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Community and Health Facility Influences on Contraceptive Use in the Eastern Cape, South Africa

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Abstract

This paper uses linked individual and health facility data from the 1998 South Africa Demographic and Health Survey and the 1998 Eastern Cape Facility Survey to explore community and health facility influences on modern contraceptive use. Several pathways of influence between the community and individual contraceptive adoption are identified, centering primarily on the community climate of female autonomy. Few significant effects of the health facility environment on contraceptive adoption are identified. The residual variation in contraceptive use highlights the deficits existing in current data sets for capturing community influences on contraceptive behaviour.

Introduction

The post-Apartheid era in South Africa has been characterized by a decline in fertility paralleled by an increase in contraceptive use among all four major population groups (Whites, Indians/Asians, Coloreds and Black Africans) (Burgard 2004; Swartz 2002). South Africa's demographic transition is considerably more advanced than other sub-Saharan African nations. The Total Fertility Rate (TFR) declined from approximately 5.0 in 1970 to stand currently at 2.2 (South Africa Department of Health et al., 2000; US Census Bureau 2007). The nation's average contraceptive use is 61% (urban 66%, rural 53%), and the contraceptive method choice is injectable contraceptives (27% of women report using injectables) (South Africa Department of Health et al., 2000; Swartz 2002). Previous studies of the determinants of contraceptive use in South Africa have focused on individual and household level influences, with gender and race roles often central to the discussion (Maharaj and Cleland 2005; Burgard 2004; Myer et al., 2002). However, few studies have examined the role of the community context in shaping an individual's decision to adopt contraception in South Africa. This paper uses data from the Eastern Cape Province, a province with poor economic and health indicators, to examine the influence community and health care infrastructure characteristics have on a woman's adoption of modern contraceptive methods.

Background

Studies of the determinants of health outcomes have long focused on individual risk factors, neglecting the wider social and cultural environment in which the outcomes occur (Pickett and Pearl 2001; Grady *et al.*, 1993; Stokols 1992). Recently, there has been growing interest in examining community influences on health outcomes in an attempt to

understand how individual health outcomes and behaviors are influenced by factors beyond the household-level (e.g., Chacko 2001; Diez-Roux 2001; Magadi et al., 2000; Pebley et al., 1996; Grady et al., 1993; Von Korff et al., 1992). This growth of the social epidemiology application, an approach which emphasizes social conditions as fundamental causes of disease (Link 1995; Koopman 1994; Halloran 1991), has been facilitated by the development of multilevel modeling techniques. These techniques provide a mechanism for measuring the influence of community factors and unobserved community effects on health outcomes, as well as a robust method for analyzing hierarchically clustered data (Diez-Roux 2001; Duncan et al., 1998; Goldstein 1995; DiPrete and Forrostal 1994). In a social epidemiology approach, social factors influencing disease are the focus of analysis and are not simply adjusted for or used as proxies for individual risk factors (Link 1995; Koopman 1994; Halloran 1991). However, many studies of community influences on health have focused on one aspect of the community environment or on characteristics of the health care infrastructure in isolation. Studies neglect to simultaneously quantify community social, economic, cultural and health care influences on health behaviors.

Evidence as to how community factors influence contraceptive use is limited (Stephenson and Tsui 2003: Stephenson and Tsui 2002). At the community level, studies of contraceptive use have focused on the influence of health service characteristics, primarily the influence of quality of care on contraceptive adoption (Tuoane, Diamond and Madise 2003; Bongaarts and Bruce 1995; Oliver 1995; Tsui and Ochoa 1992) in the absence of other community-level characteristics. Previous studies have demonstrated that, after controlling for individual characteristics, quality of care indicators such as

distance to service, provider attitudes, and contraceptive method availability are strong influences on a woman's decision to adopt contraception (Hamid and Stephenson 2006; Katende et al., 2003; RamaRao et al., 2003; Seiber and Bertrand 2002; Magnani et al., 1999; Steele et al., 1999). Quality of care lays the foundation for long-term contraceptive use and greater client satisfaction (Jain 1989). In a cross-country comparison of 15 countries, Blanc et al., have shown between 7% and 27% of women cease to practice contraception within a year of starting use for reasons related to the quality of the service environment (Blanc et al., 2002). In Bangladesh, clients who received what they perceived as high standards of care from field workers were significantly more likely to continue contraceptive use compared with those who felt they received poor care. However, the effects of quality of care provided by field workers upon contraceptive acceptance were less pronounced than those upon contraceptive continuation. (Koenig et al., 1997). Thus, the absolute number of methods offered to the client may not be as critical as the degree of trust, rapport, and confidence established between the field worker and the client. Another important aspect of service quality is the physical accessibility of the service. A study of service provision in rural Pakistan found that women who lived within five kilometers of two community-based workers were significantly more likely to adopt a modern method of contraception (Sultan *et al.*, 2002).

Recent attention toward the potential for community factors to influence health behaviors arises from the recognition of a disjuncture between theory and research practice (Grady *et al.*, 1993). In the context of contraceptive behavior, a number of theories hypothesized the influence of the community on a couple's fertility decisions (Casterline 1985), yet studies of contraceptive use dynamics only focused on individual and household-level determinants. However, less evidence exists concerning the influence of non-health facility community on contraceptive use. In a study of community influences on contraceptive use in the US, Grady et al., (1993) found that rapid population growth, high rates of unemployment, elevated levels of religious affiliation, higher socioeconomic status, and access to family planning services were all associated with increased uptake of contraception. Entwisle et al., (1996) used a combination of quantitative and qualitative data to describe the influence of physical space (in terms of access to services) and social space (in terms of social networks) on contraceptive choice in rural Thailand. Similarly, Degraff et al., (1997) found that the presence of family planning services and community-level labor-market conditions and infrastructural development are strong influences on contraceptive use in the Philippines. However, there are a number of other possible pathways through which the community may influence contraceptive use. For example, contraceptive use may be indirectly influenced by economic development through access to health services (Diez-Roux 1998) or through female autonomy and positive attitudes towards health service use (Alan Guttmacher Institute 1998). Some studies have examined other influential characteristics of the community on contraceptive use, including levels of community economic development (Stephenson and Tsui 2002; Diez-Roux 1998; Saha 1998; Nazzar et al., 1995; National Research Council 1993), levels of school participation (Chacko 2001; DeGraff et al., 1997) economic roles of children (Entwisle et al., 1989; Entwisle and Mason 1985) and community fertility norms (Nsemukila et al., 1999; Bongaarts and Bruce 1995; Nazzar et al., 1995).

Targeting health services and campaigns toward socio- and economicallydeprived areas as well as areas with poor reproductive health indicators complicates the study of community influences on contraceptive use. Thus, health services and campaigns operate in communities where women are the least likely to utilize contraceptive services. The potential biasing effect of the non-random placement of health services have been highlighted in studies that examine the impact of public health interventions on individual health outcomes (see for example Angeles *et al.*, 1998; Gertler and Molyneaux 1994; Pitt *et al.*, 1993). Gertler and Molyneaux (1994) note the use of panel data can control for the endogeneity of program inputs by measuring the multivariate correlations between changes in the health outcomes and the explanatory variables; however, most commonly available data sources for the study of the determinants of contraceptive use in less-developed nations are cross-sectional in nature.

What is missing from the literature is an examination of community influences on contraceptive use that encompass both community social, economic and cultural factors, and health facility factors beyond the simple presence of services. The incorporation of community-level factors into multilevel models of contraceptive use has the potential to allow the development of community-based family planning programs (Stephenson and Tsui 2003: Stephenson and Tsui 2002).

Study setting

The third most populous province in South Africa, Eastern Cape is also the second poorest province, containing the country's highest unemployment rate at nearly 50% (Mahlalela *et al.*, 2001). Prior to 1994, Eastern Cape was divided into three regions: Cape Provincial Authority, Ciskei, and Transkei, the latter two being independent black

8

homelands. Post-Apartheid, the governmental structures were divided into seven district councils (Mahlalela *et al.*, 2001). Eastern Cape experiences some of the worst health indicators in South Africa, falling below the national average in child mortality and childhood immunization. The Total Fertility Rate of 3.5, well above the national figure of 2.9, inversely correlates to a relatively low prevalence of modern contraceptive: Only 59% of women aged 15-45 use modern contraception (South Africa Department of Health *et al.*, 2000). As in most of South Africa, the injection is the predominant contraceptive method used by women in Eastern Cape, with 37% reporting use (South Africa Department of Health *et al.*, 2000).

There are clear racial differentials in contraceptive use, with 49% of Black Africans not using a method of contraception, compared to 33% of Coloreds and 18% of Whites. Eastern Cape has the lowest percentage of women who report receiving family planning messages in the print media (31% compared to 54% for South Africa), and the second lowest percentage of demand for family planning met (68.4% compared to 83.8% for South Africa) (South Africa Department of Health *et al.*, 2000). Family planning services are almost universally available at government clinics in Eastern Cape, and quality of care indicators such as method availability and uninterrupted electricity supply are higher than the national average (MEASURE Evaluation and EQUITY Project 2004; van Rensberg *et al.*, 2001). In contrast, Eastern Cape government clinics have the lowest proportion of doctors in any province except Northern Province (MEASURE Evaluation and EQUITY Project 2004; van Rensberg *et al.*, 2001).

Data and methods

Individual, household, and community-level data for this analysis come from the 1998 South African Demographic and Health Survey (SADHS). The DHS use a stratified multi-stage cluster sample design to collect a nationally representative sample of women of reproductive age (15-49). Questionnaire interviews are conducted with all eligible women in each sampled household to collect data on fertility, family planning, and child health, in addition to demographic and socioeconomic data. A full description of the study design can be found at http://www.measuredhs.com. The 1998 Eastern Cape Facility Survey (ECFS) collected information from 624 government clinics, which were selected on the basis of proximity to the Primary Sampling Units (PSUs) surveyed in the 1998 SADHS. PSUs are the enumeration blocks used in the sampling of the DHS and comprise twenty to thirty households. Detailed information was collected from interviews with nurses on staffing and recent staff training, supervision visits, availability of drugs, supplies and basic infrastructure, service availability, emergency services, transportation, and referrals. In terms of family planning services, information was collected on the number of family planning methods offered by the facility, whether each of the methods was in stock, and the training received by staff on family planning. The data from the 1998 ECFS was linked to the 1998 SADHS using the global positioning system coordinates for the facilities and households, such that each household was linked to the closest government clinic. Overall, 174 of the 624 clinics were linked to SADHS PSUs; the remaining clinics were located in areas that were not proximate to the populations for which information was collected in the SADHS.

The 1998 SADHS collected a sample of 11,752 women aged 15-49; the sample was restricted to women interviewed in the Eastern Cape Region (n=2756). Women who reported that they have not engaged in sexual intercourse (351), are currently pregnant (100), or are infecund (30) were excluded from the analysis, reducing the sample to 2275 women. Women from one PSU in which there was no available health facility data were also excluded, reducing the final sample size to 2262 women.

The dependent variable for analysis is given the binary code "1" if the woman reports current use of modern contraception (injection, oral pill, IUD, implant condom, female or male sterilization). The 1998 SADHS data set has a hierarchical structure, with women nested within households and households within PSUs, thus violating the assumption of independence of ordinary logistic regression models. A multilevel modeling technique was employed to account for the hierarchical structure of the data and to facilitate the estimation of community (PSU) level influences on contraceptive method choice. The multilevel modeling strategy accommodates the hierarchical nature of the data and corrects the estimated standard errors to allow for clustering of observations within units (Goldstein 1995). Multilevel models allow the identification of clustering in contraceptive method choice (also known as the random effect), providing a measure of how much the odds of reporting the use of each contraceptive catagory vary between communities. The multilevel models also control for a range of individual, household, health facility and community-level factors thought to influence the outcome. A multilevel logistic model was fitted to the binary outcome of contraceptive use, using the MLWiN software package (CMM 2007). The model is written:

$$Y_{ij} = \pi_{ij} + \varepsilon_{ij} Z_{ij}$$

11

where $\log_e(\pi_{ij}/(1-\pi_{ij})) = \alpha + \beta X_{ij}^T + U_j$. Y_{ij} is a binary outcome (reporting of modern contraceptive use) for individual i in PSU j, Y_{ij} are assumed to be independent Bernoulli random variables with the probability of the reporting of contraceptive use $\pi_{ij} = \Pr(Y_{ij} = 1)$. Consequently, to correctly specify the binomial variation, Z_{ij} denotes the square root of the expected binomial variance of π_{ij} , and the variance of the individual residual term ε_{ij} is constrained to be one. The outcome variable $\log_{e}(\pi_{ij}/(1-\pi_{ij}))$ fitted in the model is the \log_{e} odds of contraceptive use reported versus non-use. This constrained the predicted values from the model to be between zero and one. α is a constant, whilst β is the vector of parameters corresponding to the vector of potential explanatory factors defined as X_{ii} . The PSU (level 2) residual term is defined as $U_j \sim N(0, \sigma_u^2)$. A cumulative model building process is used. Model 1 includes only the random intercept term to identify the presence of community-level variation in contraceptive use. Models 2-5 add sequentially the health facility, community, household and individual-level variables, to examine how each of these groups of variables explains the residual community-level variation in contraceptive use.

The variables to be entered into the model are grouped into individual, household, health facility and community variables (Table 1). The choice of individual and household independent variables is informed by previous studies on the factors influencing contraceptive method choice. Table 1 shows all the health facility and community factors considered in the analysis, although only those that proved to be significantly associated with contraceptive method choice (Table 2) are presented in the final model. In terms of health facility characteristics, the analysis considered distance to the facility, staffing levels, staff training in family planning and reproductive health, availability of family planning and reproductive health services, and the presence of family planning methods. For community-level factors, the analysis considered levels of male and female education, levels of employment, community-level indicators of female autonomy, levels of child mortality, prevailing demographic behaviors, and community knowledge of family planning. Community-level factors are derived from individual data by aggregating individual responses to the PSU level without the index response. Interaction terms are tested between race and each of the community and health system variables to examine whether community influences on contraception vary by race.

Results

Significant community-level variation is present in contraceptive use, although the degree of variation declines substantially with the inclusion of health facility, community, household, and individual-level variables into the model (Table 3). In terms of health facility factors, the only variable that maintained significance in the final model was the mean distance to the nearest health facility. Unusually, an inverse relationship was found: women who lived further away from the health facility were more likely to be using a modern method of contraception. Three significant community-level effects were identified. Women living in communities where the ratio of men to women with primary education was higher were less likely to be using contraception. Conversely, women living in communities with a higher mean age at marriage and a higher percentage of women reporting recent physical violence from their partner were more likely to be using modern contraception. In terms of household-level factors, women living in larger households were less likely to be using contraception, while women living in wealthier households were more likely to be using contraception. None of the interaction terms tested between community and health facility variables and race was statistically significant.

Women living in urban areas, working outside the home, and having increased exposure to information on HIV/AIDS were more likely to be using contraception. Reporting of contraceptive use also increased significantly with educational attainment and parity. Relative to women aged 15-19, women aged 25 and above were significantly less likely to report contraceptive use. However, there was no significant difference in contraceptive use between women aged 15-19 and 20-24. White women were significantly more likely to report contraceptive use than Black women, and there was no significant difference in contraceptive use between Black and Colored women. Relative to single women, women who were widowed, divorced, or in a non-cohabiting union were less likely to use contraception. However, there was no significant difference in the reporting of contraceptive use between single women and women who were married or cohabiting. Women who reported that there partner disapproved of contraceptive use were less likely to use contraception than single women.

Discussion

The community and health facility variables included in the analysis do not fully explain the community-level variation in contraceptive use in Eastern Cape Province. The presence of community residual variation in contraceptive use has been shown in previous studies (Stephenson *et al.*, 2007; Amin *et al.*, 2002; Stephenson and Tsui 2002), and is often attributed either to factors that are not commonly collected in community surveys or less tangible factors that are difficult to quantify. The former may include the

14

presence of social networks that act as vehicles for the transmission of contraceptive knowledge in communities. Entwisle et al, (1996) found such networks to be an important force in explaining community variation in contraceptive use in rural Thailand, noting that social networks provide women with access to information on contraception and allow the transmission of positive attitudes towards contraception. However, social network data are absent from the SADHS (1998) data, thus the residual variation in contraceptive use may be a product of the presence of more cohesive social networks in some communities. Much of the community-level data used in the analysis was derived from individual responses. The residual variation in contraceptive use may reflect a lack of data that capture the structural elements of the community environment and are measured at the community level. For example, it seems plausible that community-level factors, such as the presence of employment opportunities or institutions that facilitate social interactions, may influence contraceptive use through providing access to economic and social resources. It is expected that the inclusion of data on these elements of the community environment would reduce the residual variation in contraceptive use.

Alternatively, factors that cannot be easily quantified in a survey may be driving the residual variation in contraceptive use. For example, beliefs surrounding contraceptive use that prevail within a community may be a strong influence on a woman's decision to adopt contraception. Previous studies have shown that women may choose to adopt a particular method as a result of the methods adopted by those in the community, and an individual's decision to adopt a modern method of contraceptive is strongly influenced by how she perceives other community members will judge her actions (Potter 1999; Rutenberg and Watkins 1997). The current analysis found no significant relationship between contraceptive use and the percentage of men or women in the community who approved of family planning, but perhaps these indicators are too crude to capture the complex community-level attitudinal forces that influence contraceptive use. Further work is needed to develop tools that can capture these elements of the community environment.

Disappointingly, only one health facility characteristic was significantly associated with contraceptive use. The analysis considered several dimensions of the health facility environment: the availability of services and family planning methods, levels of staffing and training, and the infrastructural capacity of the health facility. In earlier models, women who lived in communities where the health facility had a higher number of nurses present and a greater infrastructural capacity were more likely to use contraception. After the inclusion of all other variables, however, only women who lived further away from government clinics were more likely to be using contraception. This may reflect the targeting of family planning program efforts toward more remote areas, which are likely to have the greatest unmet need, through mobile clinics or community outreach services. The inclusion of only government health facilities in the ECFS (1998) may explain the health facility environment's inability to impact contraceptive use. The private sector serves approximately 15% of family planning users in South Africa, with higher levels of private sector utilization among the White and Asian populations (Swartz 2002). Gready et al., (1997) found that many South African women report negative experiences with government operated family planning services, and have greater confidence in services offered by the private sector. Thus, the data are not capturing the complete service environment in the community. It may be possible to explain the variation in contraceptive use with data representative of all family planning service providers.

The results also highlight the influence of expected gender roles and levels of female autonomy in shaping contraceptive use. The likelihood of contraceptive use increased in communities which had a higher mean age at marriage for women. These communities most likely provided alternative opportunities to marriage, such as education or employment, which consequently delayed marriage and also created knowledge of and demand for contraception. Marrying at an earlier age has been consistently linked to lower levels of female autonomy (UNICEF 2001), indicating that women may have higher levels of functional autonomy or decision-making power to adopt contraception in communities where women typically marry later. Conversely, women were less likely to use contraception in communities where a higher ratio of male to female primary education existed. This suggests a community may inhibit contraceptive use if it provides fewer opportunities for women to accumulate social capital. Interestingly, residence in a community in which a high number of women reported physical violence from a male partner was associated with a higher likelihood of contraceptive use. Previous studies have suggested that physical domestic violence is a deterrent to contraceptive use in South Africa. In a qualitative study from South Africa, Wood and Jewkes (1997) report that young women who attended family planning clinics often faced physical violence from their partners. This result may reflect women's reluctance to have children in a violent environment, with fears of unplanned pregnancies precipitating violence or of future violence towards the child. However, this unusual result warrants further investigation to determine the characteristics of communities with

17

high levels of domestic violence and how these characteristics may explain the observed relationship with contraceptive use.

At the individual level, there was a strong influence of race on contraceptive use. White women were more likely than Black African women to adopt contraception, a result that has been shown in many previous studies (Swartz 2002). However, race proved not to interact significantly with any of the community or health facility variables, suggesting that the community level influences on contraceptive use do not vary by race. This may be a result of the continued geographic segregation of races, a by-product of the Apartheid era that remains in South Africa. Significant interaction terms may be found in communities that contained variation in racial composition. For example, the influence of distance to health services as a barrier to contraceptive adoption on contraceptive use may vary for White and Black respondents in the same community, due to better socioeconomic conditions among Whites that include better transportation options, thereby making it easier for Whites to overcome distance to services. However, few of the communities in the data contained substantial variation in racial composition, limiting the ability to detect racial differences in community influences on contraceptive use.

The lack of data collected at the community-level and on non-governmental health facilities limit this study and reflect the continued presence of community-level variation in contraceptive use. This again highlights the need to incorporate communitylevel data collection activities into routine data collection efforts, which will further our understanding of the influences on contraceptive use that exist beyond the household.

Conclusion

The results highlight how aspects of the community can influence an individual's use of modern contraception. This knowledge can be used by program managers to shape the development of family planning provision and promotion programs. In particular, the results illustrate how female autonomy and expected gender roles in the community shape contraceptive use, demonstrating how communities with more opportunities for women to accrue social capital facilitate greater contraceptive adoption. Community-level interventions focused on family planning should target the structural elements of communities and the key actors in communities that currently inhibit women's autonomy. Such interventions should focus on providing opportunities for women to develop functional autonomy, for example, through employment and educational opportunities.

The exact mechanisms through which the significant community factors influence individual contraceptive behavior need to be identified through further in-depth qualitative and quantitative research. This study has, however, provided an important step toward our understanding of the numerous ways in which the contraceptive decisions made by an individual are influenced by the characteristics of the communities in which they live, and has provided new information on the synergistic effects of the community and health facility environments on contraceptive adoption.

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Table 1. Individual, Household, Community and Health Facility VariablesConsidered in the Analysis of Contraceptive Use

Characteristic	Operational Definition			
Individual				
Respondent's Age	Self-reported age in years: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49			
Parity	Self-reported number of children ever born: none, 1-2, 3-4, 5+			
Place of residence	Place of residence at time of interview: urban or rural			
Respondent's educational attainment	Self-reported highest level of education achieved: none, primary, secondary, higher			
Race	Self-reported race: White, Black African, Asian/ Indian, Colored			
Employment status	Respondent reports working outside the home: yes or no			
Marital status	Self-reported marital status at time of interview: single, married, cohabiting, widowed or divorced, or in a non-cohabiting union			
Spousal age difference	Calculated from respondent's reporting of her own and her husband's ages			
Exposure to HIV/AIDS information	A summative index of the number of sources from which the respondent reports she has heard of HIV/AIDS; radio, television, newspaper, pamphlet/ poster, clinic, friends, partner, or relative (range 0-8)			
Partners approval of family planning	Respondent's report of whether her partner approves of family planning: woman is single, current partner approves, current partner disapproves			
Household				
Household size	Self-reported number of people living in the household at the time of the interview			
Asset score	Summative index of ownership of household goods: piped water, electricity, flush toilet, radio, television, refrigerator, bicycle, motorcycle, car, formal floor material (vinyl, carpet, tile, concrete or wood), formal wall material (cement, corrugated iron/ zinc, brick); range 0-11			
Community				
Asset score	Mean asset score for all household in the PSU			
Spousal age difference	Mean spousal age difference for all respondents in the PSU			
Male to female primary education	Ratio of the number of men to the number of women in the PSU with primary education			
Male to female secondary education	Ratio of the number of men to the number of women in the PSU with secondary education			
Female employment	Percentage of women in the PSU who report working outside of the home			
Control of earnings	Percentage of women in the PSU who report controlling their earnings			

Age at marriage	Mean age at marriage for women in the PSU
Physical partner violence	Percentage of women in the PSU who report experiencing physical violence from their partners in the 12 months prior to the survey
Female approval of family planning	Percentage of women in the PSU who report that they approve of family planning
Male approval of family planning	Percentage of men in the PSU who report that they approve of family planning
Health Facility	
Distance to service	Distance in kilometers to the nearest government health facility
Presence of Doctors	Number of part-time and full-time doctors at the health facility
Presence of nurses	Number of part-time and full-time nurses at the health facility
Nurse posts filled	The proportion of nurse posts that are currently filled at the health facility
PHC training	The number of nurses with more than 6 months training in primary health care
Family Planning training	The number of nurses who have received training in family planning in the 12 months prior to the survey
Number of contraceptive methods available	The number of contraceptive methods in-stock at the time of the survey
Other reproductive health services	The number of reproductive health services offered at the clinic: pre-natal, post-natal and delivery care, STD and HIV diagnosis and counseling
Facility Assets	A summative index measuring the infrastructural capacity of the health facility: condoms available in reception, map of catchment area on display, adult scale, infant scale, telephone, fax machine, two-way radio, refrigerator, stethoscope, sphygmomanometer: range 0-10
Drugs available	Health facility has 14 commonly used drugs available: range 0-14

IndividualImage: Constraint of the second of th	Characteristic	Percentage	Mean (range)
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Partice approved 12.4	Partner disapproves	58.1	
	Partner approves	12.4	

Table 2. Distribution of Individual, Household, Community and Health FacilityVariables Significant in Models of Contraceptive Use

Household	
Household size Asset score	6.1 (1, 22) 3.5 (0, 11)
Community	
Male to famile primery education	0.23 (0, 1)
Male to female primary education	21.3 (16, 45)
Age at marriage	
Physical partner violence	0.05 (0, 1)
Health Facility	
Distance to service	53.1 (4.8, 400.6)
Nurse posts filled	0.74 (0, 1)
Facility Assets	7.2 (0, 10)

Table 3. Multilevel Logistic Model for Contraceptive Use among Sexually ActiveWomen aged 15-49 in Eastern Cape Province, South Africa

	Model 1	Model 2	Model 3	Model 4	Model 5
Health Facility					
Mean distance to nearest health facility		0.002 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)
Mean proportion of nurse posts that are currently filled		0.589 (0.184)	0.365 (0.173)	0.190 (0.166)	0.173 (0.181)
Mean asset score for health facilities		0.091 (0.045)	0.057 (0.042)	0.020 (0.040)	0.009 (0.043)
Community					
Ratio of men to women with primary education in the PSU			-1.067 (0.227)	-0.726 (0.217)	-0.521 (0.234)
Mean age at marriage for women in the PSU			0.059 (0.020)	0.041 (0.019)	0.047 (0.021)
% women in PSU who report physical violence from their partner in last 12 months			2.612 (0.909)	2.129 (0.885)	2.010 (0.0931)
Household Number of people currently living in household				-0.008 (0.016)	-0.044 (0.018)
Asset score				0.129 (0.021)	0.064 (0.029)
Individual Woman's age (15-19) 20-24 25-29 30-34 35-39 40-44 45-49					-0.301 (0.166) -0.411 (0.199) -1.057 (0.220) -1.252 (0.230) -1.609 (0.240) -2.250 (0.273)
Woman's education (None) Primary Secondary Higher					0.436 (0.242) 0.568 (0.247) 0.624 (0.315)
Parity (None) 1-2 3-4 5+					0.319 (0.148) 1.134 (0.178) 2.127 (0.226)
Marital status (Single) Married Cohabiting Widowed or divorced Non-cohabiting union					0.682 (0.773) 1.140 (0.797) -1.354 (0.247) -0.895 (0.250)

Place of residence (Rural) Urban					0.382 (0.192)
Race (Black) Colored White					-0.075 (0.240) 0.846 (0.357)
Employment status (Not working) Currently employed					0.331 (0.132)
Number of years age difference with spouse					-0.030 (0.015)
Number of sources from which heard information on HIV/AIDS					0.112 (0.022)
Woman's report of partner's approval of					
Partner disapproves Partner approves					-2.410 (0.774) -1.137 (0.762)
Community-level Random Intercept	0.638 (0.098)	0.557 (0.091)	0.394 (0.077)	0.293 (0.068)	0.290 (0.073)

* Results significant at the P<0.05 level are shown in italics.