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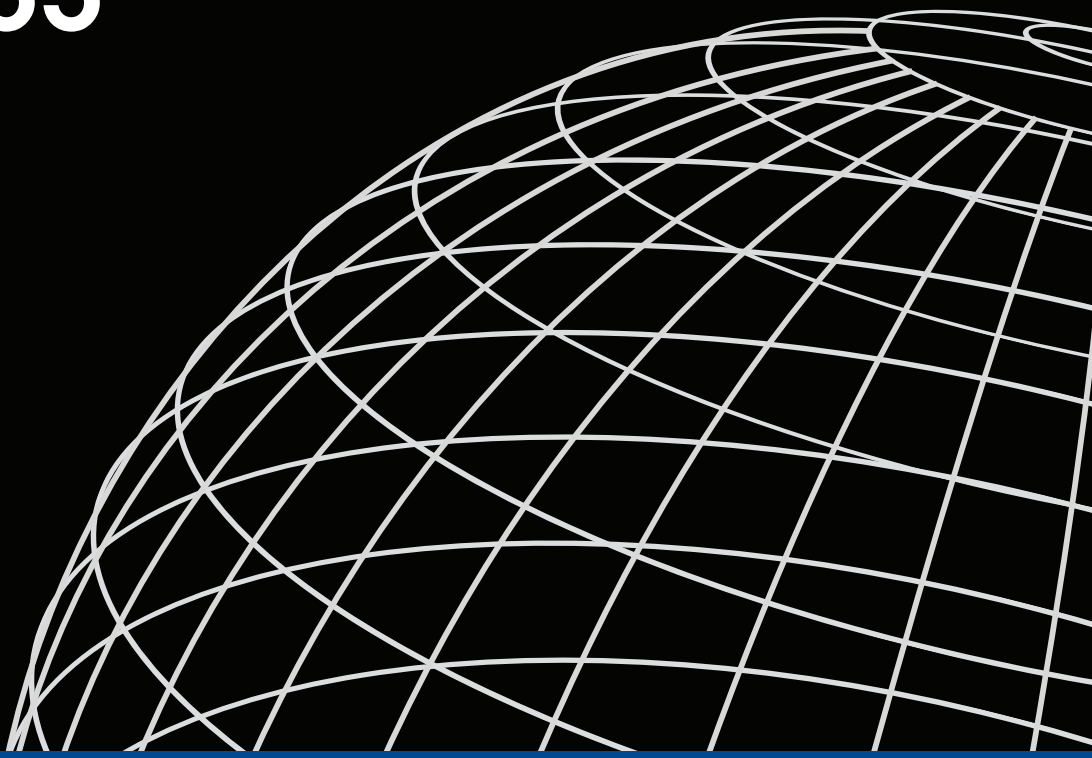

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Quality of Care in Family Planning Services at Health Facilities in Senegal

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Preface

The Demographic and Health Surveys (DHS) Program is one of the principal sources of international data on fertility, family planning, maternal and child health, nutrition, mortality, environmental health, HIV/AIDS, malaria, and provision of health services.

One of the objectives of The DHS Program is to analyze DHS data and provide findings that will be useful to policymakers and program managers in low- and middle-income countries. DHS Analytical Studies serve this objective by providing in-depth research on a wide range of topics, typically including several countries, and applying multivariate statistical tools and models. These reports are also intended to illustrate research methods and applications of DHS data that may build the capacity of other researchers.

The topics in the DHS Analytical Studies series are selected by The DHS Program in consultation with the U.S. Agency for International Development.

It is hoped that the DHS Analytical Studies will be useful to researchers, policymakers, and survey specialists, particularly those engaged in work in low- and middle-income countries.

Sunita Kishor
Director, The DHS Program

Abstract

Analysis of quality of care in family planning services in Senegal was conducted using data from two rounds of the Senegal Service Provision Assessment (SPA) surveys of 2012-2013 and 2014. The measures of quality of care were divided into structure (infrastructure of the facility and availability of commodities), process (provider's performance), and outcomes (client's overall satisfaction with services and knowledge of their method's protection from sexually transmitted infections [STIs]).

Findings revealed that most facilities have the basic infrastructure required (adequate sanitation, improved water, and private examination room). However, some facilities lack electricity, communication equipment, emergency transport, and computer and Internet. Some facilities perform better than others in availability of equipment and diagnostic tests, and some regions outperform others. The presence of several family planning commodities has improved significantly, and the presence of injectables and pills, the two most used methods, remains high, although they are much more likely to be available in public than private facilities.

The percentage of providers who offered various forms of counseling was relatively low. New clients were significantly more likely to receive counseling and a high-quality pelvic examination compared with returning clients. Although overall client satisfaction was relatively high (84 percent), only 58 percent of clients had correct knowledge of whether their method protects them from STIs. Counseling had a negative effect on overall client satisfaction and no effect on client's correct knowledge concerning protection from STIs, indicating a lack of effectiveness of counseling methods. Notably, clients who saw a provider trained in family planning in the last two years significantly increased their odds of having correct knowledge of their method's protection from STIs.

KEYWORDS: Quality of care, health facilities, SPA, SARA, counseling, family planning, client satisfaction, knowledge of method protection from STIs, Senegal

Executive Summary

Introduction

Senegal has shown increases in contraceptive use over the years, but modern contraceptive prevalence remains relatively low, at an estimated 20% of women in 2014, while total unmet need for family planning is higher, at an estimated 25%. One factor that could increase contraceptive prevalence and decrease the level of unmet need is improving quality of care in family planning services. Studies have supported the link between high quality of care and increased uptake and continuation of family planning use. The present analysis examines the quality of care in health facilities in Senegal, with a focus on family planning services. It assesses the structure, process, and outcome of the delivery of family planning services, as well as the facility, provider, and client characteristics that may be associated with quality of care.

Methods

Measures of quality of care in Senegal's health facilities were divided into three areas using the Donabedian framework (Donabedian 1988): structure (includes basic infrastructure, equipment, commodities); process (includes counseling and examinations by the provider); and outcome (measured by client overall satisfaction and correct knowledge on whether their method protects from sexually transmitted infections [STIs], including HIV/AIDS). The data used in the analysis are from the first two rounds (2012-2013 and 2014) of the Senegal Continuous Service Provision and Assessment (SPA) survey.

For the analysis of structure, indicators were selected using the WHO Service Availability and Readiness Assessment (SARA) indicator guideline. This guideline describes the equipment, diagnostic tests, and medicines that a facility should provide for quality services (both in general and service specific). In addition, a list of the basic requirements for providing family planning services was provided. The required services include family planning commodities (mainly contraceptive methods but also a device to take blood pressure), family planning guidelines, and at least one staff member trained in family planning. For the analysis of process, the counseling that was provided to family planning clients was examined, including counseling on how to use the chosen method, possible side effects, when to return to the facility, and the method's protection from STIs. In addition, the quality of pelvic examinations was assessed. The analysis of outcome used two measures: client's satisfaction with family planning services received and client's knowledge of whether their chosen method protected them from STIs.

Results

General Structure

The great majority of facilities appear to have an improved water source, adequate sanitation, and a private room for examination and/or consultations. However, electricity, communication equipment, emergency transport, and especially computer and Internet access were less available. In round 2, public and rural facilities had a significantly higher percentage of facilities with a high equipment score. All facility characteristics except managing authority in round 1 were significantly associated with the diagnostic test index. In both rounds, the categories of hospitals and health centers, private facilities, and urban facilities had higher diagnostic test scores compared with health huts, public facilities, and rural facilities.

Family Planning Structure

In round 2, contraceptive pills, progestin-only injectables, and male condoms were available in at least 80 percent of facilities. Other modern contraceptive methods were found in fewer facilities, although availability significantly increased from round 1 to round 2. The availability of combined injectables declined substantially between the two rounds. In both rounds, over 90 percent of the facilities had a blood pressure machine and had at least one staff member trained in family planning. However, only two-thirds of facilities in round 1 and three-fourths of facilities in round 2 had family planning guidelines.

In round 1, public facilities had 13 times higher odds of having injectables and 30 times higher odds of having combined oral pills compared with private facilities; in round 2, the odds were 18 times higher for injectables and 47 times higher for pills. For combined oral pills, both rounds showed significantly higher odds of having pills in health posts compared with hospitals. Urban versus rural location was not a significant covariate for availability of either method.

Process

The analysis showed that the level of counseling was inadequate. Only 18 percent of providers counseled their clients on all three items examined—how to use their method, possible side effects, and when to return. Just 9 percent of providers counseled on whether their client's method protects from STIs. Counseling was more likely to be provided to new than returning clients. Few provider characteristics studied were significant predictors of counseling, although providers with a monthly or daily salary had almost nine times higher odds of providing counseling on STIs compared with providers with no salary. Also, providers with the most supervision had almost three times higher odds of providing high-quality pelvic examinations compared with providers with no supervision.

Outcome

About 8 in every 10 clients reported being very satisfied with family planning services, but fewer had correct knowledge of whether their method offered protection from STIs. Clients with a lower level of education, clients who did not have to wait to see a provider, and clients who left the facility with a family planning method had significantly higher odds of being very satisfied compared to their respective reference categories. Few provider characteristics were significant predictors of client satisfaction. However, providers with less education had higher odds of client satisfaction compared with providers with the most education.

Counseling on side effects and when to return to the facility showed a significant negative effect for client satisfaction: clients who did not receive such counseling were more likely to be very satisfied with services than clients who received counseling—perhaps a sign that client counseling was ineffective. Clients who saw a nurse or nurse's assistant had almost twice the odds of having correct knowledge of their method's protection from STIs compared with clients who saw a midwife or other provider. Clients who saw a provider with family planning training in the past 24 months had 1.7 times higher odds of having correct knowledge about protection from STIs compared with clients who saw a provider with no recent training. Whether or not the client received counseling from a provider on their method's protection from STIs was not a significant predictor of having correct knowledge.

Conclusions

The results indicate that improvements are required in some areas of structure, level and effectiveness of counseling and medical examinations, and outcome of client's knowledge of their method's protection from STIs. The availability of several modern contraceptive commodities in health facilities increased significantly between the two SPA rounds, but the availability of some basic infrastructure components did not improve significantly. The percentage of providers offering family planning counseling to their clients was relatively low, and the effectiveness of the different forms of counseling was not seen in the outcomes of client overall satisfaction and client knowledge of their method's protection from STIs. The results of the analysis identify the providers, facilities, and regions where interventions are likely to improve quality of care for clients of health care facilities in Senegal.

1. Introduction and Rationale

Providing high quality of care, whether preventive or curative, improves the overall health and wellbeing of a population. Improving general health care services, including family planning services, can increase contraceptive use and reduce fertility rates (Creel, Sass, and Yinger 2002). Basic infrastructure is required to have a functioning facility. A number of studies have found that high quality of care in family planning is associated with an increased uptake and continuation of family planning use (Arends-Kuenning and Kessy 2007; Blanc, Curtis, and Croft 2002; Jain 1989; Koenig, Hossain, and Whittaker 1997; Magnani et al. 1999; Mariko 2003; Mensch, Arends-Kuenning, and Jain 1996; Sanogo et al. 2003). Exploring the covariates associated with quality of care in family planning services can help identify areas that require further attention and improvement.

This analysis was conducted on the Senegal Service Provision Assessment (SPA) surveys of 2012-2013 and 2014, using data obtained mainly from inventory, observation, and exit interviews conducted in a sample of formal health care facilities in Senegal. The analysis examined quality of care in health facilities' structure, health providers' processes, and clients' outcomes, using the Donabedian framework for measuring quality of care (Donabedian 1988). The literature review presented here begins with background on Senegal and the Senegalese health system and is followed by a brief review of quality of care and how it can be assessed.

1.1. Literature Review

1.1.1. Setting

Located in West Africa, Senegal has an estimated population of 13.5 million, as of 2013, and a land area of 196,722 square kilometers, with 700 kilometers of coastline (Agence Nationale de la Statistique et de la Démographie (ANSD) [Senegal] and ICF International 2015). There are 14 administrative regions: Dakar, Ziguinchor, Diourbel, Saint-Louis, Tambacounda, Kaolack, Thiès, Louga, Fatick, Kolda, Matam, Kaffrine, Kédougou, and Sédhiou. Dakar is the capital, and other major cities include Pikine, Guédiawaue, and Mbao. The country is highly urbanized, with 23 percent of the population living in Dakar, which constitutes only 0.3 percent of the country's land area (Agence Nationale de la Statistique et de la Démographie (ANSD) [Senegal] and ICF International 2015).

Senegal's population has a high percentage of youth, with over 50 percent under age 20 (Table 1). This is due to a high fertility rate, which has only decreased slightly, from a total fertility rate (TFR) of 6.0 in 1992 to 5.0 in 2014 (Table 1). Contributing to high fertility are early marriage and low levels of contraceptive use, although both indicators have improved over time. Modern contraceptive prevalence increased from 5 percent in 1992 to 20 percent in 2014. Senegal has made fertility reduction one of its priority areas in the National Health Development Program (PNDS) for 2009-2018 (Ministère de la Santé et de la Prévention 2009). The challenges that Senegal faces in increasing levels of contraceptive use include clients' concerns about side effects, cost of contraception, poor quality of family planning services, and supply stockouts (Cleland et al. 2006; Sedgh et al. 2007; Sidze et al. 2014). In addition, myths, misperceptions, and lack of knowledge still exist about family planning methods and reproductive health (IntraHealth International (a) 2012; Katz and Nare 2002).

Other priority areas of the Senegal National Health Development Program are improving access to good-quality health care and reducing maternal and child mortality. Infant mortality rates in Senegal have almost halved, from 68 deaths per 1,000 births in 1992-1993 to 33 in 2014, still relatively high. The maternal mortality ratio was estimated at 392 maternal deaths per 100,000 births by the 2010-2011 Multiple Indicator Cluster survey (Agence Nationale de la Statistique et de la Démographie [Senegal] and

ICF International 2012). This translates into a Senegalese woman having a risk of approximately 1 in 43 of dying due to a maternal cause in her childbearing years (Agence Nationale de la Statistique et de la Démographie [Senegal] and ICF International 2012). Indicators related to reducing mortality rates, such as making more than four antenatal care visits, delivering in a health facility, and obtaining the recommended childhood vaccinations, have improved since 1992 (see Table 1).

Table 1. Selection of estimated population and health indicators for Senegal from six DHS surveys from 1992 to 2014

	1992-1993	1997	2005	2010-2011	2012-2013	2014
Population						
% population age 0-14	48.1	47.6	44.6	44.8	44.2	44.8
% population age 15-19	10.2	10.5	11.1	9.8	10.6	9.9
% population over age 6 with secondary or higher education (male)	11.1	-	14.7	19.5	19.4	20.8
% population over age 6 with secondary or higher education (female)	5.4	-	8.9	13.5	14.1	15.8
Fertility and family planning						
TFR (3 years preceding survey)	6.0	5.7	5.3	5.0	5.3	5.0
Current use of modern contraceptive method (women in union)	4.8	8.1	10.3	12.1	16.1	20.0
Total unmet need	28.8	35.0	32.0	30.1	29.3	25.1
Median age at first marriage (among women age 25-49)	16.2	17.4	18.3	19.3	19.3	19.8
Maternal care						
Antenatal care visits 4+ (births in 5 years preceding survey)	13.3	16.6	39.8	50.0	46.5	48.1
Health facility place of delivery (births in 5 years preceding survey)	46.9	48.0	61.8	72.8	71.3	76.9
Child health and child mortality						
Total vaccination	49.1	-	58.7	62.8	70.2	73.7
Stunted	29.1[1]	-	19.6	26.5	18.7	18.7
Underweight	17.8[1]	-	8.5	10.1	15.7	12.6
Wasted	9.2[1]	-	14.2	17.7	8.8	5.9
Infant mortality rate (5 years preceding survey)	68.0	68.0	61.0	47.0	43.0	33.0

Source: DHS data, DHS final reports, and STATcompiler

[1]These estimates are only for children of interviewed mothers. In the remaining years, all children in the household were measured for height and weight to obtain these estimates. The 1997 Senegal DHS did not include height and weight measurements of children.

1.1.2. Senegalese Health System

The health care system in Senegal is organized in a pyramid design, with hospitals representing the top of the pyramid followed by health centers and finally health posts and huts at the lower level (IntraHealth International (b) 2012). Each health post can have a number of health huts that it supervises. As of 2014, Senegal had 86 hospitals, 242 health centers, 1,250 health posts, and 1,506 health huts (Agence Nationale de la Statistique et de la Démographie (ANSD) [Senegal] and ICF International (b) 2015). In addition to the public health sector, private for-profit and nonprofit entities, as well as the Senegal armed forces, provide health care at each level of the pyramid (Tine et al. 2014). In 2009 the government began to enact

a “National Health Plan” (Plan National de Développement Sanitaire et Social du Sénégal [PNDS] 2009-2018), which describes a strategy for improving the health of the population (IntraHealth International (b) 2012; Ministère de la Santé et de la Prévention 2009). The plan places emphasis on improving maternal and child health through decreased total fertility. It seeks to guide Senegal toward a higher quality of health services through strengthening human resources and management, improving infrastructure, and increasing availability of commodities (IntraHealth International (b) 2012; Ministère de la Santé et de la Prévention 2009).

1.1.3. Quality of Care

Numerous studies have attempted to describe and assess quality of health care (Aldana, Piechulek, and Al-Sabir 2001; Basinski et al. 1992; Bruce 1990; Caper 1988; Choudhry, Fletcher, and Soumerai 2005; Donabedian 1988; Mosadeghrad 2012; Shaikh et al. 2008); however, there does not appear to be a consensus in the literature on how to define or measure quality of care (Basinski et al. 1992). The definition and measurement of quality of care also depend on the stakeholders’ priorities, whether from the perspective of clients, health professionals, or providers, researchers, program managers, or policymakers (Conry et al. 2012; Creel, Sass, and Yinger 2002).

One of the widely used and referenced frameworks used to measure quality of care in health care is that of Donabedian (Donabedian 1988), who classified quality of care in three dimensions: structure, process, and outcome. Structure is mainly concerned with the physical attributes of a health facility, its infrastructure, inventory, and equipment, as well as the number of qualified personnel. Process refers to health care delivery, both technical and interpersonal, while outcome examines the effect of care on the patient and includes client’s satisfaction with health care services received (Donabedian 1988).

Other authors have looked at other dimensions of quality of care, but most can be included within structure, process, or outcome. For example Caper (Caper 1988) stated that efficacy, appropriateness, and caring should be used to asses qualify of care. The appropriateness and caring aspects could be considered part of the process component, as they cover how care was delivered by the health professional, from both technical and interpersonal perspectives. Caper referred to the outcome component as ‘efficacy’ and defined it as whether the diagnostic or therapeutic procedure accomplished its goal (i.e., was the outcome successful?). The suggested measurements for this component were mortality rates or severity of illness, and client satisfaction with services (Caper 1988).

Many other articles discuss process as important to the assessment of quality of care, referring to it variously as professional competence, the technical component, effectiveness, the personal relationship, a generic quality, or an intangible attribute, among other terms (Basinski et al. 1992; Joss and Kogan 1995; Mosadeghrad 2012; Parasuraman, Zeithaml, and Berry 1985; Zyzanski, Hulka, and Cassel 1974).

Concerning measurement of outcome, (Basinski et al. 1992) discussed how a cause-effect measurement of the medical outcome can be affected by many complex patient variables, such as coexisting medical conditions and psychological and socioeconomic factors, which can make this measurement difficult. “Excellent outcomes may be expected but cannot be assured, even with exemplary delivery of care” (Basinski et al. 1992, p2155). An alternative is using patient satisfaction as a measure of outcome. However, Donabedian warned that asking patients about their satisfaction with specific attributes of care as well as the interpersonal relationship with their provider may result in misreporting due to the patient’s reluctance to alienate their medical providers (Donabedian 1988). Another outcome measure can also be the knowledge gained by the client following a specific service (Bruce 1990; Donabedian 1988). This may also reflect the interaction with the provider and whether the provider was effective in transferring certain vital information regarding the service in question (Bruce 1990), for instance the use of a family planning method or knowledge of protection from sexually transmitted infections (STIs).

Structure is the most straightforward component of quality of care to assess and measure. This component can be seen as service availability and the readiness of the health facility as defined by the World Health Organization (WHO) Service Availability and Readiness Assessment (SARA) indicators (O'Neill et al. 2013). The SARA indicator guidelines also provide a set of indicators that are service specific (antenatal care, family planning, child curative services, etc.) to determine whether a health facility has met the minimum criteria for provision of the specific service in question (O'Neill et al. 2013). These indicators mainly involve assessing the availability of trained staff, relevant up-to-date guidelines, functioning equipment, diagnostic capacities, and essential medicines and commodities.

1.1.4. Quality of Care in Family Planning

The quality of family planning services is an important determinant of the uptake and continuation of contraceptive methods. Studies in various settings have reported a significant positive relationship between quality of family planning services and use of contraceptives (Arends-Kuenning and Kessy 2007; Blanc, Curtis, and Croft 2002; Jain 1989; Koenig, Hossain, and Whittaker 1997; Magnani et al. 1999; Mariko 2003; Mensch, Arends-Kuenning, and Jain 1996). A panel study in Senegal found that women who received good quality family planning services in health facilities were 1.3 times more likely to be using a contraceptive method compared with women who received poor quality of care (Sanogo et al. 2003).

Analyzing data from DHS and SPA surveys in Tanzania, (Arends-Kuenning and Kessy 2007) found that information given to clients and the provider's technical competence were significant predictors of modern contraceptive use. A longitudinal study in the Philippines found strong evidence of increased contraceptive use with improved quality of family planning services (RamaRao et al. 2003). The authors found that the probability of modern contraceptive use was 55 percent for clients who received low-quality care, 62 percent for medium-quality care, and 67 percent for high-quality care. An analysis of DHS data from 15 countries found that, within a year of starting use of a method, between 7 and 27 percent of women discontinued the method for reasons related to the quality of the service environment (Blanc et al. 2002).

Given the importance of quality of care, it is essential to use reliable methods to measure it. Two frameworks have been widely used to guide the research on quality of family planning services. One is Avedis Donabedian's structure-process-outcome framework, discussed previously (Donabedian 1988). The other is Judith Bruce's quality framework (Bruce 1990). The framework consists of six elements: choice of methods, information given to clients, technical competence of providers, provider-client interpersonal relations, mechanisms for encouraging continuity and follow up, and appropriate constellation of services.

In Donabedian's framework, family planning structure refers to the basic infrastructure and management system for family planning service delivery, including physical infrastructure (access to electricity, improved water source, adequate sanitation facilities, etc.); availability of contraceptive commodities, materials, and equipment essential for providing physical examination; and counseling services, as well as supportive management practices, such as regular supervision and in-service training for providers (Agha and Do 2009; Donabedian 1988; Ndhlovu 1995). Process refers to how the family planning services are delivered and whether the provider adheres to the standards of care. The provider's technical competency and the provider-client interpersonal relationship are often examined in assessing process (Agha and Do 2009; Hutchinson, Do, and Agha 2011). The outcome aspect in family planning can be measured by the acceptance of contraception and whether the reasons for continuation or discontinuation are related to the quality of services (RamaRao et al. 2003). With increased focus on client-centered health services, client satisfaction is also an important outcome indicator of quality of care. In addition to assessing individual dimensions of the quality of care, studies commonly have examined correlations among the dimensions,

especially how structure and process are associated with outcome measures. The general finding from these studies is that process attributes are more predictive of outcome indicators than structural attributes (Hutchinson 2011, Wang et al. 2013, Agha and Do).

Bruce's framework focuses on the process of service provision and highlights the client's perspectives and experiences (Strobino, Koenig, and Grason 2000). Bruce linked the six elements of quality to three types of outcomes: client knowledge, satisfaction, and contraceptive use behavior (Bruce 1990). Based upon this framework, the EVALUATION Project working group developed a list of quality indicators measuring each dimension (Bertrand, Magnani, and Rutenberg 1994). While many of the indicators can be obtained by either interviewing clients or observing the provider-client interactions, Bessinger and Bertrand suggested a combination of observations and client exit interviews to better assess quality of care in family planning facilities (Bessinger and Bertrand 2001).

2. Data and Methods

2.1. Senegal Continuous SPA Survey

Service Provision Assessment surveys provide detailed information on how a country delivers services, and are conducted by taking a national sample of formal health care facilities in the country. The Senegal Continuous Survey project contains a SPA component and a DHS component and is designed to have five annual rounds of data collection, with the last round in 2017. The Senegal SPA survey produces indicators that are representative at the national level, by facility type, managing authority, and the 14 regions of the country. Each round covers a representative sample of health facilities, including 50 percent of hospitals and health centers and 20 percent of health posts and a sample of their associated health huts (Agence Nationale de la Statistique et de la Démographie [Senegal] and ICF International 2014). Health facilities selected in the first round were not selected in the second round, creating a dependent sampling structure between the two rounds. The first two rounds comprise a census for hospitals and health centers but not for health posts or health huts. A census for all facility types would only be achieved after combining all five phases of the Continuous SPA.

The analysis uses data from the first two rounds of the Senegal Continuous SPA, round 1 in 2012-2013 and round 2 in 2014. The description of the sample of health facilities for rounds 1 and 2, excluding the health huts, is found in Table 2 in the Results Section.

The selection of health huts is different from other types of facilities. Among all health huts associated with a sampled health post, one health hut is randomly selected. Not every health post sampled supervises a health hut. In 2012-2013, 74 health huts were examined, while in 2014 this number increased to 89. The sampling methodology used to select the health huts does not allow analysis with the other health facility types, since the probability of selection for health huts depends on that of the health posts. Therefore, health huts were excluded from the overall sample and, when applicable, were analyzed separately.

In both rounds of the Senegal Continuous SPA used in the analysis, a health facility inventory was conducted that includes information about the infrastructure, equipment, commodities, and medicines that are necessary for providing priority services. When applicable, the inventory questions include observing the presence of the item and whether it is functioning (for equipment), or still valid (for medicines and commodities). Separate and reduced inventory and health worker questionnaires were used for health huts.

The other types of data collected in the SPA include the observation checklist and client exit interviews, as well as interviews with health providers. Health workers were selected and interviewed with a questionnaire that covers information about the workers, including their qualifications, training, and the

type of services they provide. The observation checklist has both technical aspects, such as adherence to international protocols, and nontechnical aspects, such as the level of counseling provided. At the end of the observation, the clients were interviewed to assess their level of satisfaction with the services and the health facility in general. In addition, the client's knowledge of the services and counseling offered was examined.

The two rounds of the Senegal Continuous SPA survey differ in the type of observations and exit interviews conducted. In the 2012-2013 SPA, the observation and exit interviews were conducted for family planning and child curative services, while in the 2014 SPA the observation and exit interviews were conducted for antenatal care and child curative services. Therefore, while comparisons can be made between the two rounds from data obtained from the inventory and health provider questionnaires, comparisons cannot be made from data from the family planning observation checklist and exit interviews. Health huts did not have observation checklists or exit interviews.

To select a sample for observation of family planning services, family planning clients were systematically selected if there were clients waiting to be seen. Otherwise, clients were selected for observation as they arrived. A general rule is to observe the consultations for a maximum of three providers of family planning services. For each selected provider, a maximum of five consultations were observed on the day of the assessment. All family planning clients whose consultations were observed were eligible for the exit interview. In addition, a sample of health workers was selected for conducting the health provider interviews, which elicit information on the provider's background characteristics. In facilities with eight or fewer providers, all providers were eligible for interview. In facilities with more than 8 providers, between 8 and 15 providers were selected for interviewing, in a systematic sample. Providers whose consultations were observed and providers who were respondents for the entire inventory questionnaire or parts of it were automatically selected for the health worker interview.

2.2. Methods

2.2.1. Construction of Variables

Following the Donabedian framework (Donabedian 1988), three types of dependent variables were constructed to represent the three components of quality of care: structure, process, and outcome. Structure was measured with facility inventory data. Dependent variables were constructed for general structure and more specific dependent variables for family planning structure. The process and outcome dependent variables only focused on measuring family planning quality of care; the data required to construct these variables came from observations and client exit interviews for family planning. Therefore these variables were only available for the 2012-2013 SPA, since the 2014 SPA did not have observation and exit interviews for family planning. For each component of quality of care, the appropriate independent variables were used to describe associations and/or perform regressions in order to identify the determinants of quality of care.

2.2.1.1. General Structure Variables

The WHO Service Availability and Readiness Assessment (SARA) was used as a guide to construct the structure quality of care indices (World Health Organization (WHO) 2013), which represent the structure dependent variables. This reference provided a list of indicators, both general and service specific, required to provide the necessary quality of care. These include indicators on the infrastructure, equipment, diagnostic tests, commodities, and medicines of health facilities.

Appendix A summarizes the infrastructure indicators and covers the availability of the basic infrastructure required for a functioning health facility—access to electricity, improved water source, adequate

sanitation facilities, communication equipment, private room, computer and Internet access, and an emergency transport vehicle. These indicators were examined separately for each survey round.

To examine the availability and readiness of the facilities in terms of equipment, diagnostic tests, and medicines, a number of indicators were required, as Appendix B shows. Principal component analysis (PCA), a data reduction method, was used to create a composite index for each of these areas. PCA based on DHS data is routinely used to construct the wealth index. This method has been criticized because the PCA technique, designed for use with continuous normally distributed data, is being applied to binary or categorical data (Howe, Hargreaves, and Huttly 2008; Sharker et al. 2014). However, alternative methods that may be more appropriate for categorical data, such as multiple correspondence analysis, are more complex and do not provide much improvement (Howe, Hargreaves, and Huttly 2008). Therefore, PCA was seen as an appropriate method to create service readiness indices in a manner analogous to the construction of the wealth index. To improve the results produced from PCA and to reduce misclassification, Sharker et al. (2014) recommend removing negative loadings. In addition, they recommend that any PCA that produces a first component explaining less than 30 percent of the total variation be interpreted with caution. These recommendations were considered in the construction and interpretation of the composite indices. To perform the PCA, each indicator was coded as a binary variable for having the item/service or not. The first PCA was then performed, and any indicators that produced negative loadings or loadings below 0.1 were removed. Then PCA was conducted again. The first component of the second analysis, which explains the highest percent of the variance in the data, was then used to produce a composite score or index. The composite index was then divided into terciles to represent low, medium, and high quality of care for the respective area.

Appendix B summarizes the indicators used for constructing the composite indices for equipment, diagnostic tests, and medicines. For the diagnostic test and medicine indices, no indicators showed any negative loadings or loadings below 0.1. For the equipment index, however, the indicators for sharps and waste disposal produced negative loadings in both rounds and were therefore removed from the PCA. The resulting first component from the analysis of equipment and diagnostic test explained more than 30 percent of the variance in both rounds. The PCA for medicines in the first round did not produce any negative loadings or loadings below 0.1; however, in the second round the medicine Simvastatin had a negative loading, and the medicines Amitriptyline and Amlodipine both had loadings below 0.1. In order to have comparable results, these three medicines were dropped from the PCA in both rounds. These medicines were not present in high percentages in the facilities. The resulting PCA for medicines was less than 30 percent in both rounds, and, therefore, the interpretation and analysis of this index should be interpreted with caution. As Appendix B shows, Cronbach's alpha for each of the indices was above 0.7 and thus shows general agreement in the grouping of the indicators.

2.2.1.2. Family Planning Structure Variables

To assess the readiness of health facilities for providing family planning services, the analysis used a number of indicators from the WHO SARA guide for family planning services. These indicators include availability of various types of modern contraceptive methods, a family planning guideline, a functioning blood pressure machine, and at least one staff member in the facility with family planning training. For the availability of modern contraceptive methods, only methods that were found to be valid and not expired were considered as having the method available in the facility. Figure 1 summarizes these indicators for both rounds among facilities that offer family planning services. The health provider data were used to construct the training variable. In round 1, the question on training asked the providers if they had family planning training in the past two years, while in round 2 the question was for family planning training in the past three years. This difference is minor but should be taken into consideration when interpreting the results from Figure 1 and Table 10.

Only the variables for availability of progestin-only injectables and combined oral pills were selected for further analysis of family planning structure among facilities that provided family planning services. Progestin-only injection was found to be the method most used by the clients, and combined oral pills was second in popularity (see Results, Table 11). These were also the top two modern methods according to the most recent Senegal DHS household survey (Agence Nationale de la Statistique et de la Démographie (ANSD) [Senegal] and ICF International 2015).

2.2.1.3. Covariates for structure

The covariates used to study quality of care for structure (both general structure and family planning structure) are found in Table 2. These variables were chosen to identify the characteristics of the health facility most associated with improved quality of care. For the managing authority variable, the private category includes health facilities managed by NGOs or religious-based organizations. The region variable was constructed as follows: North (regions of Louga, Matam, and Saint Louis); Dakar; Thiès; Central (regions of Diourbel, Fatick, Kaffrine, and Kaokack); East (regions of Kédougou and Tambacounda); and South (regions of Kolda, Sédhiou, and Ziguinchor).

2.2.1.4. Process Variables

Data for the analysis of the process component of quality of care came from direct observations of family planning consultations and physical examinations. The process assessment focused on the quality of counseling and the appropriateness of procedures during the pelvic examination. There was only one male in the observation sample; therefore, the analysis was restricted to female clients who were provided or prescribed a method during the observed visit. The quality of counseling was measured with four binary indicators on the content of information exchanged between the provider and the client during the counseling session: whether the provider counseled on how to use the method; whether the provider discussed side effects of the method; whether the provider gave advice on when to return for follow-up services; and whether the provider counseled about method protection from STIs. These indicators were defined specifically for the method provided or prescribed to the client (see Appendix C). To assess the overall quality of counseling, a binary variable was also created for all methods used, based on whether the client was counseled on all three aspects about the method: how to use it, side effects, and when to return to the facility.

To measure the quality of pelvic examinations, the number of appropriate procedures performed by the provider was first calculated based on a checklist of the procedures that should be performed before, during, and after a pelvic examination (see Appendix D). A binary quality indicator was then constructed using the median number of procedures as the cutoff point. A client was considered to have received a high quality of pelvic examination if the number of procedures she received was at or higher than the median level; otherwise she was considered to have received a low quality of pelvic examination. This indicator was only available for women who received a pelvic examination during the visit.

2.2.1.5. Outcome Variables

Two dependent variables were used to study the outcome component of quality of care in family planning. The first variable used a question in the family planning client exit interview that asks clients about their overall satisfaction with the services provided. The categories for response were: (1) very satisfied, (2) more or less satisfied, and (3) not satisfied. To create a binary dependent variable, the response “more or less satisfied” was combined with “not satisfied.” The second outcome dependent variable, also a binary variable, examines the knowledge of the client after receiving services, and is derived from a question asked during the family planning exit interview. The question asks the client if their method protects them from STIs, including HIV/AIDS. The method the client was using was determined from the observation of the family planning consultation, during which the method or

methods provided or prescribed to the client were recorded. Clients who answered yes and who were not using condoms (only two observations) were coded as having incorrect knowledge, those who answered no were coded as having correct knowledge (unless they were using condoms), and those who answered that they did not know were removed from the analysis. The analysis of the satisfaction outcome was restricted to users of pills, injectables, IUDs, and implants (all users except for 10 cases), and the analysis of the knowledge outcome was restricted to all users. This was because two variables on counseling required in the satisfaction outcome analysis were only available for users of pills, injectables, IUDs, and implants. All the outcome analyses on quality of care were restricted to female clients.

2.2.1.6. Covariates for Process and Outcome

Table 11 shows all of the independent variables used for the analysis of process and outcome. The independent variables are divided into three groups: the background characteristics of the client, the provider, and the facilities. The managing authority variable (private or public) used to describe facilities was not included in the analysis of process or outcome, since only 17 observations and exit interviews were in private health facilities, after selecting users of a modern contraception method. The appropriate independent variables were selected for each process and outcome dependent variable. The provider's characteristics were drawn from the health provider interview. The client's characteristics were taken mainly from the client exit interviews, except for client status (new or returning client), family planning method used, and whether the client left the clinic with a method, which were drawn from the observation of the family planning consultation.

For client's age, 52 clients who responded that they do not know their age were placed with the oldest group, age 40-58, on the assumption that the oldest were least likely to know their age. Similarly, 21 clients who responded that they did not know how long they waited to see a provider were placed with the largest waiting category of two hours or more, on the assumption that clients who had to wait very long might not remember exactly how long they waited. As for the provider characteristics, only eight specialists and general physicians (four if we select for current users of a modern method) were observed, and these were placed within the nurse or nurse assistant category. One important characteristic was personal supervision that the provider received during the six months before the survey. It refers to technical support or supervision from a facility-based supervisor or from a visiting supervisor in various forms, including review of records or reports, observation of work, feedback on work performance, and discussion of problems encountered by the provider. A three-category variable was constructed to measure personal supervision: received none, received one to five supervisory items, and received all six listed supervisory items.

For process analysis, the independent variables included the client's background characteristics (age, education, new or returning, and contraceptive method used), the provider's background characteristics (provider category, years of education, training received, supervision, having a job description, and salary type), and the facility characteristics (health facility type, locality, region, and the equipment composite index created from the PCA). Years of education received was used as a proxy for the number of years of experience (Choudhry, Fletcher, and Soumerai 2005). In addition, the variable salary type was included as a measure that might influence the provider's motivation, which in turn could affect their performance (Rowe et al. 2005). The facility characteristics, and specifically the equipment composite index, represent the structure component, which was discussed by Basinski et al. and Donabedian (Basinski et al. 1992; Donabedian 1988) as possible predictors of the process component of quality of care. While the presence of equipment in a facility may not necessarily have a direct effect on the process or the provider's level of care, it may serve as a proxy for the overall environment and readiness of the facility, and is included as a predictor of the process quality of care for this purpose. The diagnostic tests composite index could not be included, as it was highly correlated with facility type, while the medicine composite index was not recommended for use in further analysis because it explained less than 30 percent of the variance.

Outcome analysis of client's overall satisfaction included the client variables of fee paid for service, waiting time, and whether the client left with a family planning method (Agha and Do 2009; Aldana, Piechulek, and Al-Sabir 2001; Hutchinson, Do, and Agha 2011). In addition, the process dependent variables were included as covariates. These included variables based on providing counseling on how to use the method, the side effects of the method, and when to return if side effects appeared. Counseling on side effects and counseling on when to return were highly correlated with each other and therefore were not included in the same regression model. These variables were only asked of user of pills, injectables, IUDs, and implants and not all users (difference of only 10 cases). The facility characteristics and the equipment composite index were also added as covariates in the outcome analysis.

Finally, for the outcome analysis of knowledge of the method's protection from STIs, a variable representing whether the provider provided counseling on this issue was included as a covariate. The covariates used for the outcome satisfaction analysis, such as fee paid for service, waiting time, whether the client left with a method, other counseling process variables, and the structure composite indices were not included, as these do not have a direct pathway to this outcome.

2.2.2. Analyses

For the structure analyses, comparisons between the two survey rounds were conducted when possible. This involved testing whether the differences in the proportions of services offered, basic infrastructure, and family planning structure indicators were significant. A separate but similar analysis was conducted for health huts. Due to the dependent sampling structure between the two survey rounds, a conservative 1 percent significance level was used for testing the differences between the rounds. This is due to the underestimation of the standard errors of the estimates. The standard test assumes independence, whereas the two samples were actually dependent. Therefore, to be conservative, a lower level of significance was used. Only p-values below 0.01 were considered significant.

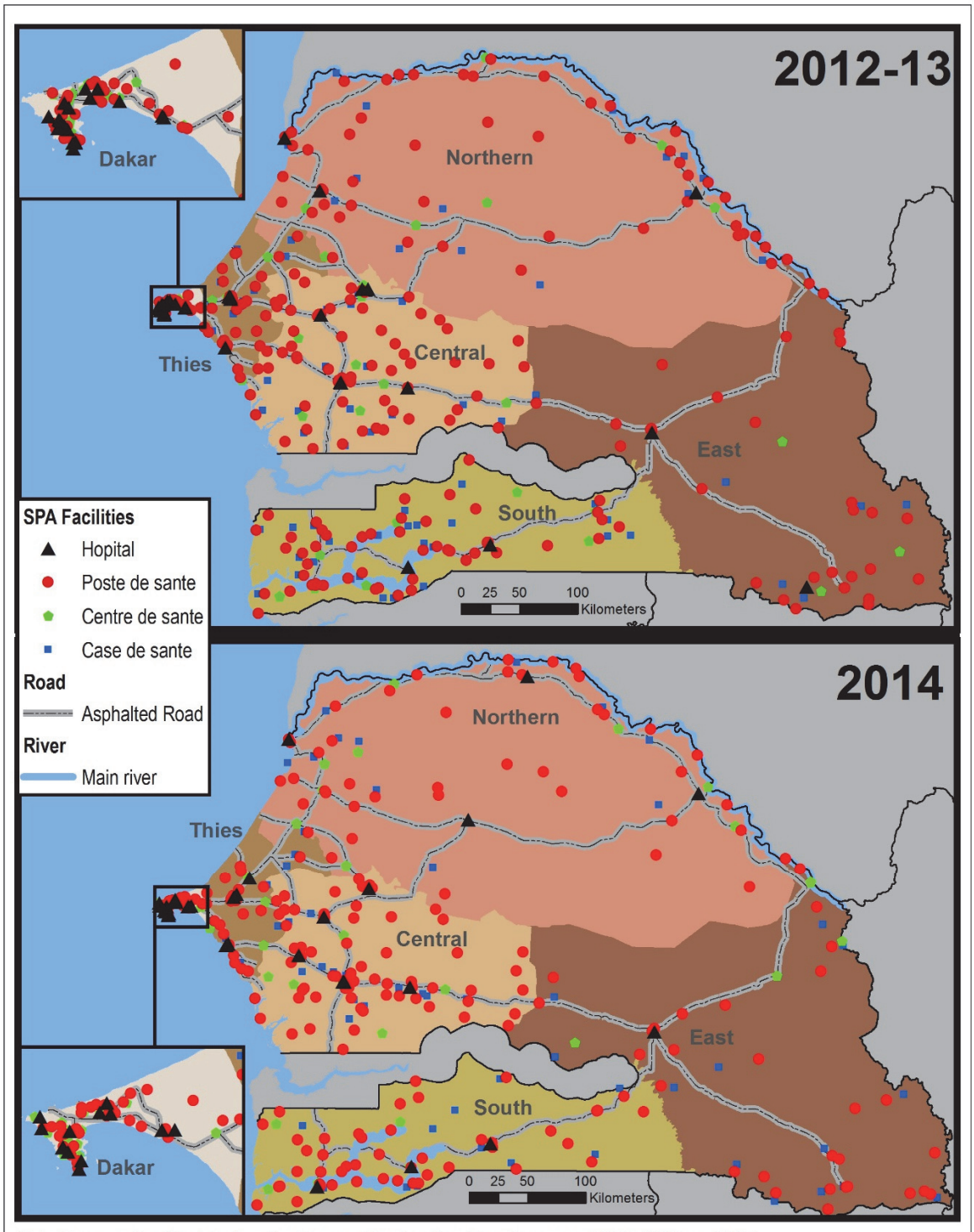
The analysis takes into consideration the sampling weights and the stratified sampling design, with stratification by facility type and the 14 regions of Senegal. This consideration does not allow the usual Chi-square tests for associations, and F-tests were used instead. For the analysis of structure, the unit of analysis was the health facility, and therefore the facility weight was used. However, for the process and outcome components of quality of care, the unit of analysis was the client, and therefore the client's weight was used.

All regressions performed in family planning structure, process, and outcome analyses involved binary dependent variables, and therefore logistic regressions were used for fitting models. For the logistic regressions, pseudo-R^2 values are reported, which take into consideration the weights but not the stratified sampling design. All analyses were performed using the Stata statistical software version 13.0 (StataCorp. 2013).

3. Results

3.1. Health Facilities

The maps on the following page show the distribution of the sample of health facilities for each round of the SPA. The maps also show the main roads and other geographical information, such as main rivers and asphalted roads, to demonstrate the accessibility of these facilities. The facilities shown in the map are the hospital (hôpital), health center (centre de santé), health post (poste de santé), and health hut (case de santé) facilities visited in each SPA round.



Data Sources: Facility data from the Senegal Service Provision Assesment 2012-2013 and 2014.
Region base map from DHS Spatial Data Repository. World base map from the US State Department SSIB.
Roads and Water layers from DCW (2009) updated (codified) by OCHA/ROWCA in Jan 2012.

Table 2 provides a descriptive summary of the facilities surveyed in round 1 and round 2. Specifically, Table 2 outlines the facility type, managing authority, urban/rural location, and regional breakdown of the facilities. Most of the facilities in the sample were at the health post level (87 to 88 percent for both rounds) and were publically managed (83 percent in round 1 and 81 percent in round 2). There were slightly more facilities in rural than urban regions, 56 percent rural in round 1 and 62 percent in round 2. The Central region had the most facilities (23 percent for both rounds), and the East region had the fewest (9 percent for both rounds).

Table 2. Description of facility characteristics

	Round 1 (N=364)			Round 2 (N=363)		
	%	Weighted N	Unweighted N	%	Weighted N	Unweighted N
Health facility type						
Hospital	4.7	17	35	4.1	15	35
Health center	8.2	30	64	8.1	29	62
Health post	87.1	317	265	87.9	319	266
Managing authority						
Private	17.0	62	59	18.8	68	70
Public	83.0	302	305	81.2	295	293
Locality						
Urban	44.1	161	168	37.6	136	158
Rural	55.9	203	196	62.4	227	205
Region						
North	18.7	68	63	18.9	69	62
Dakar	19.6	71	71	19.0	69	72
Thiès	13.2	48	41	13.3	48	43
Central	23.3	85	83	23.4	85	83
East	9.0	33	41	9.2	33	41
South	16.1	59	65	16.2	59	62

3.2. Quality of Care in General Structure

3.2.1. Basic Infrastructure

Tables 3 through 5 present changes in service provision and the general structure of the facilities between the two rounds. Table 3 compares the differences between the two rounds in types of services provided (family planning services, antenatal care (ANC) services, child vaccination services, and child curative services) by facility type (hospital, health center, health post, and health hut). Even though all facility types demonstrated some increase in types of service provided from round 1 to round 2, these increases were small and not significant at the 1 percent level. At the health hut level, facilities that provided family planning services increased by 22.9 percentage points and child vaccination services increased by 11.6 percentage points, but these increases were not significant. As mentioned previously, health huts were analyzed separately due to the nature of their selection in the sample.

Table 3. Services offered by facility type for round 1 and round 2

	Family planning Services			ANC services			Child vaccination services			Child curative services		
	Round 1 % [C.I.]	Round 2 % [C.I.]	diff	Round 1 % [C.I.]	Round 2 % [C.I.]	diff	Round 1 % [C.I.]	Round 2 % [C.I.]	diff	Round 1 % [C.I.]	Round 2 % [C.I.]	diff
Hospital	68.0 [50.7,81.5]	72.6 [54.3,85.5]	4.6	75.9 [59.1,87.3]	79.1 [60.6,90.3]	3.2	33.5 [19.9,50.6]	28.1 [14.9,46.6]	-5.4	81.9 [65.0,91.7]	83.5 [64.7,93.3]	1.6
Health center	77.9 [65.7,86.6]	83.8 [70.6,91.7]	5.9	79.5 [67.7,87.7]	83.7 [70.5,91.7]	4.2	74.8 [62.8,83.8]	73.2 [59.5,83.6]	-1.6	93.7 [84.4,97.6]	98.7 [90.9,99.8]	5.0
Health post	86.6 [81.5,90.4]	88.1 [83.5,91.5]	1.5	90.6 [86.1,93.8]	92.0 [87.8,94.8]	1.4	87.0 [81.9,90.8]	87.1 [82.5,90.6]	0.1	95.1 [91.5,97.2]	96.7 [93.6,98.3]	1.6
Total	85.0 [80.6,88.6]	87.1 [83.0,90.3]	2.1	89.0 [85.1,92.0]	90.8 [87.1,93.5]	1.8	83.4 [79.0,87.1]	83.6 [79.5,87]	0.2	94.3 [91.2,96.4]	96.3 [93.6,97.9]	2.0
Health hut	43.2 [31.1,56.0]	66.1 [54.0,76.4]	22.9	28.7 [19.6,40.0]	31.4 [20.1,45.5]	2.7	45.5 [32.8,58.7]	57.1 [46.2,67.4]	11.6	96.6 [86.5,99.2]	96.5 [89.6,98.9]	-0.1

Note: Health huts analyzed separately. Estimates reported as % [95% C.I.] for each round.
Differences are round 2 − round 1 and are tested at 1% level; all differences were found to be non-significant.

Tables 4 and 5 depict the general structural indicators and the changes between rounds 1 and 2, stratified by facility type, managing authority, locality, and region. The structural items in Table 4 consist of electricity, improved water source, and adequate sanitation. Overall, most facilities (over 97 percent in both rounds) had access to adequate sanitation and almost 90 percent in both rounds had access to an improved water source. However, only about 60 percent of the facilities had electricity, with large variations by health facility type and region. For instance, and as expected, the percentage of hospitals with electricity was over 90 percent in both rounds, while almost half of the health post facilities lacked regular electricity. The percentage of facilities with electricity decreased slightly overall, but there were large decreases in private facilities (-15 percentage points) as well as in the Dakar region (-17 percentage points); these decreases were not significant. Since, overall, the percentage of facilities with access to improved water and adequate sanitation was high, there was little room for improvement. There was a large increase in the percentage of facilities with access to an improved water source in the East region (an increase of approximately 20 percentage points), although this was not significant.

Table 4. Percentage of facilities with electricity, improved water source, and adequate sanitation, by facility characteristics.

	Electricity			Improved water source			Adequate sanitation		
	Round 1 % [C.I.]	Round 2 % [C.I.]	diff	Round 1 % [C.I.]	Round 2 % [C.I.]	diff	Round 1 % [C.I.]	Round 2 % [C.I.]	diff
Health facility type									
Hospital	91.8 [76.4,97.5]	98.4 [89.7,99.8]	6.6	98.6 [91.0,99.8]	100.0	1.4	100.0	100.0	0.0
Health center	76.9 [64.8,85.7]	68.2 [54.0,79.7]	-8.7	93.5 [84.3,97.5]	100.0	6.5	98.4 [89.6,99.8]	100.0	1.6
Health post	54.8 [48.7,60.8]	53.7 [47.8,59.5]	-1.1	87.8 [83.5,91.1]	91.6 [88.0,94.2]	3.8	97.5 [94.8,98.8]	98.2 [95.5,99.3]	0.7
Managing authority									
Private	66.2 [51.6,78.2]	51.0 [38.5,63.4]	-15.2	94.8 [86.4,98.1]	98.6 [90.8,99.8]	3.8	100.0	100.0	0.0
Public	56.8 [50.8,62.6]	58.0 [51.9,63.9]	1.2	87.5 [83.2,90.9]	91.2 [87.3,94.0]	3.7	97.3 [94.4,98.7]	98.0 [95.1,99.2]	0.7
Locality									
Urban	56.9 [48.6,64.8]	59.4 [50.5,67.7]	2.5	98.2 [93.1,99.6]	99.2 [94.5,99.9]	1.0	98.8 [94.4,99.8]	98.2 [92.9,99.5]	-0.6
Rural	59.5 [52.1,66.6]	55.1 [48.1,61.9]	-4.4	81.3 [75.3,86.1]	88.7 [83.7,92.3]	7.4	96.9 [93.1,98.6]	98.5 [95.1,99.6]	1.6
Region									
North	43.5 [31.2,56.7]	40.8 [28.7,54.1]	-2.7	92.6 [81.4,97.3]	92.7 [82.3,97.2]	0.1	100.0	100.0	0.0
Dakar	76.3 [63.1,85.9]	59.2 [46.2,71.1]	-17.1	96.0 [85.0,99.0]	100.0	4.0	98.0 [86.6,99.7]	98.1 [87.2,99.7]	0.1
Thiès	58.6 [41.9,73.5]	67.3 [50.6,80.6]	8.7	94.3 [79.5,98.6]	100.0	5.7	97.1 [81.8,99.6]	100.0	2.9
Central	40.2 [29.5,52.0]	42.0 [31.7,53.0]	1.8	94.5 [85.6,98.0]	97.7 [90.6,99.5]	3.2	99.2 [94.5,99.9]	100.0	0.8
East	69.1 [50.0,83.3]	76.9 [58.2,88.9]	7.8	61.7 [43.9,76.8]	81.6 [63.3,91.9]	19.9	93.1 [77.2,98.2]	90.9 [72.9,97.3]	-2.2
South	73.8 [60.2,84.0]	73.3 [60.1,83.3]	-0.5	78.0 [66.3,86.5]	76.8 [63.5,86.3]	-1.2	95.7 [85.9,98.8]	97.5 [83.9,99.7]	1.8
Total	58.4 [52.9,63.6]	56.7 [51.3,61.9]	-1.7	88.8 [85.0,91.7]	92.6 [89.4,94.9]	3.8	97.7 [95.4,98.9]	98.4 [96.0,99.4]	0.7

Notes: See Appendix A for description of basic infrastructure variables. Estimates reported as % [95% C.I.] for each round. Differences are round 2 − round 1 and are tested at 1% level, all differences were found to be non-significant.

Table 5 describes the presence of communication equipment, private room, emergency transportation, and computer and Internet access in the facilities for each round. Overall, almost all facilities had a private room, and this was true for all facility types and for both rounds. However, the presence of communication equipment, emergency transport, and especially computer and Internet access was lacking, particularly in health posts. Only 58 percent of facilities in round 1 and 50 percent in round 2 had communication equipment, with large and significant decreases between the two rounds in rural areas (-14 percentage points) and in the East region (-61 percentage points). There were also large discrepancies by facility characteristics. For instance, the South and North regions had lower proportions of facilities with communication equipment compared with the Dakar region. Approximately two-thirds of the facilities in both rounds had emergency transport. A large and significant decrease between the two rounds in the percentage of facilities with emergency transport was found in the South region (-25 percentage points). There was an increase of 22 percentage points in the Dakar region, although this increase was not significant. The percentage of facilities with access to computer and Internet was relatively low in both rounds (only 26 percent in round 1 and 33 percent in round 2). There were very large variations by all facility background characteristics. Hospitals had the highest proportion of facilities with computer and Internet access, reaching 87 to 94 percent in both rounds compared with 19 to 27 percent for health posts. Some significant increases were found between the two rounds; the percentage of urban facilities with computer and Internet access increased by 19 percentage points, and in the Dakar region by a significant 26 percentage points.

Table 5. Percentage of facilities that have communication equipment, private room, emergency transport, and computer and Internet access by facility characteristics

	Communication equipment			Private room			Emergency transport			Computer and internet		
	Round 1 % [C.I.]	Round 2 % [C.I.]	diff	Round 1 % [C.I.]	Round 2 % [C.I.]	diff	Round 1 % [C.I.]	Round 2 % [C.I.]	diff	Round 1 % [C.I.]	Round 2 % [C.I.]	diff
Health facility type												
Hospital	93.4 [77.0,98.4]	98.4 [89.7,99.8]	5.0	100.0	100.0	0.0	87.6 [69.6,95.6]	92.1 [75.9,97.7]	4.5	86.7 [67.9,95.2]	93.5 [77.4,98.4]	6.8
Health center	86.0 [75.8,92.4]	79.9 [67.3,88.4]	-6.1	98.4 [89.3,99.8]	98.4 [89.3,99.8]	0.0	86.9 [75.8,93.3]	88.4 [74.7,95.2]	1.5	68.5 [55.3,79.2]	72.3 [57.9,83.2]	3.8
Health post	53.4 [48.0,58.7]	45.4 [40.1,50.9]	-8.0	99.5 [96.5,99.9]	98.3 [95.5,99.3]	-1.2	62.0 [56.5,67.2]	62.5 [56.3,68.3]	0.5	18.9 [14.3,24.4]	27.1 [22.2,32.6]	8.2
Managing authority												
Private	81.5 [68.8,89.8]	74.6 [62.0,84.1]	-6.9	96.6 [85.2,99.3]	100.0	3.4	60.5 [46.0,73.3]	60.5 [47.2,72.4]	0.0	60.8 [46.0,73.8]	66.2 [53.6,76.9]	5.4
Public	53.2 [47.7,58.5]	44.7 [39.3,50.4]	-8.5	100.0	98.0 [95.1,99.2]	-2.0	66.2 [60.8,71.2]	67.0 [60.8,72.7]	0.8	19.1 [15.2,23.6]	25.8 [21.2,31.1]	6.7
Locality												
Urban	72.4 [64.4,79.2]	79.9 [71.6,86.2]	7.5	99.7 [97.9,100.0]	98.8 [94.8,99.7]	-0.9	52.7 [45.2,60.1]	61.3 [52.2,69.6]	8.6	39.1 [31.6,47.2]	58.1 [49.1,66.5]	**19.0****
Rural	46.6 [40.0,53.2]	32.6 [26.5,39.3]	**-14.0****	99.2 [94.6,99.9]	98.1 [94.3,99.4]	-1.1	75.1 [68.3,80.8]	68.5 [61.4,74.9]	-6.6	15.9 [11.3,21.8]	18.6 [13.7,24.8]	2.7
Region												
North	42.9 [30.3,56.4]	23.0 [14.0,35.4]	-19.9	100.0	100.0	0.0	74.5 [61.1,84.4]	72.4 [59.5,82.4]	-2.1	20.0 [11.8,31.7]	34.3 [23.4,47.2]	14.3
Dakar	80.3 [67.4,89.0]	87.2 [75.0,93.9]	6.9	99.3 [95.3,99.9]	99.3 [95.3,99.9]	0.0	33.1 [23.8,43.9]	55.2 [42.5,67.3]	22.1	42.3 [31.0,54.6]	68.1 [54.7,79.1]	**25.8****
Thiès	81.9 [65.7,91.5]	75.9 [59.3,87.2]	-6.0	96.7 [79.3,99.5]	100.0	3.3	54.5 [38.2,69.9]	60.4 [44.0,74.6]	5.9	32.0 [19.8,47.4]	39.6 [25.8,55.2]	7.6
Central	48.7 [38.8,58.6]	45.2 [34.1,56.8]	-3.5	100.0	100.0	0.0	78.3 [67.1,86.5]	74.2 [62.5,83.3]	-4.1	16.2 [10.1,24.9]	22.1 [14.5,32.2]	5.9
East	91.8 [72.2,98.0]	30.9 [18.1,47.5]	**-60.9*****	100.0	92.3 [73.4,98.1]	-7.7	58.1 [40.2,74.1]	66.5 [47.2,81.5]	8.4	25.2 [13.5,42.0]	13.1 [5.9,26.7]	-12.1
South	23.2 [14.4,35.1]	36.7 [25.8,49.3]	13.5	100.0	95.0 [82.1,98.7]	-5.0	87.4 [76.9,93.6]	62.4 [48.3,74.6]	**-25.0****	23.6 [14.2,36.6]	14.5 [7.4,26.2]	-9.1
Total	58.0 [53.1,62.7]	50.4 [45.5,55.2]	-7.6	99.4 [97.3,99.9]	98.4 [96.0,99.3]	-1.0	65.2 [60.3,69.8]	65.8 [60.3,70.9]	0.6	26.1 [21.9,30.9]	33.4 [28.9,38.3]	7.3

Notes: See Appendix A for description of basic infrastructure variables. Estimates reported as % [95% C.I.] for each round.
Differences are round 2 − round 1 and are tested at 1% level, **p <0.01, *** p<0.001

3.2.2. General Structure Composite Indices

A composite index was created using PCA to describe the level of availability and readiness of the facilities in terms of equipment, diagnostic tests, and medicines (see Appendix B). Each index was then divided into terciles to represent low, medium, and high levels of availability and readiness in equipment, diagnostic tests, and medicines for each round. Table 6 for round 1 and Table 7 for round 2 describe the associations between these index levels and facility characteristics. For the equipment index in round 1, only region was significantly associated with the equipment index, with Thiès and Central regions having the highest percentage of facilities with a high score for the equipment index. The North and Dakar regions had the highest percentage of facilities with a low score (62 percent and 48 percent respectively). In round 2, managing authority, locality, and region were significantly associated with the equipment index. Within these variables, the facilities that were public, rural, and located in Thiès or South regions had the highest percentages, with a high score on the equipment index. As in round 1, the North and Dakar regions had the highest percentage of facilities with a low score (45 percent and 49 percent respectively). In both rounds, facility type was not significantly associated with the equipment index.

Table 6. Levels of readiness of equipment, diagnostic tests, and medicines by facility background characteristics (N=364), round 1

	Equipment				Diagnostic tests				Medicines			
	Low (%)	Medium (%)	High (%)	p-value	Low (%)	Medium (%)	High (%)	p-value	Low (%)	Medium (%)	High (%)	p-value
Health facility type				0.070				**<0.001**				**<0.001**
Hospital	33.3	19.8	47.0		23.3	7.8	68.9		49.2	12.2	38.7	
Health center	47.1	23.9	29.0		11.8	9.4	78.8		28.7	26.8	44.6	
Health post	32.8	34.7	32.5		49.9	24.3	25.7		33.0	42.3	24.7	
Managing authority				0.502				0.731				**<0.001**
Private	33.9	27.0	39.1		47.2	18.1	34.7		56.6	14.1	29.3	
Public	34.0	34.3	31.6		45.2	23.2	31.6		28.6	44.8	26.6	
Locality				0.064				**0.001**				**<0.001**
Urban	41.0	29.0	30.0		52.2	13.0	34.8		47.2	35.2	17.6	
Rural	28.5	36.3	35.2		40.3	29.7	30.0		22.5	43.1	34.5	
Region				**<0.001**				**<0.001**				**<0.001**
North	62.0	30.0	7.9		28.2	28.6	43.2		20.4	49.7	29.9	
Dakar	48.4	28.3	23.3		66.5	5.6	27.9		71.5	21.5	7.0	
Thiès	25.7	28.1	46.2		80.2	4.8	15.0		23.2	35.2	41.6	
Central	17.3	25.1	57.7		27.1	48.1	24.8		28.5	48.7	22.8	
East	23.4	61.0	15.6		48.1	23.3	28.6		32.8	35.6	31.6	
South	20.9	42.5	36.5		37.0	12.0	51.0		17.9	42.5	39.5	

For the diagnostic test index, all the variables except managing authority in round 1 were significantly associated with the index for the availability of diagnostic tests. In both rounds, hospitals, health centers, and urban areas had the highest percentage of facilities with a high score in the diagnostic test index. Managing authority was not significant in round 1; however, in round 2 this variable was significantly associated with the diagnostic test index, with private facilities having the highest score. For the region variable, in round 1 the highest scores were found for the North and South regions, while in round 2 the Dakar region had the highest score. In round 1, 80 percent of the facilities in the Thiès region had a low score for diagnostic tests; this improved substantially, decreasing to 26 percent of facilities with a low score in round 2.

While all variables in both rounds were significantly associated with the medicines index, these results may not be reliable since the first component from the PCA for medicines was below 30 percent. Therefore, no further interpretation of the results will be discussed for this index.

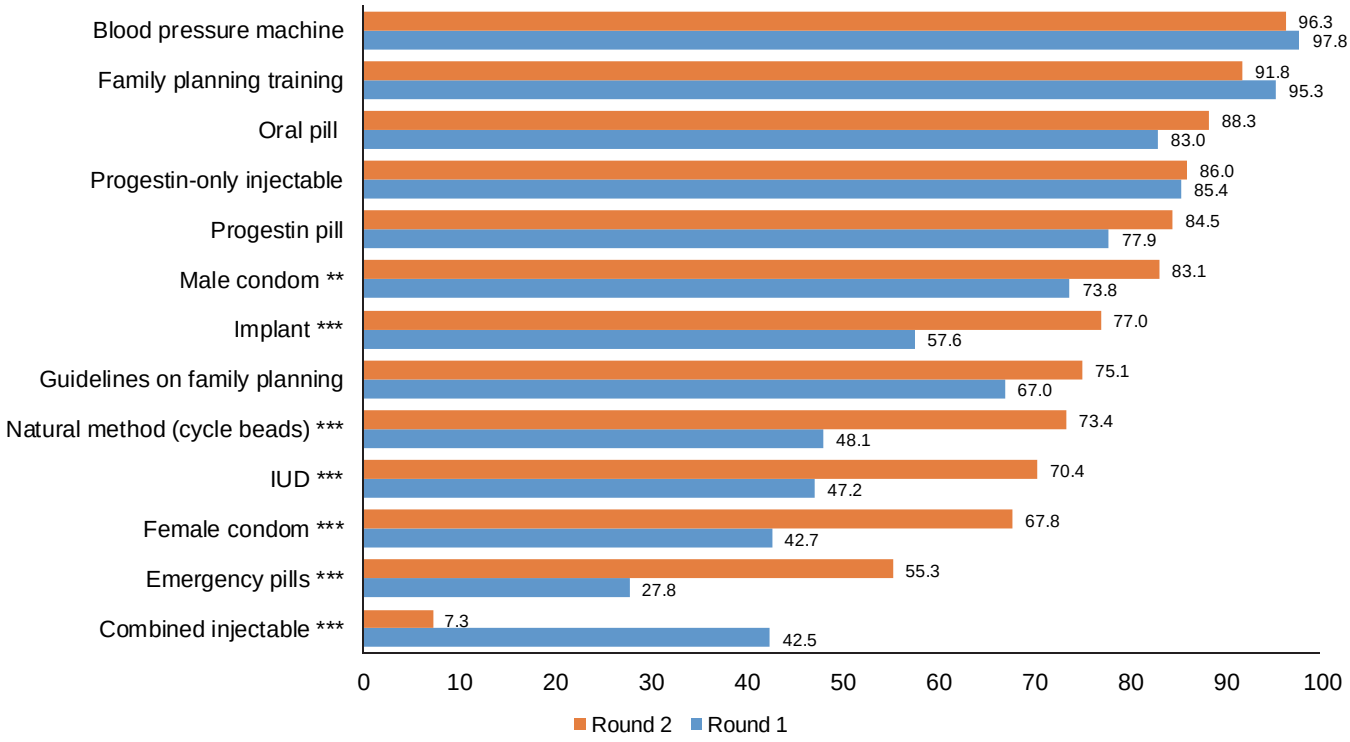
Table 7. Levels of readiness of equipment, diagnostic tests, and medicines by facility background characteristics (N=363), round 2

	Equipment				Diagnostic tests				Medicines			
	Low (%)	Medium (%)	High (%)	p-value	Low (%)	Medium (%)	High (%)	p-value	Low (%)	Medium (%)	High (%)	p-value
Health facility type				0.129				**<0.001**				**0.025**
Hospital	39.1	41.2	19.7		29.8	4.7	65.5		55.0	6.1	38.9	
Health center	47.9	32.7	19.5		19.5	26.5	53.9		38.1	20.6	41.3	
Health post	32.4	38.4	29.1		37.3	57.0	5.7		36.9	31.1	32.0	
Managing authority				**0.039**				**<0.001**				**0.001**
Private	44.9	39.2	15.9		52.3	25.3	22.4		51.4	9.8	38.8	
Public	31.4	37.8	30.8		31.6	58.7	9.6		34.6	33.7	31.7	
Locality				**<0.001**				**<0.001**				**<0.001**
Urban	45.2	38.1	16.7		38.2	38.3	23.5		57.9	17.6	24.5	
Rural	27.2	38.1	34.7		33.9	61.0	5.1		25.6	36.2	38.3	
Region				**0.002**				**0.012**				**<0.001**
North	45.4	39.3	15.3		33.8	57.8	8.5		36.1	35.5	28.4	
Dakar	48.9	37.5	13.6		40.3	34.6	25.1		65.8	16.1	18.2	
Thiès	24.8	35.9	39.3		26.3	59.4	14.3		33.7	28.4	38.0	
Central	33.5	33.8	32.8		34.6	59.3	6.1		20.8	29.5	49.7	
East	20.1	49.6	30.2		38.3	51.1	10.5		18.8	44.5	36.8	
South	19.0	38.9	42.1		39.2	52.4	8.4		45.3	28.8	25.9	

3.3. Quality of Care in Family Planning Structure

Figure 1 describes the readiness and availability of the facilities for providing family planning services. The availability of family planning methods was highest for combined oral pills, progestin pills, progestin-only injectables, and male condoms (over 80 percent in round 2). Other family planning methods were not as available. The availability of male condoms, female condoms, IUDs, implants, emergency pills, and natural methods (cycle beads) increased significantly in round 2, by almost 20 percentage points for implants and more for these other methods, except male condoms, which increased in availability by 9 percentage points. The availability of the combined injectable method decreased significantly, from 43 percent of facilities in round 1 to 7 percent in round 2. In both rounds, a high percentage of facilities had at least one trained health provider—95 percent in round 1 and 92 percent in round 2. For round 1, the question asked about training in the last two years, while in round 2 the question asked about training in the last three years. The percentage of facilities with a blood pressure machine was also high (above 96 percent in both rounds). Only 67 percent of the facilities in round 1 and 75 percent in round 2 had a guideline manual on family planning. Although the percentage increased between the two rounds, the increase was not significant.

Figure 1. Facilities with family planning commodities and at least one staff member trained in family planning



Note: Differences are round 2 − round 1 and are tested at 1% level, **p <0.01, ***p<0.001

Progestin-only injectables were the most used method for women visiting the facilities in round 1 (60 percent), and pills were the second most used method (25 percent) (see Table 11); this information was not available for round 2, since there were no observation or exit interviews for family planning in round 2. Injectables were also the most used modern method in the DHS household survey conducted in the same year as round 1 of the SPA (6 percent among women in union), although the DHS did not differentiate between progestin-only and combined injectables (Agence Nationale de la Statistique et de la Démographie [Senegal] and ICF International (a) 2013). Pills were reported as the second most used method in the DHS survey (5 percent), but the survey did not differentiate between combined pills and progestin-only pills (Agence Nationale de la Statistique et de la Démographie [Senegal] and ICF International (a) 2013).

Further analysis was conducted to study the facilities providing progestin-only injectables and combined oral pills among facilities that offered family planning services, as Tables 8 and 9 show, in order to assess the family planning structure of the facilities in terms of availability of the two most used contraceptive methods in Senegal. Table 8 shows that all facility background variables were significantly associated with the availability of progestin-only injectables, with the highest percentages found in health centers and health posts, public facilities, rural areas, and the North and South regions, for both rounds. However, in the adjusted logistic regression, shown in Table 9, only public facilities were found to have significantly higher odds of having progestin-only injectables available compared with private facilities, in both rounds (OR 12.7 in round 1 and 17.6 in round 2, p<0.001 in both rounds). For round 1, health centers had significantly higher odds of having injectables available compared with hospitals. Facility type was not a significant predictor of availability of injectables in round 2. In round 2 the variables of

facility type and locality were highly correlated, which may affect the estimates. This was not the case in round 1.

Table 8. Association of the availability of progestin-only injectables and combined oral pills by facility characteristics among facilities that provide family planning services

	Injectables Round 1		Injectables Round 2		Combined oral pill Round 1		Combined oral pill Round 2	
	%	p-value	%	p-value	%	p-value	%	p-value
Health facility type		**<0.001**		**0.012**		**<0.001**		**<0.001**
Hospital	41.2		63.6		34.4		59.1	
Health center	92.2		84.0		81.6		87.7	
Health post	86.8		87.0		85.2		89.4	
Managing authority		**<0.001**		**<0.001**		**<0.001**		**<0.001**
Private	28.7		41.2		20.1		38.9	
Public	90.4		92.2		88.5		95.2	
Locality		**0.005**		**0.003**		0.063		**0.004**
Urban	77.6		76.9		77.5		79.9	
Rural	90.3		90.6		86.4		92.5	
Region		**<0.001**		**0.033**		**0.007**		0.105
North	95.6		89.7		91.6		93.8	
Dakar	65.7		70.6		70.3		76.2	
Thiès	81.5		86.3		79.8		89.8	
Central	83.4		88.5		84.4		91.8	
East	92.1		86.2		67.6		91.0	
South	96.6		94.7		94.2		86.2	

Table 9. Results of adjusted logistic regressions of availability of progestin-only injectables and combined oral pills among facilities that offer family planning services for both rounds

	Injectables Round 1		Injectables Round 2		Combined oral pill Round 1		Combined oral pill Round 2	
	OR	C.I.	OR	C.I.	OR	C.I.	OR	C.I.
Health facility type (ref.=hospital)								
Health center	**6.8***	1.2 - 39.7	0.9	0.3 - 3.3	3.4	0.9 - 13.4	1.4	0.3 - 5.7
Health post	3.6	1.0 - 13.8	1.7	0.5 - 5.5	**6.2****	1.8 - 20.6	**3.9***	1.2 - 12.9
Managing authority (ref.=private)								
Public	**12.7*****	3.9 - 40.8	**17.6*****	6.2 - 50.2	**29.9*****	8.7 - 102.2	**46.7*****	14.8 - 147.6
Locality (ref.=urban)								
Rural	0.7	0.3 - 2.2	0.7	0.2 - 2.1	0.7	0.3 - 1.7	0.4	0.1 - 1.6
Region (ref.=North)								
Dakar	**0.1***	0.0 - 0.8	0.6	0.2 - 2.8	0.5	0.1 - 2.3	0.6	0.1 - 4.0
Thiès	0.3	0.1 - 1.6	0.9	0.2 - 4.5	0.6	0.2 - 2.2	0.8	0.1 - 6.2
Central	0.3	0.1 - 1.4	1.0	0.3 - 3.7	0.8	0.2 - 2.6	1.0	0.2 - 5.2
East	0.6	0.1 - 4.9	0.7	0.1 - 4.6	**0.2***	0.1 - 0.7	0.7	0.1 - 9.1
South	1.6	0.2 - 13.1	2.7	0.5 - 14.5	2.0	0.4 - 10.5	0.4	0.1 - 2.9
Pseudo R^2	0.25		0.22		0.25		0.32	

* p<0.05, ** p<0.01, *** p<0.001

As Table 8 shows, managing authority and health facility type were significantly associated with the availability of the combined oral pill in both rounds. Region was only significantly associated with this dependent variable in round 1 and locality was only significant in round 2. After adjusting for the other variables, only managing authority and the health post category of the facility type variable remained significant in both rounds (Table 9). Public facilities had almost 30 times greater odds of having the combined oral pill available compared with private facilities in round 1, and the odds were 47 times greater in round 2 ($p<0.001$ in both rounds). In round 1, Dakar region had lower odds of having progestin-only injectables compared with the North region, and the East region was also marginally significant with lower odds of having the combined oral pill available compared with the North region.

For both dependent variables in the adjusted model, the width of the odds ratio confidence intervals for public facilities is very large, due to the small percentage of private facilities in the sample, and especially private facilities that offer family planning services. In fact, only 25 private facilities in round 1 and 39 facilities in round 2 offered family planning services (the number was the same whether weighted or unweighted).

3.4. Health Huts

Health huts are the lowest level of health facility in Senegal. They are also the most accessible and numerous type of health facility. Health huts report to their respective health posts. Table 10 shows the infrastructure, equipment, and commodities available at the health huts surveyed, as well as the differences in these items from round 1 to round 2. As with the other facility types discussed in Table 4, a high percentage of health huts had a private room (over 90 percent in both rounds). Availability of adequate sanitation facilities was also relatively high (approximately 70 percent in both rounds), while access to electricity, improved water, communication equipment, and emergency transport was lacking. Almost half of the health huts surveyed in both rounds had no access to improved water, and more than half (almost 60 percent) had no emergency transport. A very low percentage of health huts had electricity or communication equipment in both rounds. This percentage increased in round 2 but not significantly.

For basic equipment, more than half of the health huts in round 1 had disinfectant, running water with soap or alcohol rub, gloves, and a sharps container. In round 2, these items were found in approximately 70 percent or more of health huts. In both rounds, however, only about 40 percent of health huts had a waste receptacle. There were no significant increases in the equipment items between the two rounds when comparisons could be made. No data were available for the remaining equipment listed in Table 10 for round 1, but for round 2 only 40 percent of health huts had an adult scale and 45 percent had a stethoscope.

For basic family planning commodities, the presence of combined oral and progestin-only pills was relatively low in round 1, but increased significantly in round 2, when 44 percent of health huts had combined oral pills available and 39 percent had progestin-only pills. The availability of male condoms increased to 46 percent of health huts in round 2, but the increase was not significant. Estimates were not reported for injectables as they had very low counts. Female condoms also had low counts in round 1, while 24 percent of health huts had female condoms in round 2. In round 1, approximately 81 percent of health huts had at least one staff member trained in family planning, declining to 67 percent in round 2 although the decrease was not significant. As with the other facility types shown Figure 1, only a minority of health huts had a family planning guideline available (31 percent in round 1 and 42 percent in round 2). The increase between the two rounds was not significant.

Table 10. Percentage of health huts that have the following: infrastructure, equipment, and other commodities

	Round 1 N=74	Round 2 N= 89	
	% [C.I.]	% [C.I.]	diff
Basic infrastructure			
Electricity	14.1 [7.8,24.2]	26.1 [16.8,38.2]	12.0
Improved water	47.6 [33.2,62.5]	50.8 [38.6,63.0]	3.2
Adequate sanitation facilities	70.5 [54.1,82.9]	69.5 [56.6,79.9]	-1.0
Communication equipment	17.8 [9.5,31.0]	25.9 [16.2,38.8]	8.1
Private room	92.8 [79.1,97.8]	95.6 [88.3,98.4]	2.8
Emergency transport	43.3 [30.8,56.7]	44.0 [32.3,56.5]	0.7
Basic equipment			
Adult scale	no obs	39.9 [28.9,52.0]	-
Child scale	no obs	65.8 [53.0,76.7]	-
Thermometer	no obs	78.5 [66.1,87.2]	-
Stethoscope	no obs	44.7 [33.6,56.3]	-
Disinfectant	67.8 [52.6,80.0]	85.3 [75.0,91.8]	17.5
Running water with soap or alcohol rub	56.2 [42.2,69.2]	70.1 [57.1,80.5]	13.9
Gloves	64.0 [48.7,76.9]	76.6 [63.7,86.0]	12.6
Sharps container (safety box)	64.7 [49.5,77.4]	67.6 [54.5,78.4]	2.9
Waste receptacle (pedal bin) with lid and plastic bin liner	39.3 [26.5,53.9]	39.6 [27.8,52.8]	0.3
Basic family planning commodities			
Combined oral pills	(21.1) [13.2,32.0]	43.7 [32.0,56.3]	**22.6****
Progestin-only pills	(13.3) [6.0,27.0]	39.3 [28.2,51.6]	**26.0****
Combined injectable	^	^	
Progestin-only injectable	^	^	
Male condom	(23.5) [15.1,34.7]	46.0 [34.3,58.1]	22.4
Female condom	^	23.5 [15.1,34.7]	
At least one staff member trained in family planning	80.9 [69.5,88.8]	66.8 [54.3,77.3]	-14.1
Guidelines on family planning	31.4 [21.5,43.4]	42.1 [30.6,54.6]	10.7

Note: See Appendix A for description of basic infrastructure variables.
( ) Indicated counts are lower than 20, ^ indicates counts were lower than 10.
Differences are round 2 − round 1 and are tested at 1% level, **p <0.01

3.5. Quality of Care in Family Planning Process

3.5.1. Description of Study Population

The analysis of the process and outcome components of quality of care used data mainly from the observation and exit interviews (in addition to data from the health provider interview for obtaining information on provider characteristics). As described in the methods section, the clients of providers whose consultations were observed were selected for an exit interview, so that the analysis could match each client to her provider. Table 11 describes the independent variables used in the process and outcome analysis for users of modern family planning methods (90 percent of clients interviewed were either prescribed or provided with a modern method). Most of these clients were age 25-39 (58 percent), had no education (49 percent), were returning clients (69 percent), and were mainly using progestin-only injections for family planning (60 percent). Almost half paid between 500 and 999 CFAs[1] for their family planning visit (47 percent), and approximately 30 percent waited less than half hour to see a provider, while 13 percent did not wait at all. Almost all the clients left the facility with a family planning method (94 percent).

One-third of family planning providers (32 percent) were nurses or nurse assistants, while two-thirds (68 percent) were midwives or other providers. (Only 41 of the 592 providers in this group were classified as other.) Correspondingly, 82 percent of the providers were female since it is unusual for men to be midwives. In fact, since provider category and provider sex were very highly correlated, the two factors were not included together in regression analyses. Most providers had 13-16 years of education (58 percent). Just over half (55 percent) had not received any family planning training in the past two years. Half (50 percent) received all six items of supervision, and 58 percent had a job description. The majority of the providers received a monthly or daily salary (64 percent), while 10 percent received no pay.

As for the facility characteristics, hospitals and health centers were combined in the analysis due to the small number of observations and exit interviews conducted in hospitals. The majority of these interviews were conducted in health posts (81 percent), and in urban areas (52 percent), and 28 percent were in Dakar.

[1] 1 USD ~ 500 CFA in the period of 2012-2013

Table 11. Description of client, provider, and facility background characteristics after selecting for clients using a contraceptive method

Variable	Category	%	Weighted N
Client characteristics			
Client's age	14-24	26.6	232
	25-39	57.6	502
	40-58 and don't know	15.8	138
Client's education	No education	49.3	430
	Primary and post-primary	30.3	264
	Secondary or more	20.4	178
Fee paid for service[1]	0-9	7.7	67
	10-499	14.4	125
	500-999	46.6	407
	1,000 or more	31.3	273
Waiting time	No wait	12.8	111
	Less than half hour	29.4	257
	Half hour to one hour	19.8	173
	One hour to 2 hours	18.4	161
	2 hours or more	19.6	171
Client status	New client	30.7	268
	Returning client	69.3	605
Contraceptive method used	Pills	24.8	216
	Progestin-only injection	60.3	526
	IUD or implants[2]	14.9	130
Client left with a method	Yes	94.0	820
	No	6.0	52
Provider characteristics			
Provider category	Nurse or nurse assistant[3]	32.2	281
	Midwife and other	67.8	592
Provider sex	Male	18.2	159
	Female	81.8	713
Provider years of education	6-12	6.5	56
	13-16	58.2	507
	17+	35.4	309
Provider training in family planning in the past 24 months	Yes	45.1	393
	No	54.9	479
Provider number of items supervised	None	20.7	181
	1-5	28.8	251
	6	50.4	440
Provider has a job description	Yes	57.8	504
	No	42.2	368
Provider salary type	Monthly or daily salary	63.7	556
	No regular salary but other compensation	26.0	227
	None	10.2	89
Health facility characteristics			
Health facility type	Hospital/health center	19.0	166
	Health post	81.0	706
Locality	Urban	52.1	454
	Rural	47.9	418
Region	Northern	18.0	157
	Dakar	27.6	241
	Thiès	14.4	126
	Central	19.4	169
	East	4.4	38
	South	16.2	142
General structure equipment composite index	Low	40.5	353
	Medium	27.0	235
	High	32.6	284

Notes: [1] Currency in CFA, 1 USD ~ 580 CFA
[2] Includes 10 respondents who used other methods, which were male condoms, LAM, and counseling on periodic abstinence
[3] Includes 4 unweighted doctors and specialists for users

3.5.2. Family Planning Process

Table 12 shows the quality of counseling and pelvic examination by selected characteristics of clients, providers, and facilities. Overall, the quality of counseling was poor. Just 18 percent of clients were counseled on all three important aspects of their method: how to use the method, possible side effects, and when to return to the facility. Among 872 observed female clients who were provided or prescribed a method, fewer than two-thirds (63 percent) received information on how to use the method, such as dosage and frequency of use, duration of effectiveness, and correct use of natural family planning methods such as the standard days method and lactational amenorrhea (LAM). Among women using pills, injectables, IUDs, or implants, fewer than one-third (29 percent) were counseled on their method's side effects; 37 percent were told when to return for follow-up. Counseling related to method protection from STIs was even less common. Only 9 percent of the observed consultations involved a discussion on whether the method protects against STIs, including HIV. With regard to the clinical examination, only 32 percent of providers performed 8 or more of the 16 listed procedures that should be conducted before, during, and after the procedure.

Table 12. Family planning counseling and clinical examination by client, provider, and facility characteristics

		Family planning counseling										Clinical examination	
		Counseling on how to use method, side effects, and when to return[1]		How to use method[2]		Side effects[1]		When to return[1]		Method protects from STI[2]		Performed a high quality of pelvic examination[3]	
Variable	**Category**	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**
Client's age			**0.170**		0.115		0.176		**0.005**		0.074		0.413
	14-24	22.5		69.1		33.4		47.8		13.1		28.7	
	25-39	15.9		59.8		25.7		33.6		8.1		31.6	
	40-58 or don't know	17.1		62.1		31.6		31.9		4.5		38.3	
Client's education			**0.046**		0.092		0.245		0.111		0.288		**<0.001**
	No education	13.9		58.4		25.8		32.7		6.8		20.7	
	Primary & post primary	22.2		66.5		29.9		40.5		10.8		41.2	
	Secondary or more	21.0		67.0		33.6		42.4		11		42.9	
Client status			**<0.001**		**<0.001**		**<0.001**		**<0.001**		**<0.001**		**0.002**
	New client	38.1		89.2		53.9		60.8		18.1		43.3	
	Returning client	8.9		50.8		18.0		27.0		4.8		25.0	
Contraceptive method used			**0.013**		**<0.001**		**0.001**		**<0.001**		0.547		**<0.001**
	Pills	15.6		77.0		22.2		26.8		7.1		32.2	
	Progestin-only injection	16.0		54.8		27.6		37.4		9.0		21.6	
	IUD or implants[4]	29.0		70.3		45.2		54.5		11.4		60.7	
Provider category			0.586		0.186		0.592		0.707		0.063		0.889
	Nurse or nurse assistant	16.4		58.1		26.9		38.4		13.1		31.0	
	Midwife and other	18.5		64.7		29.5		36.5		6.8		32.4	
Provider sex			0.955		0.158		0.789		0.257		**0.039**		0.813
	Male	18.1		56.3		27.4		42.7		16.1		29.8	
	Female	17.8		64.0		29.0		35.9		7.2		32.3	
Provider years of education			0.972		0.513		0.401		0.770		0.267		0.657
	6-12	18.4		52.9		37.7		31.8		2.3		15.6	
	13-16	18.2		64.0		29.8		36.7		10.3		31.9	
	17+	17.3		62.0		25.3		38.8		7.7		33.4	
Provider training in family planning in the past 24 months			0.644		0.789		0.740		0.394		0.862		0.119
	No	17.1		61.9		28.0		35.3		9.1		37.2	
	Yes	18.8		63.2		29.5		39.3		8.6		26.6	

(Continued…)

Table 12 − *Continued*

		Family planning counseling										Clinical examination	
		Counseling on how to use method, side effects, and when to return[1]		How to use method[2]		Side effects[1]		When to return[1]		Method protects from STI[2]		Performed a high quality of pelvic examination[3]	
Variable	**Category**	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**	**%**	**p-value**
			0.646		0.127		0.277		0.125		0.105		0.064
Provider number of items supervised	None	20.4		65.4		34.3		38.2		7.0		21.3	
	1-5	15.5		55.9		23.9		43.4		5.3		27.5	
	6	18.2		65.3		29.1		33.2		11.7		39.4	
			0.814		0.478		0.803		0.618		0.550		0.9
Provider has a job description	No	17.3		60.7		28.0		38.4		7.8		32.6	
	Yes	18.2		64.0		29.2		36.2		9.6		31.7	
			0.346		0.340		0.740		0.532		**0.003**		0.513
Provider salary type	Monthly or daily salary	19.3		64.5		29.8		38.6		11.7		21.7	
	No regular salary but other compensation	17.1		61.5		27.1		35.1		4.8		34.4	
	None	10.7		53.8		25.7		32.8		1.4		28.2	
			0.138		0.583		0.077		0.120		0.169		**0.019**
Health facility type	Hospital/health center	13.9		64.4		22.7		31.5		5.9		45.3	
	Health post	18.8		62.2		30.1		38.5		9.6		28.1	
			0.295		**<0.001**		0.225		0.524		0.263		**0.001**
Locality	Urban	19.7		70.1		31.3		35.8		7.1		42.2	
	Rural	15.8		54.4		25.8		38.6		10.7		17.9	
			0.545		**<0.001**		0.179		**0.010**		0.339		**<0.001**
	Northern	11.7		49.1		19.6		29.2		4		9.8	
	Dakar	17.2		77.0		30.5		28.0		8.6		54.7	
Region	Thiès	24.3		64.0		40.1		39.0		8.9		23.8	
	Central	17.5		44.6		26.8		49.4		8		21.6	
	East	24.0		43.1		34.6		26.9		7.3		28.2	
	South	18.8		78.6		25.7		48.0		16		29.3	
			0.127		0.373		0.093		0.005		0.842		0.74
General structure equipment composite index	Low	13.3		64.7		23.1		28.5		7.8		30.5	
	Medium	21.8		64.9		34.7		41.6		10		28.9	
	High	20.2		58.1		30.7		44.2		8.4		35.4	
Total		**17.9**		**62.6**		**28.7**		**37.1**		**8.9**		**32.1**	

[1] Only applies to users of pill, injectable, IUD, and implant

[2] Applies to all users, only ten respondents reported using methods other than pill, injectable, IUD, or implant.

[3] Applies to clients who conducted a pelvic exam

[4] Includes 10 respondents who used other methods, which were male condoms, LAM, and counseling on periodic abstinence.

Table 12 also indicates variations in the quality of counseling and pelvic examination associated with selected characteristics of client, provider, and facility. New clients were significantly more likely to receive counseling on all aspects of their method compared with returning clients. For example, 89 percent of new clients compared with 51 percent of returning clients received advice on how to use their method, and 54 percent of new clients compared with 18 percent of returning clients were told about side effects. Similarly, a higher percentage of new clients than returning clients received high quality of pelvic examination, at 43 percent and 25 percent, respectively. Quality of counseling was also associated with the specific method received by the client. Users of pills or injectables were less likely to be counseled on side effects and follow-up services than those who were provided or prescribed implants or IUDs. Users of injectables were also less likely to be advised on how to use the method compared with users of all other methods. Users of implants or IUDs were also more likely to receive a better quality of pelvic examination.

Quality of counseling and pelvic examination were also associated with some characteristics of the facility, including facility type, urban or rural location, and region. The provider's characteristics were less important. Only provider's salary type and sex showed significant associations with counseling on method protection from STIs.

Table 13 presents the results of the adjusted logistic models for the three process outcomes. After controlling for other variables, being a new client was still significantly associated with receiving better quality of counseling and pelvic examination. The odds of receiving high-quality counseling for new clients was more than five times the odds for returning clients ($p<0.001$ for both counseling measures). For pelvic examination, new clients had over twice the odds compared with returning clients (95% CI: 1.3-4.6). Provider's salary type also remained significant; providers who received a monthly or daily salary had nine times higher odds ($p<0.05$) of providing counseling on method protection from STIs compared with providers without a salary. In the adjusted models, personal supervision received by the provider was an important determinant of performing a good-quality pelvic examination, but it was not important in the unadjusted analysis, shown in Table 12. Providers who received all six listed supervisory items in the last six months had 3.3 times the odds ($p<0.01$) of performing a high quality of pelvic examination compared with those who did not receive any personal supervision. Clients observed in health posts were less likely (OR 0.3, $p<0.05$) to receive a high quality of pelvic examination than those in a hospital or health center, and rural facilities had four times higher odds ($p<0.01$) of providing counseling on method protection from STIs compared with urban facilities. The facility equipment structure index was not associated with any of the process outcomes.

Table 13. Adjusted logistic regression of family planning process dependent variables, round 1

Variable	Category	Counseled on how to use, side effects, and when to return[1]		Counseled on method protection from STI[2]		High quality of pelvic examination[3]	
		OR	C.I.	OR	C.I.	OR	C.I.
Clients age (ref.=14-24)	25-39	0.7	0.4 - 1.3	0.7	0.4 - 1.4	0.9	0.5 - 1.5
	40-58 & don't know	1.1	0.6 - 2.1	0.4*	0.1 - 0.9	1.7	0.7 - 3.9
Client's education (ref.=secondary or more)	No education	0.5	0.3 - 1.1	0.5	0.2 - 1.3	0.4*	0.2 - 0.8
	Primary & post primary	1.0	0.5 - 1.8	1.1	0.4 - 2.7	1.0	0.5 - 1.8
Client status (ref.=returning client)	New client	**6.1*** **	**3.7 - 10.2**	**5.3*** **	**2.8 - 10.2**	**2.4** **	**1.3 - 4.6**
Contraceptive method used (ref.=IUD or implants)	Pills	0.6	0.3 - 1.4	1.2	0.4 - 3.4	**0.3** **	**0.1 - 0.7**
	Progestin-only injection	0.7	0.4 - 1.4	1.8	0.8 - 4.3	**0.2*** **	**0.1 - 0.4**
Provider category (ref.=midwife and other)	Nurse or nurse assistant	0.8	0.4 - 1.4	1.4	0.6 - 3.3	1.0	0.4 - 2.8
Provider years of education (ref.=17+)	6-12	1.6	0.4 - 7.1	0.3	0.1 - 2.0	0.3	0.0 - 2.1
	13-16	1.2	0.7 - 2.2	1.2	0.6 - 2.7	0.7	0.3 - 1.7
Provider training in family planning in the past 24 months (ref.=no)	Yes	1.5	0.8 - 2.7	0.8	0.4 - 1.9	0.5	0.2 - 1.0
Provider number of items supervised (ref.=none)	1-5	0.6	0.3 - 1.4	0.8	0.3 - 2.6	2.0	0.7 - 5.8
	6	0.7	0.4 - 1.6	1.4	0.6 - 3.6	**3.3** **	**1.5 - 7.7**
Provider has a job description (ref.=no)	Yes	0.9	0.4 - 1.8	1.4	0.6 - 2.9	0.7	0.3 - 1.6
Provider salary type (ref.=none)	Monthly or daily salary	1.9	0.5 - 6.4	**9.0***	**1.4 - 58.0**	2.1	0.5 - 8.5
	No regular salary but other compensation	1.7	0.5 - 5.5	3.9	0.6 - 24.5	2.6	0.6 - 11.5
Health facility type (ref.=hospital/health center)	Health post	1.6	0.9 - 2.9	1.0	0.4 - 2.4	**0.3***	**0.1 - 0.8**
Locality (ref.=urban)	Rural	0.8	0.4 - 1.6	**4.0** **	**1.4 - 11.6**	0.6	0.2 - 1.6
Region (ref.=Northern)	Dakar	1.0	0.2 - 4.0	2.1	0.5 - 8.4	**4.6***	**1.3 - 16.5**
	Thiès	1.9	0.6 - 6.1	2.0	0.4 - 9.1	2.0	0.4 - 10.2
	Central	0.9	0.3 - 3.1	1.1	0.2 - 5.4	2.8	0.6 - 13.5
	East	1.6	0.3 - 7.1	1.0	0.1 - 9.0	6.0	0.9 - 40.8
	South	0.8	0.2 - 2.8	1.8	0.5 - 7.2	1.9	0.4 - 9.5
General structure equipment composite index (ref.=low)	Medium	1.8	0.7 - 4.7	0.5	0.2 - 1.3	1.6	0.6 - 4.3
	High	1.9	0.8 - 4.5	0.5	0.2 - 1.3	1.0	0.4 - 2.5
Pseudo R2		0.17		0.19		0.26	

[1]Only applies to users of pill, injectable, IUD, and implant

[2]Applies to all users, only ten respondents reported using methods other than pill, injectable, IUD, or implant.

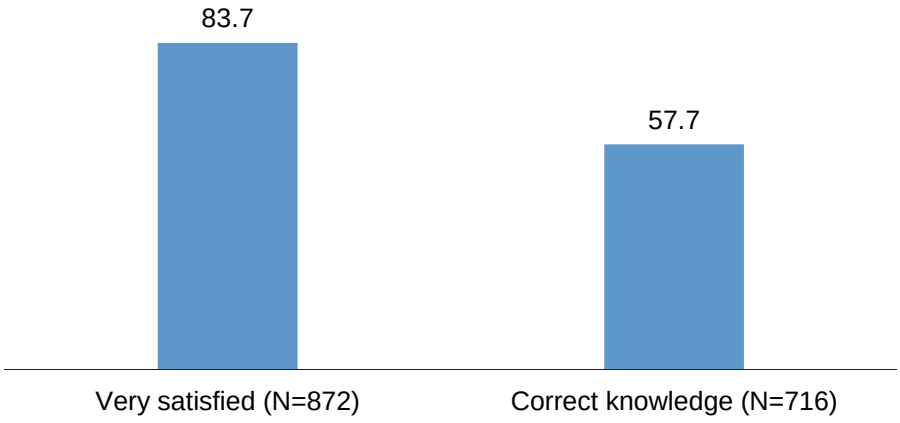
[3]Applies to clients who conducted a pelvic exam

* p<0.05, ** p<0.01, *** p<0.001

3.6. Quality of Care in Family Planning Outcomes

Figure 2 shows the two dependent variables used to assess the outcomes of quality of care in family planning service delivery. The first outcome variable, overall satisfaction with family planning services, indicates that 84 percent of users of pills, injectables, IUDs, or implants were very satisfied with the services they received. For the second outcome dependent variable, only 58 percent of the clients had correct knowledge on whether their method protects from STIs (clients using all methods). Approximately 16 percent of clients did not know whether the method they were using protects from STIs (results not shown). Further analysis of the respondents in the "do not know" category does not clearly indicate whether to group them with the respondents who answered either "yes" or "no," as we cannot know for certain how they would have answered if probed further. Therefore, for this dependent variable, clients who responded that they did not know were removed from the analysis. Consequently the denominator for this variable differs from that of the satisfaction outcome.

Figure 2. Description of outcome dependent variables, all users



3.6.1. Overall Satisfaction with Family Planning Services

Table 14 summarizes the associations of both outcome variables with several covariates representing client, provider, and facility characteristics. The counseling variables produced from the process analysis (taken from the observation data) were also included as part of the provider variables in the outcome analysis. Waiting time, whether the client left with a method, provider years of education, provider number of items supervised, having a job description, salary type, region, and the general structure equipment composite index all had significant associations with overall client satisfaction. Clients who did not have to wait to see a provider and clients who left with a method were more satisfied with family planning services compared with the remaining categories for each variable. Clients who were seen by a provider who had 13-16 years of education had higher overall satisfaction compared with providers with 6-12 years or 17 or more years of education. In addition, clients seen by a provider who had the maximum number of supervisory items, had a job description, and had a monthly or daily salary were more satisfied. The greatest difference in satisfaction appears to be by region, as only 59 percent of clients in the Northern region were satisfied with services compared with 97 percent in the South. Finally, clients who visited facilities with a high general structure equipment composite index were more satisfied than clients who visited facilities categorized as medium or low.

Table 14. Association of overall client satisfaction with family planning services and client knowledge of family planning method's protection from STIs by client's and provider's background characteristics, round 1

Variable	Category	All users that are very satisfied N=872		Correct knowledge of all users N=716	
		(%)	p-value	(%)	p-value
Client's age			0.312		0.181
	14-24	82.1		51.5	
	25-39	83.1		60.3	
	40-58 & don't know	88.5		59.3	
Client's education			0.202		0.169
	No education	84.7		54.5	
	Primary & post primary	85.3		57.6	
	Secondary or more	78.9		64.6	
Fee paid for service			0.707		
	0-9	81.2			
	10-499	81.7			
	500-999	83.3			
	1000 or more	85.8			
Waiting time			**<0.001**		
	No wait	96.5			
	Less than half hour	77.0			
	Half hour to one hour	81.1			
	One hour to 2 hours	88.4			
	2 hours or more	83.6			
Client status			0.859		0.222
	New client	84.1		53.9	
	Returning client	83.5		59.5	
Contraceptive method used			0.090		0.469
	Pills	78.4		57.6	
	Progestin-only injection	85.3		56.3	
	IUD or implants[2]	86.1		63.9	
Client left with method			**<0.001**	-	-
	Yes	85.1		-	-
	No	62.3		-	-
Provider category			0.883		**0.002**
	Nurse or nurse assistant	84.0		66.6	
	Midwife and other	83.6		53.4	
Provider sex			0.114		0.300
	Male	79.5		61.8	
	Female	84.6		56.7	
Provider years of education			**0.007**		0.700
	6-12	83.0		61.7	
	13-16	87.1		58.6	
	17+	78.2		55.7	
Provider training in family planning in the past 24 months			0.278		**0.019**
	Yes	85.3		63.2	
	No	82.4		53.6	

(Continued…)

Table 14 − *Continued*

Variable	Category	All users that are very satisfied N=872 (%)	p-value	Correct knowledge of all users N=716 (%)	p-value
Provider number of items supervised			**<0.001**		**0.004**
	None	73.5		52.3	
	1-5	82.8		49.4	
	6	88.4		64.3	
Provider has a job description			**<0.001**		0.236
	Yes	88.6		59.8	
	No	76.9		54.9	
Provider salary type			**<0.001**		**0.003**
	Monthly or daily salary	91.6		63.0	
	No regular salary but other compensation	70.7		49.9	
	None	67.6		46.2	
Counseled on how to use method			0.495		0.137
	Yes	84.4		60.1	
	No	82.5		53.8	
Counseled on side effects of method[1]			0.068		0.993
	Yes	79.5		57.4	
	No	85.3		57.5	
Counseled on when to return[1]			0.249		0.983
	Yes	81.6		57.4	
	No	84.9		57.5	
Counseled on whether method protects from STI					0.165
	Yes			66.8	
	No			56.7	
Health facility type			0.084		0.756
	Hospital/health center	79.8		58.8	
	Health post	84.6		57.5	
Locality			0.316		0.922
	Urban	85.0		57.5	
	Rural	82.3		57.9	
Region			**<0.001**		**<0.001**
	Northern	58.9		44.9	
	Dakar	87.9		64.6	
	Thiès	75.0		53.4	
	Central	94.5		46.7	
	East	91.5		61.0	
	South	96.7		78.1	
General structure equipment composite index			**0.020**		
	Low	79.3			
	Medium	85.3			
	High	87.8			

[1] Only applies to users of pill, injectable, IUD, and implant
[2] This includes 10 respondents who use other methods, which were male condoms, LAM, and counseling on periodic abstinence.

As Table 15 shows, some of the variables that had significant associations with overall satisfaction in Table 14 lost their significance in the adjusted logistic regression models. Only client's waiting time, provider's years of education, and region remained significant. In addition, client's education and

counseling on side effects, in Model I, and counseling on when to return, in Model II, became significant in the adjusted regression model.

The results of the logistic model summarized in Table 15 indicate that clients with no education or with primary and post-primary education had almost twice the odds of being very satisfied compared with clients with secondary or more education, in both Model I and Model II ($p<0.05$ for all). Clients who did not have to wait at all to see a provider had 5.4 times the odds of being very satisfied ($p<0.05$) compared with those who waited two hours or more in Model I, and 5.7 times the odds ($p<0.05$) in Model II. Clients who left with a family planning method had approximately four times the odds of being very satisfied ($p<0.01$) compared with those who did not leave with a method, in both models. The confidence intervals for this variable are very wide due to the small number of clients who did not leave with a method (only 6 percent, as shown in Table 10). The results also indicate that clients who were seen by providers having 6-12 years of education or 13-16 years of education had almost three to four times significantly higher odds of being very satisfied compared with clients who saw providers with the highest level of education (17 years or more). No pattern was observed in the odds ratios for provider's education—that is, the odds of a client being very satisfied did not increase with increasing years of the provider's education. An interesting finding was the effect of counseling on side effects (Model I) and when to return for follow-up (Model II). Both counseling variables indicated that clients who did not receive any counseling had higher odds of being satisfied compared with clients who received counseling; (OR = 2.6, $p<0.01$ in Model I and OR = 2.0, p-value<0.05 in Model II). Finally, the highest odds ratios for being very satisfied were for the region categories, with clients from the South region of Senegal having 12.3 times the odds of being satisfied compared with Northern Senegal, in Model I ($p<0.001$), and 13.9 times in Model II (p-value<0.001). Clients in Central Senegal had over 10 times the odds of being very satisfied compared with those in the North region (OR = 10.7, $p<0.001$, Model I and OR = 11.5, $p<0.001$, Model II).

Table 15. Adjusted logistic regression of clients very satisfied with family planning services and client's correct knowledge of method's protection from STIs, round 1

		Very satisfied Model I[1]		Very satisfied Model II[1]		Correct knowledge[2]	
Variable	**Category**	**OR**	**C.I.**	**OR**	**C.I.**	**OR**	**C.I.**
Clients age (ref.=14-24)	25-39	0.9	0.5 - 1.6	0.9	0.6 - 1.6	1.4	0.9 - 2.2
	40-58 & don't know	1.9	0.8 - 4.4	1.8	0.7 - 4.3	1.3	0.7 - 2.3
Client's education (ref.=secondary or more)	No education	**2.1***	1.2 - 3.9	**2.1***	1.2 - 3.8	0.7	0.4 - 1.2
	Primary & post primary	**2.0***	1.0 - 3.7	**2.0***	1.1 - 3.7	0.9	0.5 - 1.5
Fee paid for service (ref.=1000 or more)	0-9	1.3	0.6 - 3.0	1.4	0.6 - 3.1		
	10-499	0.9	0.4 - 2.0	1.0	0.4 - 2.2		
	500-999	0.9	0.5 - 1.6	1.0	0.6 - 1.8		
Waiting time (ref.=2 hours or more)	No wait	**5.4***	1.2 - 24.0	**5.7***	1.3 - 25.2		
	Less than half hour	0.8	0.4 - 1.4	0.8	0.4 - 1.4		
	Half hour to one hour	1.0	0.5 - 2.1	1.1	0.5 - 2.2		
	One hour to 2 hours	1.2	0.5 - 3.0	1.2	0.5 - 2.8		
Client status (ref.=returning client)	New client	1.2	0.6 - 2.4	1.1	0.6 - 2.2	0.7	0.5 - 1.1
Contraceptive method used (ref.=IUD or implants)	Pills	1.1	0.5 - 2.7	1.1	0.5 - 2.6	1.1	0.6 - 2.0
	Progestin-only injection	1.4	0.7 - 2.9	1.4	0.6 - 3.0	0.9	0.5 - 1.6
Client left with method (ref.=no)	Yes	**3.9****	1.5 - 10.4	**3.7****	1.4 - 10.0		

(Continued…)

Table 15 − *Continued*

Variable	Category	Very Satisfied Model I[1] OR	Very Satisfied Model I[1] C.I.	Very Satisfied Model II[1] OR	Very Satisfied Model II[1] C.I.	Correct Knowledge[2] OR	Correct Knowledge[2] C.I.
Provider category (ref.=midwife and other)	Nurse or nurse assistant	1.0	0.6 - 1.9	1.1	0.6 - 1.9	**2.1****	1.3 - 3.2
Provider years of education (ref.=17+)	6-12	**3.6***	1.2 - 10.3	**2.9***	1.0 - 8.3	1.7	0.8 - 3.7
	13-16	**3.8*****	2.2 - 6.6	**3.4*****	1.9 - 6.1	1.1	0.8 - 1.7
Provider training in family planning in the past 24 months (ref.=no)	Yes	1.5	0.9 - 2.6	1.5	0.9 - 2.5	**1.7****	1.2 - 2.5
Provider number of items supervised (ref.=none)	1-5	1.0	0.6 - 2.0	1.2	0.7 - 2.3	0.7	0.4 - 1.2
	6	0.9	0.5 - 1.6	0.9	0.5 - 1.7	1.1	0.7 - 1.9
Provider has a job description (ref.=no)	Yes	1.1	0.6 - 1.9	1.1	0.6 - 1.9	1.0	0.6 - 1.5
Provider salary type (ref.=none)	Monthly or daily salary	2.0	0.9 - 4.5	2.0	0.9 - 4.6	1.3	0.7 - 2.5
	No regular salary but other compensation	0.9	0.4 - 1.8	0.9	0.4 - 1.8	1.3	0.7 - 2.5
Counseled on how to use method (ref.=no)	Yes	1.3	0.8 - 2.2	1.3	0.8 - 2.2		
Counseled on side effects of method[1] (ref.=yes)	No	**2.6****	1.5 - 4.6				
Counseled on when to return[1] (ref.=yes)	No			**2.0***	1.2 - 3.5		
Counseled on whether method protects from STI (ref.=no)	Yes					1.2	0.6 - 2.3
Health facility type (ref.=hospital/health center)	Health post	1.5	0.8 - 2.8	1.4	0.8 - 2.6	0.7	0.5 - 1.1
Locality (ref.=urban)	Rural	0.9	0.5 - 1.7	1.0	0.5 - 1.8	1.3	0.8 - 2.0
Region (ref.=Northern)	Dakar	**5.3*****	2.1 - 12.9	**4.8*****	1.9 - 11.9	**3.0****	1.4 - 6.3
	Thiès	**2.8***	1.2 - 6.6	**2.5***	1.1 - 5.9	1.9	1.0 - 3.7
	Central	**10.7*****	3.6 - 32.3	**11.5*****	3.7 - 36.3	1.3	0.6 - 2.6
	East	**5.2***	1.4 - 19.0	**4.6***	1.3 - 16.6	2.0	0.8 - 4.9
	South	**12.3*****	3.4 - 45.4	**13.9*****	3.7 - 52.5	**4.2*****	1.9 - 9.2
General structure equipment composite index (ref.=low)	Medium	0.9	0.5 - 1.7	0.9	0.5 - 1.5		
	High	1.0	0.5 - 2.0	1.0	0.5 - 1.9		
Pseudo-R²		0.25		0.25		0.09	

Note: For client satisfaction outcome, Model I includes the variable for counseled on side effects, and Model II includes the variable on counseled on when to return. [1] Users of pill, injectable, IUD, and implant. [2] All users.
* p<0.05, ** p<0.01, *** p<0.001

3.6.2. Knowledge of Method's Protection from STIs

As Table 14 shows, it was mainly the provider's characteristics that had a significant association with the client's knowledge of whether their method protects from STIs. No background characteristics of clients were significantly associated with their knowledge. A significantly higher percentage of clients with

correct knowledge were found among clients who saw providers categorized as nurse or nurse assistant, or clients who saw providers receiving family planning training in the past two years. Provider's number of supervised items received and provider's salary type were also significantly associated with client's knowledge; however, these two variables lost significance in the adjusted logistic regression, as Table 15 shows. Region was also found to be significantly associated with client's knowledge; in the South 78 percent of clients had correct knowledge compared with 45 percent in Northern Senegal ($p<0.001$). An interesting finding was the lack of significance in the association between a provider's counseling on the method's protection from STIs and the client's knowledge of the topic.

Table 15 summarizes the estimates of logistic regression for clients having correct knowledge of their method's protection from STIs. Only three independent variables remained significant in the adjusted logistic regression model: provider category, provider family planning training, and region. Clients who saw a nurse or nurse's assistant had twice the odds of having correct knowledge compared with clients who saw a midwife or other provider (OR = 2.1, $p<0.01$). Similarly, clients who saw a provider who received family planning training in the last two years had higher odds of having correct knowledge compared with clients who saw a provider with no recent training (OR = 1.7, $p<0.01$). For region, only the South and Dakar had significant odds ratios in the logistic regression model for correct knowledge. Clients in the South had 4.2 times the odds of having correct knowledge compared with clients in the North ($p<0.001$), while clients in Dakar had three times the odds of having correct knowledge compared with Northern Senegal ($p<0.01$).

4. Discussion

The purpose of this report was to assess the quality of care in family planning services in Senegal in order to identify areas for intervention. Improvements in the quality of care in family planning services can contribute to the increased use and continuation of contraceptive methods. Data from the first two rounds of the Senegal Continuous SPA were the basis of the analysis. The analysis was organized around three components of quality of care: structure, process, and outcome. This discussion will highlight some of the variations across facilities and providers in the quality of care in family planning service delivery.

4.1. General Structure

Family planning services were most commonly available at the health post level, the third of four tiers of the health system in Senegal, and least available in health huts, the lowest tier, although the proportion of health huts offering family planning services increased between the two rounds of the Senegal Continuous SPA. Almost all health facilities—excluding health huts—had access to an improved source of water, adequate sanitation, and a private room. When comparing hospitals, health centers, and health posts, in terms of infrastructure, health posts were at a disadvantage in electricity, communication equipment, emergency transport, and computer and Internet access. Health posts were also at a disadvantage in terms of the availability of essential medicines and diagnostic tests. In both rounds, they had the lowest percentage of facilities with a high score for the composite indices constructed for medicines and diagnostic tests using several indicators as identified by the WHO Service Availability and Readiness Assessment (SARA) indicator guideline. Improvements in basic infrastructure as well as readiness and availability of equipment, diagnostic tests, and medicines are needed for these facilities to be able to provide good quality health care (O'Neill et al. 2013). Since health posts appear to be the main facility for providing family planning services, improvements in the infrastructure of health posts can help improve the quality of care provided.

Health huts, which are supervised by a health post and are mainly found in remote locations, were found to have poor infrastructure. Of particular concern is the lack of communication equipment and emergency

transport for a large proportion of the health huts in both rounds of the SPA, leaving women vulnerable in emergency situations. Moreover, the proportion of health facilities with communication equipment in rural areas, where most health huts are found, significantly decreased between the two rounds.

There were large differences between regions in availability of basic infrastructure, equipment, diagnostic tests, and medicines. The North region had the fewest facilities with electricity and communication equipment in round 2. The South and East regions also had a low proportion of facilities with communication equipment (only about a third of the facilities), and for the East region this decreased significantly, by 61 percentage points, between the two rounds. In both rounds, the North and Dakar had the highest percentages of facilities with a low score on the equipment composite index. For the diagnostic test index the highest percentages of facilities with a low score were in Dakar and Thiès in round 1, and Dakar, South, and East in round 2. The medicine index had a first component of variance explained below 30 percent, so caution is required in interpreting the results; however, Dakar had the highest percentage of facilities with a low score on the medicine index in both rounds. The findings of the low scores for Dakar region seem unexpected as this is a very urban region. In the analysis of the availability of progestin-only injectables in the health facilities, the Dakar region was also found to have significantly fewer injectables available compared with the North region in round 1. However, the analysis of the process and outcome components have shown that Dakar outperforms the Northern region. This indicates that the structure component is not necessarily linked to the process and outcome components in the quality of care.

Some of the suggested improvements highlighted in this analysis are at the national level in terms of infrastructure (for instance, electricity and communication) and therefore may take time to achieve. Other improvements can be achieved directly at the facility level in terms of improvements in the availability of commodities, which include emergency transport, equipment, diagnostic tests, and medicines.

4.2. Family Planning Structure

Many improvements in the availability of family planning methods were seen between the rounds, especially in availability of family planning methods that are less commonly used (i.e., male condoms, female condoms, IUDs, implants, emergency pills, and cycle beads). A significant increase was also found for health huts in their availability of combined oral and progestin-only pills. This increase is important, as having more choices of methods available at health facilities can be an approach to raise levels of contraceptive use (Ross and Stover 2013). However, without further research we cannot know whether more options will in fact lead to higher contraceptive prevalence in Senegal. These improvements in the availability of family planning methods can be attributed to successful interventions, such as the informed push distribution of contraceptives aimed at reducing stockouts of modern contraceptive methods, especially pills, injectables, IUDs, and implants (Daff et al. 2014). This intervention began in some regions of Dakar and Saint-Louis in June 2012 and is expected to be implemented nationwide by July 2015.

While the availability and clients' use of progestin-only injectables is high, the combined injectable method is less popular. In addition, the availability of this method decreased significantly, by 35 percentage points, between the two rounds. This result is disconcerting since the combined injectable, which contains progestin and estrogen hormones, is medically preferable to its progestin-only counterpart due to less disruption in the menstrual cycle and faster return to fertility compared with progestin-only injectables (Gallo et al. 2008). Further study is required to understand why the combined injectable is not used in the health facilities. The significant decrease should be examined in the upcoming rounds of the Senegal Continuous SPA.

Public health facilities had much higher odds of having progestin-only injectables and combined oral pills available compared with private facilities. These findings are consistent with a study that examined services in Ghana, Tanzania, and Kenya (Hutchinson, Do, and Agha 2011), which found that more methods were available at all levels of public facilities than in private facilities. Availability of progestin-only injectables and combined oral pills did not differ significantly by region (except for the East for pills in round 1) or locality in the adjusted models, in both rounds. Although the confidence intervals are wide, more research may be required to understand why private facilities appear to be less prepared in these two family planning structure indicators. In addition, hospitals seem to be less prepared in terms of the availability of these methods. In both rounds, health posts were more likely than hospitals to have pills. In round 1, health centers were more likely than hospitals to have injectables.

4.3. Process

With few exceptions, the results have shown little variation in counseling or the high quality of pelvic examinations provided, by characteristics of the client, provider, or facility. The proportion of clients who received counseling was relatively low. Providers appeared to concentrate counseling on how to use the method (63%) and less on side effects (29%) or when to return (37%). In addition, only 9% of the clients received counseling on their method's protection from STIs; only a third of the clients received high-quality pelvic examinations. None of the providers' characteristics were significantly associated with the different forms of counseling or high quality of pelvic examinations, with the exception of provider sex and provider salary type, which were found to be significantly associated with counseling on STIs. In the adjusted models, counseling on STIs was significantly more likely from providers who had a regular monthly salary than from those with no salary. This difference may indicate that providers with no salary are less motivated or less inclined to provide counseling. (Rowe et al. 2005) mentioned that the administrative environment of health workers, including salary, could influence their performance. Another important provider factor associated with the quality of services is personal supervision received by the provider (Thatte and Choi 2014). Supervision, especially with resulting feedback, can directly link to quality of care. After a formative supervision intervention in health facilities in four districts of Senegal, significant improvement was observed in a range of service areas across all districts (Suh, Moreira, and Ly 2007). In the present analysis, in the adjusted models, supervision did not have an effect on whether the provider gave counseling, but providers who received all six supervisory items were over three times as likely to provide high-quality pelvic examinations. Only a few of the other covariates representing the client and facility characteristics were significantly associated with provider counseling or pelvic examination. In the adjusted models, new clients were more likely to receive counseling or a high-quality pelvic exam compared with returning clients. Perhaps providers assumed that returning clients had already been counseled about their method in previous visits and thus did not need further counseling at each visit. However, counseling may be required more than once to ensure that clients understand fully how to use their family planning method, are aware of the side effects, and know whether their method protects from STIs. Only 9 percent of the providers were observed to provide counseling on whether the client's method protects from STIs, and 42 percent of clients had incorrect knowledge of whether their family planning method protects from STIs. Many women believe incorrectly that their method protects them from STIs.

In the adjusted models for counseling, the only facility characteristic found to be significant was locality. Rural facilities had four times the odds of providing counseling on method's protection on STIs compared to urban facilities. In the adjusted models for high quality of pelvic examinations, health facility type and region had one significant category. Health posts were found to be significantly less likely to provide a high quality of pelvic examination. This is most likely due to the absence of the equipment and specialists available for providing pelvic exams in health posts. Similarly, the Dakar region, which has more hospitals and health centers than the other regions, was significantly more likely to provide pelvic examinations of high quality, compared with the other regions. The structure equipment index, which was

used as a proxy for the facility's overall structure, was not significantly associated with the process-dependent variables in the unadjusted and adjusted analysis. In addition, virtually no significant relationships were found between the basic infrastructure indicators in Appendix A and the process-dependent variables (results not shown). The link between structure and process has been reported as being weak by Donabedian (Donabedian 1988); Basinski et al. indicated that this relationship depends on which structure and process components are compared (Basinski et al. 1992). This potentially explains how the region of Dakar, housing the capitol of Senegal, could score low on the equipment index yet still provide a higher quality of pelvic examinations. Because providing the various forms of counseling and high quality of pelvic examinations does not differ greatly by the client, provider, or facility characteristics, with some exceptions, it appears that the promotion of adequate counseling and a high level of pelvic examination is required in all the health facilities of Senegal.

4.4. Outcome

The final component of quality of care is the outcome. This was measured by the client's satisfaction with the family planning service they received and by their knowledge of their method's protection from STIs. As the outcome analysis showed, most clients (84 percent) reported being very satisfied with the family planning services they received, but satisfaction is negatively associated with some aspects of counseling. The process indicators of whether the client received counseling on side effects and when to return actually significantly decreased the odds of being satisfied. Counseling on how to use the method was not significantly related to satisfaction, perhaps implying that the provider/client interaction during counseling was unsatisfactory. Clients who were seen by providers with less than 17 years of education were more satisfied than those who were seen by providers with 17 or more years of education. As other studies have found (Agha and Do 2009; Aldana, Piechulek, and Al-Sabir 2001; Hutchinson, Do, and Agha 2011), waiting time was a significant predictor of client satisfaction. Clients who did not have to wait had higher odds of being satisfied than those who waited two hours or more. However, the other categories of waiting time were not significant. Having no education, primary education, or post-primary education also increased the odds of being very satisfied compared with having secondary or higher education. The same result has been found in Kenya (Agha and Do 2009), but in another study involving three sub-Saharan countries this was not always found to be true (Hutchinson, Do, and Agha 2011). The structure equipment index was not a significant predictor of client satisfaction. There were large and significant variations across regions. The North region had the lowest level of client satisfaction, and the South and Central regions had the highest. The South region, followed by Dakar, also had significantly higher odds of clients with correct knowledge of whether their method protects from STIs. It may be worth examining further the health facilities in the South region to understand why they produce higher levels of client satisfaction than other regions.

After adjusting for all the covariates in the model, the only significant predictors of client's correct knowledge on whether their method protects from STIs were provider's category, provider's training, and region. Clients who saw a nurse or nurse assistant had twice the odds of having correct knowledge compared with those who saw a midwife or other provider. Provider training on family planning almost doubled the odds of clients having correct knowledge. Although most facilities had at least one staff member trained in family planning (Figure 1), only 45 percent of providers who prescribed or provided a modern family planning method had receiving family planning training in the past two years (Table 11). The differences in family planning training by provider category were not significant (results not shown). These findings imply that training providers in family planning could improve the client's knowledge of their method's protection from STIs. While correct knowledge could be gained elsewhere and not only from a family planning provider, providing more training for midwives and other types of providers, as well as providing more facilities with family planning guidelines, may be effective interventions to improve client knowledge of STI protection.

As in the analysis of client satisfaction, counseling was not found to improve outcomes. Clients who received counseling on whether their method protects from STIs were not more likely to have correct knowledge. In a study in Zambia, the odds of correct knowledge were higher among clients who were counseled in their method's protection from STIs (Chikamata et al. 2002). That study also found a much higher proportion of clients who had correct knowledge compared with Senegal—75 percent—among users of a method other than condoms (Chikamata et al. 2002). The apparent lack of impact of the counseling on STIs in Senegal suggests that this type of counseling offered in the health facilities is of poor quality. This result is similar to the absence of a significant impact of counseling on how to use a method and a *negative* impact of counseling on side effects, and when to return, on client satisfaction with family planning services. Further analysis on the effectiveness and quality of the counseling provided in family planning services may be required to understand why counseling is not improving outcomes. The apparent lack of effective counseling could be a result of the manner in which the counseling was provided, including the provider/client interpersonal relationship, which is an important aspect of providing quality of care in family planning (Bruce 1990), as well as in maternal health care (Srivastava et al. 2015). Effective counseling can improve outcomes; a study on client-centered versus physician-centered consultations found that clients who received a client-centered consultation significantly increased their likelihood of satisfaction with services and method continuation at seven months (Abdel-Tawab and Roter 2002).

In the 2015 Senegal SPA, observation and exit interviews will be available for family planning, and future analysis can provide comparisons between the 2012-2013 and 2015 rounds of the Senegal Continuous SPA surveys. This type of analysis may provide insight as to whether improvements have been made in the process and outcome measures of quality of care in family planning services and whether counseling is able to improve outcomes.

4.5. Limitations

The complexity of defining quality of care, as well as selecting and constructing the indicators, is one of the limitations of the study. There is also the question of whether providers who know they are being observed are providing better or more counseling than normal. That is, they may perform differently under observation, a phenomenon known as the Hawthorne Effect (Mayo 2003; McCambridge, Witton, and Elbourne 2014). Even though the overall percentage of providers offering different types of counseling is relatively low, the percentage could be even lower when the providers are not being observed.

There are limitations to the outcome measures as well. Client satisfaction may be over-reported due to the client perhaps not wanting to speak against their providers (Donabedian 1988); satisfaction is also subjective. Knowledge of whether a family planning method protects from STIs could be gained from other sources and may not be attributed to the providers or facility characteristics. It can be difficult to find appropriate and objective outcome measures of quality of care, since health outcomes do not depend solely on the quality of care. Another limitation, when comparisons were made between the two rounds in the structure analysis, is the short time period between the two surveys. Despite the short time period, differences were detected, and these indicated that many facilities had increased their availability of family planning commodities. Fewer changes were detected between the rounds in terms of the basic infrastructure of facilities. This was expected, as infrastructure requires more time for change compared with increasing the availability of family planning commodities or equipment.

5. Conclusions

The analysis of the first two rounds of the Senegal Continuous SPA indicate that improvements may be required in the structure, process, and outcome of the quality of care in family planning services. Some of the basic infrastructure components that are essential for providing quality of care in health services are lacking. Significantly more methods of family planning became available between the two rounds, especially methods that are less commonly used, such as emergency pills and condoms, suggesting that the mix of available methods may be improving. However, the availability of the combined injectable method decreased significantly between the two rounds. For the two most used methods—progestin-only injectables and combined oral pills—public facilities were more likely to have these methods available in their facilities compared with private facilities.

Improvements may be required in the level and effectiveness of counseling and examinations provided by health workers. The percentage of providers who gave the necessary family planning counseling to their clients as well as a high quality of pelvic examination was relatively low. New clients were more likely to receive counseling and high-quality pelvic examinations compared with returning clients. Few other characteristics of clients, providers, and facilities were significant predictors of receiving counseling and a high quality of pelvic examination. The effectiveness of the counseling provided in facilities with family planning services was also not seen in the analysis of the outcomes of overall satisfaction and the client's knowledge of their method's protection from STIs. Clients who were counseled on side effects and when to return were less likely to be satisfied, and whether clients received counseling on their method's protection from STIs was not a significant predictor of having correct knowledge. This may indicate that not only is more counseling required in the health facilities in Senegal, but also more training may be required on how to provide more effective and client-centered family planning counseling. For the outcome of correct client knowledge of their method's protection from STIs, which was relatively low at 58 percent, clients who saw a provider with family planning training were almost twice as likely to have correct knowledge compared with clients who saw a provider with no training, indicating that more training in the methods of family planning may be another desirable type of intervention.

One of the main findings is the apparent weak link between the structure of the facility (measure by the equipment index) and the process and outcome components. For example, the Dakar region had poor scores for equipment, diagnostic tests, and medicine, and was less likely to have progestin-only injectables available, when compared to the Northern region, but Dakar significantly outperformed the Northern region in terms of high quality of pelvic examinations, client satisfaction, and client's knowledge of their method's protection from STIs. Improvements in structure may not be required to achieve improvements in process and outcome, and it may be more effective to focus interventions on provider training in family planning and counseling methods in order to improve outcomes. However, this conclusion is probably related to the type of structure components being examined; some structural components are essential for a functioning and well-performing facility that offers family planning services of high quality. Further analyses of the remaining rounds of the Senegal SPA will explore these findings, but the initial results provided in this report have identified some of the factors related to providers and facilities where interventions could improve the quality of care in family planning.

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Appendix A

Description of basic infrastructure variables

Variable	Definition
Electricity	Facility is connected to national grid that is always available during service hours, or has other sources of electricity such as a generator or solar system.
Improved water source	Access to water source from piped, public tap, standpipe, tubewell/borehole, protected dug well, protected spring, or rain water.
Adequate sanitation facilities	Toilet/latrine uses flush or pour flush to piped sewer system, septic tank, pit latrine, or other place; or ventilated improved pit latrine, pit latrine with slab, or composting toilet.
Communication equipment	Facility has an observed and functioning landline or an observed and functioning facility-owned cellphone. There were no observations for variables for short-wave radio.
Private room	Facility has a private examination room or other room with auditory and visual privacy.
Computer and Internet	Facility has an observed and functioning computer and access to Internet for at least two hours on the days that client services are offered.
Emergency transport	Facility has an observed functional ambulance that has fuel, or has access to an ambulance or other vehicle for emergency transport in another facility.

Appendix B

Variables used to construct the structure PCA of equipment, diagnostic tests, and medicines

Equipment		Diagnostic tests		Medicines	
Adult scale		Hemoglobin		Amoxicillin adult	
Child scale		Blood glucose		Amoxicillin child	
Thermometer		Malaria		Ampicillin powder	
Stethoscope		Urine dipstick protein		Beclometasone inhaler	
BP machine (digital or manual with stethoscope)		Urine dipstick glucose		Ceftriazone injection	
Light source		Urine pregnancy		Glivenclamide	
Sharps container (safety box)		HIV		Insulin injection	
Waste receptacle (pedal bin) with lid and plastic bin liner		Syphillis		Metformin	
Disinfectant				Omeprazole	
Syringes				ORS	
Running water with soap or alcohol rub				Paracetamol	
Gloves				Salbutamol	
Guidelines for standard precautions				Zinc	
Round 1	**Round 2**	**Round 1**	**Round 2**	**Round 1**	**Round 2**
31.4% (0.750)[1]	**34.2% (0.723)**	**58.6% (0.898)**	**42.7% (0.806)**	**26.0% (0.747)**	**23.1% (0.702)**

Note: All variables were coded as binary variables, having item versus not having the item. Variables with negative loadings or loadings below 0.1 were removed.

[1] % explained by first component in PCA (Alpha)

Appendix C

Family planning process variables

Variables used for constructing indicators on quality of counseling

Method*	How to use[1]	Side effects[2]	When to return[2]	Protection from STIs[1]
Pills or injectables	When to take What to do if forget	Initial side effects that may occur (such as nausea, weight gain, and breast tenderness)	Return to clinic if side effect appears	Method does not protect against STIs, including HIV
Condoms	Each can be only used once			Dual protection
IUD	Good for up to 5-12 years Users should regularly check strings after each menstruation	Common side effects that may occur	Return to clinic 3-6 weeks post-insertion or after first menses Return to clinic if side effects continue	Method does not protect against STIs, including HIV
Implants	Good for 3-5 years	Initial side effects that may occur (such as nausea, weight gain, breast tenderness)	Return to clinic if side effects continue	Method does not protect against STIs, including HIV
Periodic abstinence or SDM	How to identify a woman's fertile period No intercourse during woman's fertile period without alternative method (condom)			Method does not protect against STIs, including HIV
LAM	Must be exclusively (or near-exclusively) breastfeeding Not effective after menstruation begins again Infant must be less than age 6 months			Method does not protect against STIs, including HIV

Note: Only methods provided or prescribed to observe clients were included.
[1] Apply to users of all methods reported.
[2] Apply to only users of pills, injectables, IUDs, and implants.

Appendix D

Variables used for constructing the quality of pelvic examination indicator

Before Procedure

1 Ensured that client had visual privacy

2 Ensured that client had auditory privacy

3 Explained procedure to client before starting

4 Prepared all instruments before starting procedure

5 Washed hands with soap and water or disinfected hands before starting procedure

6 Put on latex gloves before starting procedure

During Procedure

7 Used sterilized or high-level disinfected (HLD) instruments

8 Asked the client to take slow deep breaths and to relax muscles

9 Inspected the external genitalia

10 Explained speculum procedure to client (if speculum used)

11 Inspected the cervix and vaginal mucosa (using speculum and light)

12 Performed a bimanual examination

After Procedure

13 Removed gloves

14 Washed or disinfected hands after removing gloves

15 Wiped contaminated surfaces with disinfectant

16 Placed reusable instruments in chlorine-based disinfecting solution immediately after the procedure