johnson K *et al.* *Socioeconomic Differences in Health, Nutrition, and Population within Developing Countries*. World Bank: Washington, DC, 2007.
35. Khan S, Mishra V, Arnold F, Abderrahim N. *Contraceptive Trends in Developing Countries*. Macro International Inc: Calverton, MD, 2007.
36. Stupp PW, Daniels D, Ruiz A. *Reproductive, Maternal and Child Health in Central America: Health Equity Trends*. Centers for Disease Control and Prevention: Atlanta, GA, 2007.
37. Limwattananon S. *Private-Public Mix in Health Care for Women and Children in Low Income Countries: An Analysis of Demographic and Health Surveys*. The Rockefeller Foundation: Bangkok, Thailand, 2008.
38. Wang W, Wang S, Pullum T, Ametepi P. *How Family Planning Supply and the Service Environment Affect Contraceptive Use: Findings from our Four East African Countries*. Macro/ICF International: Calverton, MD, 2012.
39. Hutchinson PL, Do M, Agha S. Measuring client satisfaction and the quality of family planning services: a comparative analysis of public and private health facilities in Tanzania, Kenya and Ghana. *BMC Health Serv Res* 2011; 11: 203.
40. Agha S, Do M. The quality of family planning services and client satisfaction in the public and private sectors in Kenya. *Int J Qual Health Care* 2009; 21: 87–96.
41. Shah NM, Wang W, Bishai DM. Comparing private sector family planning services to government and NGO services in Ethiopia and Pakistan: how do social franchises compare across quality, equity and cost? *Health Policy Plan* 2011; 26: i63–i71.
42. Powell-Jackson T, Macleod D, Benova L, Lynch C, Campbell OM. The role of the private sector in the provision of antenatal care: a study of Demographic and Health Surveys from 46 low- and middle-income countries. *Trop Med Int Health* 2014; 20: 230–239.
43. Benova L, Macleod D, Footman K *et al.* Role of the private sector in childbirth care: cross-sectional survey evidence from 57 low- and middle-income countries using Demographic and Health Surveys. *Trop Med Int Health* 2015; doi: 10.1111/tmi.12598.
44. Footman K, Benova L, Goodman C *et al.* Using multi-country household surveys to understand who provides reproductive and maternal health services in low and middle-income countries: a critical appraisal of the Demographic and Health Surveys. *Tropical Med Int Health* 2015; 20: 589–606.
45. Measure DHS. 2013. (<http://www.measuredhs.com/Measure>) [21 Nov 2013].
46. Bradley S, Croft T, Fishel J, Westoff C. *Revising Unmet Need for Family Planning*. ICF International: Calverton, MD, 2012.
47. Kane R, Irving G, Brown S *et al.* Long-acting, reversible and permanent methods of contraception: insight into women's choice of method. *Qual Prim Care* 2009; 17: 107–114.
48. Vyas S, Kumaranayake L. Constructing socio-economic status indices: how to use principal components analysis. *Health Policy Plan* 2006; 21: 459–468.
49. Kolenikov S, Angeles G. *The Use of Discrete Data in Principal Component Analysis: Theory, Simulations, and Applications to 254 Socioeconomic Indices*. Carolina Population Center, UNC: North Carolina, 2004.
50. Montagu D, Yamey G, Visconti A, Harding A, Yoong J. Where do poor women in developing countries give birth? A multi-country analysis of demographic and health survey data. *PLoS One* 2011; 6: e17155.
51. United Nations Department of Economic and Social Affairs. *World Population Prospects: The 2012, 2013. Revision*. ([http://esaunorg/unpd/wpp/unpp/panel\\_populationhtm](http://esaunorg/unpd/wpp/unpp/panel_populationhtm)) [16 Dec 2013].
52. Kagawa RC, Anglemeyer A, Montagu D. The scale of faith based organization participation in health service delivery in

O. M. R. Campbell *et al.* **Private sector provision of family planning**

- developing countries: systematic [corrected] review and meta-analysis. *PLoS One* 2012; 7: e48457.
53. Levine R, Langer A, Birdsall N *et al.* Contraception. In: Jamison D, Breman J, Measham A, Alleyne G, Claeson M, Evans D, Jha P, Mills A, Musgrove P. (eds). *Disease Control Priorities in Developing Countries* (2nd edn). World Bank: Washington, DC, 2006.
54. Agha S, Do M. Does an expansion in private sector contraceptive supply increase inequality in modern contraceptive use? *Health Policy Plan* 2008; 23: 465–475.
55. Bertrand JT, Hardee K, Magnani R, Angle M. Access, quality of care and medical barriers in family planning programs. *Int Fam Plan Perspect* 1995; 21: 64–69 & 74.
56. Sharma S, Dayaratna V. Creating conditions for greater private sector participation in achieving contraceptive security. *Health Policy* 2005; 71: 347–357.
57. Peters DH, Mirchandani GG, Hansen PM. Strategies for engaging the private sector in sexual and reproductive health: how effective are they? *Health Policy Plan* 2004; 19 (Suppl 1): i5–i21.
58. Berendes S, Heywood P, Oliver S, Garner P. Quality of private and public ambulatory health care in low and middle income countries: systematic review of comparative studies. *PLoS Med* 2011; 8: e1000433.
59. UNAIDS. Fact Sheet 2014. Global Statistics, 2014. ([http://www.unaids.org/sites/default/files/en/media/unaids/contentassets/documents/factsheet/2014/20140716\\_FactSheet\\_en.pdf](http://www.unaids.org/sites/default/files/en/media/unaids/contentassets/documents/factsheet/2014/20140716_FactSheet_en.pdf)) [4 May 2015]: UNAIDS.

**Supporting Information**

Additional Supporting Information may be found in the online version of this article:

**Table S1.** Characteristics of studies that looked at family planning source by sector across multiple countries.

**Table S2.** List of countries included in the analyses of family planning by survey year, characteristics of women sampled and whether data were collected on whether women were advised about side-effects.

**Table S3.** Grouping of modern contraceptives by duration, ease of training and the actual time needed to deliver the method, excluding counselling.

**Table S4.** Selected need, use and sector of use characteristics, by country (for category definitions, see Table 1).

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