

Review article

Pharmacy provision of sexual and reproductive health commodities to young people: a systematic literature review and synthesis of the evidence[☆]

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Abstract

Background: We conducted a systematic review of peer-reviewed literature on youth access to, use of and quality of care of sexual and reproductive health (SRH) commodities through pharmacies.

Methods: Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol, we searched for publications from 2000 to 2016. To be eligible for inclusion, articles had to address the experiences of young people (aged 25 years and below) accessing SRH commodities (e.g., contraception, abortifacients) via pharmacies. The heterogeneity of the studies precluded meta-analysis — instead, we conducted thematic analysis.

Results: A total of 2842 titles were screened, and 49 met the inclusion criteria. Most ($n=43$) were from high-income countries, and 33 examined emergency hormonal contraception provision. Seventeen focused on experiences of pharmacy personnel in provision, while 28 assessed client experiences. Pharmacy provision of SRH commodities was appealing to and utilized by youth. Increasing access to SRH commodities for youth did not correspond to increases in risky sexual behavior. Both pharmacists and youth had reservations about the ease of access and its impact on sexual behaviors. In settings where regulations allowing pharmacy access were established, some pharmacy personnel created barriers to access or refused access entirely.

Discussion: With training and support, pharmacy personnel can serve as critical SRH resources to young people. Further research is needed to better understand how to capitalize on the potential of pharmacy provision of SRH commodities to young people without sacrificing qualities which make pharmacies so appealing to young people in the first place.

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1. Introduction

There are over 1.8 billion young people between the ages of 10 and 24 years in the world today, 90% of whom live in developing countries [1]. Comprising one quarter of the world's total population [2], youth are faced with a number of challenges to their sexual and reproductive health (SRH) and well-being. SRH challenges are not unique to this population and are faced by men and women of all ages.

However, even when services are available in a given community, added financial, cultural or social barriers may prevent young users from utilizing them, especially if providers and communities are biased against youth access [3].

As a result, 16 million girls aged 15–19 years and 1 million girls under age 15 years give birth every year, and complications during pregnancy and childbirth are the second leading cause of death for 15–19-year-old girls globally [4]. Additionally, an estimated 3 million girls aged 15 to 19 years undergo unsafe abortions each year [4]. Millions of women worldwide have an unmet need for contraception. However, in many regions of the world, adolescents wanting to avoid pregnancy can be up to twice as likely as adult women to have an unmet need for modern contraception [5]. Data from 61 low- and middle-income

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countries (LMICs) estimate that 33 million young women aged 15–24 years have an unmet need for contraception [6], demonstrating a need to improve access to and uptake of SRH commodities.

Pharmacy access — that is, making commodities available either over-the-counter (openly accessible at a pharmacy) or behind-the-counter (dispensing contingent on evaluation from a pharmacist) — is one strategy that might help to overcome barriers for young people unwilling or unable to access services from another health care provider. Pharmacy provision allows for more direct access to SRH commodities. To date, there has been very little documentation, for adults or youth, around pharmacy-based distribution of reproductive commodities. Encouragingly, however, the health and well-being of adolescents and young people are receiving increased attention and emphasis in a number of global-level collaborations and strategies developed in recent years, including Family Planning 2020 [7], the UN Secretary-General's Global Strategy for Women's Children's and Adolescents' Health [8] and even some targets from the newly minted Sustainable Development Goals [9]. It seemed particularly timely, therefore, to identify strategies for best providing needed SRH commodities to a young population. As such, we conducted a systematic review of the peer-reviewed literature to identify any evidence on young people's (aged 25 years or younger) access to, use of and quality of care of SRH commodities in pharmacies.

2. Methods

We conducted this systematic review according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) [10]. We searched for studies that addressed the following research question:

What is the experience of young people (25 years and younger) who access SRH commodities through pharmacies?

2.1. Search strategy

We searched PubMed, Embase, Popline and Scopus databases for relevant publications without language restrictions published between 1 January 2000 and 1 May 2016. We searched for articles published from the year 2000 onwards in light of a noticeable, turn-of-the-century shift in policies worldwide towards increasing SRH commodities' availability through pharmacy provision. The search strategy for each database was developed by mapping keywords associated with the two major components of the research question ("SRH commodities" and "pharmacies") onto established controlled vocabulary for the selected database (for example, MeSH for PubMed or Emtree for Embase). The search strategies developed for each database are available in [Appendix A](#). We also searched the Cochrane database for existing or related systematic reviews. We screened the references of all articles identified for data extraction. Excluding duplicates, in total, we identified 2842

records for potential inclusion. [Fig. 1](#) contains a flow diagram of the study selection process.

2.2. Screening

We first screened articles by title, yielding 350 potential articles. We then dual screened (L.G. and M.J.H.) the abstracts for relevance, also eliminating articles that did not have an abstract in English, Spanish, Portuguese or French; nonresearch articles (e.g., commentaries, editorials); and posters/presentations from meetings. Where there was disagreement between the screeners as to whether an article should be included or excluded, we included the article. All articles that either screener was unsure about were discussed in person until an inclusion/exclusion decision was reached. We also screened references from two reviews of the literature (the first on community pharmacy supply of emergency hormonal contraception [11] and the second on emergency contraception in South Africa [12]); this provided an additional four articles for full-text review. We were left with 114 articles which were read in full by L.G.

2.3. Inclusion/exclusion criteria

We included all articles that considered the provision of SRH commodities to young people via pharmacies. All studies focused on or contained data on people aged 25 years or younger; this also meant including broader population-based studies that disaggregated data by age group.

SRH commodities included contraceptive methods, abortifacients and sexually transmitted infection (STI) self-test kits. We were interested in the overall experience of commodity provision to young people in pharmacies from either the young person's or the provider's perspectives. We excluded all studies that only reported on changes in prevalence of pharmacy provision (i.e., population-based trend data) or any other studies that did not provide information on young people's experiences acquiring the commodities.

Ultimately, L.G. abstracted 49 articles (presented in [Table 1](#)) using data extraction forms modified from a previous review [13]. The included studies employed qualitative and quantitative, experimental and observational designs, and were equally heterogeneous in the outcomes measured. As a result, meta-analysis was not possible — instead, we used thematic analysis to synthesize results across the diverse data available. Additionally, given the variety of study methods used, there was no one (or even two) scoring system that could be used to evaluate quality; instead, [Table 1](#) also includes detailed notes on each study's strengths and weaknesses.

3. Results

Of the 45 studies identified from the 49 abstracted articles, a majority were from high-income countries, most notably the United States (22 articles, including 1 that spanned the US–Mexico border) and the United Kingdom (12 articles). Only six articles were from low- and middle-income countries. Emergency

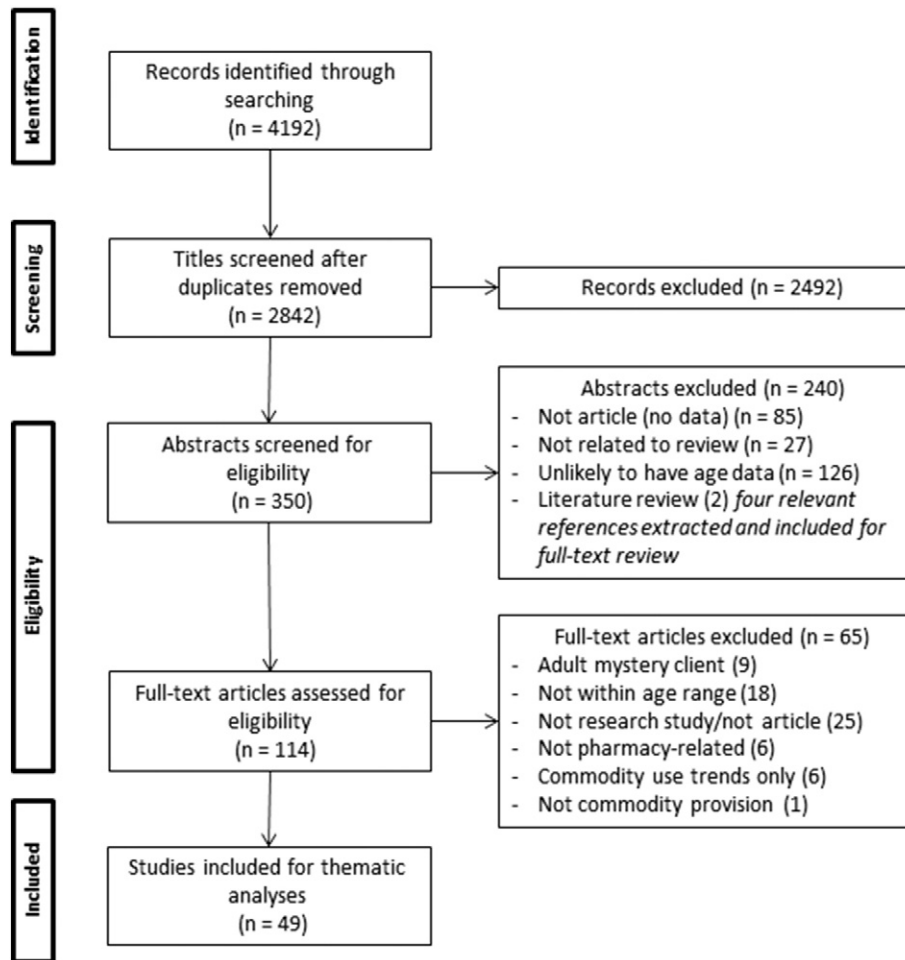


Fig. 1. Study selection flow diagram.

contraceptive pills (ECPs) were the subject of 33 of the 49 articles; the remaining 16 included provision of misoprostol as an abortifacient (one article), oral contraception (seven articles), STI self-screening kits (four articles) and SRH commodities in general (four articles). Most ($n=28$) described client (real or simulated) experiences, 17 described the experiences of the pharmacist or pharmacy personnel, while the remaining 4 provided both pharmacists' and clients' perspectives. Ten of the 49 articles included only adolescent populations (10–19 years), while an additional 6 focused specifically on youth (10–25 years). The remaining studies included a broader age range of clients but contained enough age-disaggregated data that we could report on some adolescent- or youth-related findings. The use of mystery clients to assess client experience in pharmacies was a popular methodology and featured in 10 articles. Below, we summarize our findings into thematic areas.

3.1. The appeal of pharmacies for reaching young people

Young people expressed satisfaction with their experience accessing SRH commodities from pharmacies [14–17]. Users cited convenience as a major draw of pharmacies, specifically their longer operating hours (including evenings and weekends)

[18–20], accessible locations [14] and ease of commodity access [21,22]. Five articles cited the speed to obtain SRH commodities, such as oral contraception or ECPs, as a major draw of pharmacy access [16,17,21,23,24]. Young people accessed emergency contraception (ECP) faster, with fewer hours elapsing from the time of unprotected sex, when ECPs were available over-the-counter or without a prescription as compared to clinic or prescription access [16,23]. Corroborating these findings, having to obtain a prescription for a needed SRH commodity was cited as an obstacle to access for young women in two studies [21,25].

With regards to anonymity and privacy, the evidence was mixed. Some clients reported privacy as one of the advantages of pharmacy provision [14,15,17,22]; however, clients and providers also noted a lack of privacy — particularly when running through commodity-dispensing protocols or other screening procedures — as a key concern [18,26,27].

3.2. SRH outcomes and ease of use

3.2.1. Repeated ECP use and risky behaviors

Over one quarter of the included articles assessed the relationship between pharmacy availability of SRH

Table 1
Description of studies, ordered by publication year

Authors/year/ country	Study design and methods	Study population	Relevant outcomes	Regulations	Results	Strengths	Limitations
Barrett et al. 2000 United Kingdom [42]	Qualitative (in-depth interviews)	Providers: <i>n</i> =18 community pharmacists <i>n</i> =6 general practitioners	Attitudes towards over-the-counter availability of ECPs	ECPs available only through physician prescription	Providers expressed concerns about repeat use in terms of promiscuity	Reflexivity and first-hand accounts of providers' beliefs	Study takes place prior to deregulation, and centers on hypothetical deregulation
Wilson et al. 2000 United Kingdom [20]	Observational (school- and mail- based survey)	Clients: <i>n</i> =711 males and females aged 13–19	Current provision of SRH commodities in pharmacies	Hormonal contraception available only with a prescription	29% of males, 13% of females got contraception from pharmacist at last intercourse. Embarrassment (55%), lack of information (25%) and confidentiality (27%) are key barriers to pharmacy access Pharmacists' who never dispensed ECPs expected ECP users to be adolescents or sexually irresponsible women who use ECPs on a regular basis.	Inclusion of males and females. Assessed views on pharmacy access vs. FP clinics and GPs	Low response rate for postal survey component
Seston et al. 2001 United Kingdom [43]	Qualitative (focus group discussions)	Providers: <i>n</i> =14 pharmacists	Concerns about deregulation of ECPs; perceived support and training needs for deregulation	ECPs available in pharmacies under "patient group direction" — a pharmacist protocol to determine eligibility for ECP use	Pharmacists who did dispense found that most clients were women in their 20s who had experienced failure of contraceptive method	Includes providers who had and had not dispensed ECPs	ECP provision to <i>youth</i> is never explicitly explored; instead, it arises from concerns about who might abuse ECP access
Sucato et al. 2001 United States (Washington) [14]	Observational (self-administered survey)	Clients: <i>n</i> =126 females ages 15–21, received ECPs from a pharmacist	Reasons for going to a pharmacist; satisfaction with care provided by pharmacist	Pharmacies evaluated are part of state program to train pharmacists on ECP prescribing and dispensing, and make ECP available for purchase by women without prescription.	Reasons included "easy to get to" and "privacy protection." If services didn't exist, 20% wouldn't know where else to go, 22% would wait and see if they became pregnant. Clients felt counseling was clear (99%) and were satisfied with time to ask questions (95%)	Respondents were able to report on actual decision- making and experience in obtaining ECPs from a pharmacy	Low response rate (36%). 25% of sample never received the survey

Ratanajamit et al. 2002 Thailand [57]	Randomized controlled trial Intervention: course to increase ECP knowledge and improve dispensing skills. Mystery clients assess outcomes	Providers: <i>n</i> =60 pharmacy and drugstore personnel	Knowledge of and practice in dispensing ECPs	ECPs available over-the-counter	Significantly higher knowledge of ECPs (score of 22.1 vs. 18.5), higher levels of provision of dosing information (45 vs. 12 pharmacists providing), but no statistical difference in medical history taking between intervention and control group	Robust study design 3-month follow-up	Youth issues never explicitly explored, study included because mystery clients are <25
Raymond et al. 2003 United States (various settings) [34]	Longitudinal Study mimics pharmacy access. Women requesting ECPs asked to review ECP package designed for OTC use and were then sold ECPs	Clients: <i>n</i> =585 females presenting for an ECP prescription at 8 Planned Parenthood sites and 5 pharmacies in 5 cities	Use of ECP product under (simulated) over-the-counter conditions	ECPs available only through physician prescription	With ECP access, minors not significantly more likely than older women to use products in a contraindicated or incorrect manner and did not have more adverse events or subsequent pregnancy	Study modeled OTC setting closely. Low loss to follow-up (only 7%)	Limited generalizability to women self-selecting ECPs
Conard et al. 2003 United States (Indiana) [51]	Cross-sectional (self-administered, mail-in survey)	Providers: <i>n</i> =948 chief pharmacists of active licensed pharmacies in Indiana	Pharmacists' attitudes and practices related to SRH services for adolescents.	ECPs and other contraception only available through physician prescription	Pharmacists <45 were more likely to state they dispensed ECPs. Male pharmacists more likely to think adolescents asked questions about prescriptions. Few felt trained in adolescent issues (13%), confidentiality (23%)	Excellent response rate (70%). Use of clear case studies to provide insight into prescribing practices	Limited generalizability to other cadres of pharmacy workers and beyond the state of Indiana
van Bergen et al. 2004 Netherlands [41]	Cohort (picked up <i>Chlamydia trachomatis</i> screening kit at pharmacy and followed up for test results, questionnaire)	Clients: <i>n</i> =446 women (<30 years) recruited from a pharmacy, who were offered kits	Response rates, chlamydia test results, survey results	Prescription refills of oral contraceptives can be ordered remotely and collected at pharmacy, no GP contact required	CT-positivity detected among ethnic minority population where 15% were CT positive, as compared with 6%–10% found in other Dutch STI clinics. Higher rates of CT positivity among youth (13% among 15–	Vulnerable population focus: multicultural, low income. Cross-checked urine samples with test results. Explored nonparticipation	Generalizability to other populations, pharmacies

Table 1 (continued)

Authors/year/ country	Study design and methods	Study population	Relevant outcomes	Regulations	Results	Strengths	Limitations
Killick et al. 2004 United Kingdom [35]	Cross-sectional (questionnaire)	Clients: <i>n</i> =419 pharmacy ECP clients (ages 16–39)	Knowledge of ECP use, planned future contraceptive use	ECPs available for purchase from a pharmacist for women aged 16+	19-year-olds, and 14% among 20–24-year-olds) as compared to older age group (5% among 25–29-year-olds) Most of the users (72%) were <20. 49% of women in their 20s, 20% of women <20 and 31% of those 30+ paid.	Data from 112 different pharmacies	Systematic bias in questionnaire distribution and response rates
Raymond et al. 2004 United States (North Carolina) [29]	Cross-sectional (screening data to an ECP telephone counseling and prescription service)	Clients: <i>n</i> =7774 female callers, 88% aged<29 years, 37% aged<19 years	ECP use patterns	Special program: any woman needing ECPs could call service and be screened. US\$40 fee for prescriptions	83% adolescent users received 1 prescription (compared with 84% of users overall). 12% adolescent users received 2 prescriptions (compared with 11% of users overall). 5% adolescent users received 3 prescriptions (compared with 5% of users overall)	Generalizable data available for various ethnicities and education levels. Extended hours of call service provides data on weekend use	Only data were those obtained as part of screening process, no ability to follow up with participants.
Raine et al. 2005 United States (California) [30]	Randomized controlled trial Three arms (clinic access, pharmacy access, and advanced provision to ECPs)	Clients: <i>n</i> =2117 female clients (ages 15–24) enrolled from 4 FP clinics	Use patterns, risky sexual behaviors and pregnancy/STIs	State legislation allowing women to obtain ECPs from pharmacies without consulting a physician	Women in pharmacy group were no more likely to use ECP than women in the clinic group. Women in the pharmacy group (8.5%) not more likely than women in the clinic group to use ECP 2+ times.	Explores pharmacy provision distinct from advance provision. Follow-up rates equal across groups, no difference in characteristics of women lost to follow-up	High contamination across study arms. Could not be an intent-to-treat analysis as some participants were lost to follow-up.
Blanchard et al. 2005 South Africa [44]	Quantitative (in-person questionnaire administered to pharmacy providers	Providers: <i>n</i> =34 pharmacy providers from 28 pharmacies	Providers' knowledge and attitudes towards providing ECPs	ECP available for purchase in pharmacies without prescription and for free in public health facilities	No significant differences in sexually risky behavior, pregnancy, or STIs by study group Fewer than half felt <18s should get ECP access. One third did not offer ECP to <18s.	Careful screening of pharmacies for eligibility (pharmacies visited an average of four	Response bias Recall bias: reliance on pharmacist self-report

					Fewer than one third thought <18s should get advance ECP provision.	times before interview conducted)	
					Concern that ECP access increases risky behavior		
Lloyd et al. 2005 United Kingdom [36]	Observational (retrospective pharmacy record review) Pharmacies submitted monthly returns over 24 months	Clients: n=1412 Records of pharmacy clients	Trends in age of ECP users	All pharmacies in study area could provide ECPs on request (14 and 15 year olds had to demonstrate competence)	At beginning, about 21% of the clients were <20. Increased to 46% after two quarters, and afterwards clients<20 accounted for 42%–45% of consultations. By end of study, community pharmacies were the largest provider of ECP	Study site in a rural area. Data available from before program start	Limited generalizability to other areas of the UK
Harper et al. 2005 United States (California) [31]	Randomized controlled trial Three arms (clinic access, pharmacy access, and advanced provision of ECPs)	Clients: n=964 female FP clinic clients, aged 15–24, recruited from four clinics in study area	Pharmacy use by age, risky sex, STIs and pregnancy	State legislation allowing women to obtain ECPs from pharmacies without consulting a physician	ECP use among adolescents<16 (38%) similar to group aged 16–17 (38%), and higher than those aged 18–19 (33%). Adults (aged 20–24) had lower overall use (24%). Pharmacy access no more likely than clinic access participants to use ECP, engage in risky behaviors, get STIs or be pregnant	Robust study design with specific youth focus (15–24), computer-generated randomization, researchers blinded to participant group allocation	Participants enrolled from clinics, making them not representative of those who seek services from non-facility sources
Bissell et al. 2006 United Kingdom [45]	Qualitative (in-depth interviews)	Providers: n=45 pharmacists participating in program to supply ECPs without charge	Pharmacist views on provision of ECP to young people	ECPs made available for purchase from a pharmacist for women aged 16+. In some areas there is an option for obtaining free access to ECPs	Confidentiality noted as advantage of pharmacies. Concern that pharmacy supply encouraged “irresponsible” attitudes to contraception. Particular concern for younger women without a regular partner	A diversity in gender, ethnicity, age of pharmacists, and socio-demographics of areas where pharmacies were located	Response bias: all pharmacists were participating in a special program designed to make ECPs more accessible to young people

Table 1 (continued)

Authors/year/ country	Study design and methods	Study population	Relevant outcomes	Regulations	Results	Strengths	Limitations
					and those who chose to have unprotected sex.		
Chin-Quee et al. 2006 Jamaica [58]	Qualitative (observation, interviews)	Both: <i>n</i> =78 pharmacists interviewed <i>n</i> =524 females (age not specified) who purchased OC interviewed <i>n</i> =14 adolescent mystery client observations	Pharmacist willingness to sell OC to minors (<16 years) Access to OCs for 16 year olds	Oral contraception available for purchase in pharmacies without prescription	Girls<14 requested ECPs Mystery client refused access by 9 of 15 pharmacists and told she needed prescription. When MC could buy the pill, no report of negative reaction. When asked whether they would sell to minors (<16), 46% of pharmacists said they would not, 38% said they would. Age was the most mentioned factor in pharmacists' decisions to restrict customer access to OCs	Use of multiple data sources allows for triangulation in collection of data on contraceptive-accessing experience	Sampling limits generalizability. Limited data collected on youth self-reported experiences as only 3% of interviewed pill customers were<20
Landau et al. 2006 United States (nationwide) [25]	Cross-sectional (nationally representative telephone survey)	Clients: <i>n</i> =811 females, age 18–44, at risk of unintended pregnancy	Experiences with hormonal contraception and interest in pharmacy access to reproductive health commodities	Certain states have legislation allowing pharmacy access to ECPs.	Younger women (aged 18–25) nearly twice as likely (1.78 OR) as women 36+ to support pharmacy access to OC, patch and ring. Uninsured, single, and young women more likely to have had problems obtaining a prescription for contraception	Random-digit dialing to obtain a nationally representative sample	Majority of data are not age-disaggregated and therefore not extractable. Low response rate (37%)
Lara et al. 2006 Latin America (unspecified) [63]	Qualitative (in-person interviews with pharmacy personnel and mystery clients visits to same pharmacies)	Both: <i>n</i> =100 pharmacies visited by mystery clients (aged 15–24, male and female) <i>n</i> =97 pharmacies where	Pharmacy staff knowledge and provision practices of misoprostol and other medical abortifacients	Abortion legally restricted, but research suggests many women frequently use misoprostol (often obtained from pharmacies) to self-induce abortion	Half of participants knew of drug to “interrupt a pregnancy.” Increased to 74% during MC encounters. 60% said misoprostol was available in interview; 53% said it was available to MCs.	Pharmacy staff survey followed by MC evaluation of the same pharmacy compares staff's reported and actual behavior.	Youth provision not explored: MC are aged 18–25, but no comment on any age bias. Same pharmacies received MC

		a staff member was interviewed			6% of those recommending misoprostol in interviews and 17% in MC visit offered dosage effective for medical abortion.	Inclusion of male and female MC allows for assessment of pharmacy staff interactions with clients of different sex	visits and staff surveys, but MC did not necessarily interview the same staff member as was surveyed
Lewington et al. 2006 United Kingdom [23]	Observational (pharmacy record review)	Clients: $n=203$ females, aged 13–20, requesting ECPs from two family planning clinics, and community pharmacies	Differences in access experience between young women accessing ECPs at family planning clinics vs. community pharmacy settings	ECPs in study community could be provided free to women <20. Women <16 who could demonstrate competence also had access	61% of the staff interviewed reported at least one request for abortifacient, more from women (71%) than men (31%); average age of requester: 22 Weak but significant inverse correlation between age and time to access ECPs via pharmacy. Clients <16 significantly more likely to not have used any form of contraception.	Specific focus on women age 20 and under, data age-disaggregated, provides needed focus on younger adolescents (16 and under)	Small sample of youth under age 16
Foster et al. 2006 United States (California) [37]	Cross-sectional (questionnaire)	Clients: $n=426$ females, aged 13–47, requesting ECPs from 25 pharmacies participating in the direct ECP access program	Previous use of ECP, information on unprotected intercourse, reason for requesting ECP and barriers to obtaining ECP	Post training, pharmacists can be certified to provide ECP without a prescription. No federal law in place providing prescription-free access.	Clients took significantly less time to access ECPs from pharmacies (41h median at clinic compared to 16h at pharmacy) Pharmacy faster and more convenient than a doctor. Interest in getting more SRH services from pharmacist (contraceptives, STI testing). <16s took 27h longer to access ECP than women aged 30+,	Questionnaire completed on site, reducing barriers to participation. Demographic information available for all women accessing ECPs	Operating hours of pharmacies affected time to obtain ECP. Respondent bias — participants women who requested ECP

Table 1 (continued)

Authors/year/country	Study design and methods	Study population	Relevant outcomes	Regulations	Results	Strengths	Limitations
Peremans et al. 2007 Belgium [18]	Qualitative (focus group discussions)	Providers: <i>n</i> =33 (4 FGDs) general practitioners <i>n</i> =24 (3 FGDs) pharmacists <i>n</i> =26 (5 FGDs) school physicians	Health professionals' experiences dealing with ECP requests	ECP are accessible in pharmacies free of charge	clinically and statistically significant delay Pharmacists report many ECPs sold in weekend and evenings, reluctance to dispense to men and young girls. Concern with privacy in pharmacy and community for counseling young patients. Pharmacists at ease with opportunity to help adolescents, quality counseling by pharmacists a concern, often refer to GPs Respondents (57.7%) believed patients receiving ECP should be a certain age: mean of 17.25 years Over 1/3 were refused ECPs Of those that provided, 1/3 asked for ID, almost half asked to confirm minor status.	Asking similar questions of three cadres of health workers to triangulate experiences. Including health professionals from both in-school and out-of-school settings	Assessed only self-report of behavior — no other way to compare reported views and behavior to actual performance
Griggs et al. 2007 United States (Texas) [59]	Cross-sectional (mail-in survey)	Providers: <i>n</i> =148 community pharmacists	Knowledge and perceptions of ECP and dispensing	ECPs only available by prescription	Respondents (57.7%) believed patients receiving ECP should be a certain age: mean of 17.25 years	Extensive piloting of study instrument prior to its implementation	Minimal youth-related data
Delotte et al. 2008 France [26]	Qualitative (adolescent mystery client requesting ECPs)	Clients: <i>n</i> =53 pharmacies visited by MC random sample of all pharmacies in the city	Adolescent experience obtaining ECPs in pharmacies	ECPs available anonymously and for free through pharmacies to minors who meet dispensing criteria	Over 1/3 were refused ECPs Of those that provided, 1/3 asked for ID, almost half asked to confirm minor status. Fewer than half that provided gave information on use or side effects. None provided additional SRH counseling	Adolescent MC recorded actual rather than reported pharmacist behaviors	Low generalizability
Krishnamurti et al. 2008 United States (Pennsylvania) [46]	Mixed-Methods (interviews and surveys) Structured surveys were administered either on paper or electronically and consisted of a	Clients: <i>n</i> =30 interviews <i>n</i> =125 survey	Peer decision-making around sex and contraception, knowledge of ECPs, awareness and use of ECPs; prediction of effect of increased	Federal approval of over-the-counter sale of ECPs to women 18+	45.8% teens 16+ and 44% teens <16 thought their peers would have more unprotected sex with increased ECP access. When asked who should be able to purchase	Focus on high-risk populations (racial minorities, urban area). Open-ended interview guide allowed natural	Social desirability and response bias based on sensitivity of topics

	combination of closed and open-ended questions	females aged 12–19, from “at-risk” communities	ECP availability on behavior		ECPs without a prescription, 18% chose “anyone aged 12+,” 43% chose “anyone aged 16+,” 23% chose “anyone 18+” and 7% said no one.	conversation among participants talking about a taboo subject	
Arnet et al. 2009 Switzerland [33]	Pharmacy record review Official 1-page ECP written assessment form is used during consultation and helps pharmacists make the decision to administer ECPs	Clients: <i>n</i> =729 (380 from 2003, 349 from 2006) females, aged 15–49, obtaining ECPs accessing ECPs from 18 pharmacies in 3 cities	Profile of ECP users just after deregulation and three years later	ECPs accessible without prescription in pharmacies for women 16+, provided: a pharmacist dispenses, a counseling interview takes place	<16s less likely to know about ECP, more likely to think that greater availability would increase unprotected sex Stratification of the study population by age groups showed no differences in the contraceptive methods used between groups. Reuse significantly more frequent in group 2006 women aged 18–21 than group 2003 (21.3% vs. 33.1%, <i>p</i> <.001). Significant correlation observed between span of time until reuse and age (<i>p</i> <.01)	Opportunity to assess client use of ECPs when deregulation took place and three years later. Retrospective design assured that pharmacies were not biased by the study	Forms based on patient recall and reporting. No age-disaggregated data provided on contraception use during ECP request period
Brabin et al. 2009 United Kingdom [40]	Pharmacy record review Pharmacists offered screening kit with questionnaire after completing the ECP protocol	Clients: <i>n</i> =2904 females, age range unspecified, requesting ECPs	Previous ECP use and chlamydia treatment	ECPs available free, without prescription in pharmacies for women <25. Pharmacies also offered mail-in <i>Chlamydia trachomatis</i> screening	Only one quarter of women provided ECPs were offered screening. Using actual (rather than grouped) ages, there was a significant increase in the number of positive tests with age. 24/264 returned samples in total were positive (9.1%)	Pharmacy records during study allowed for later screening of proportion of kits offered to clients, and proportion of kits accepted and returned by clients	Lack of understanding why clients did not return the test, uncertainty as to whether clients felt obligated to accept test kits
Sampson et al. 2009 United States	Mixed methods (mystery client (MC) and interview)	Both: <i>n</i> =115 pharmacies called with mystery clients	Comfort providing ECP to adolescents; ability for adolescents to obtain method	<18s can obtain ECPs without a prescription from designated	Rural pharmacies calls less successful than urban, Spanish	Study design provides opportunity to compare reported vs. actual behavior.	Did not assess actual provision of ECPs.

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Table 1 (continued)

Authors/year/ country	Study design and methods	Study population	Relevant outcomes	Regulations	Results	Strengths	Limitations
(California) [56]	MC phone calls to pharmacies in English and Spanish, posing as a 15- or 18-year-old needing ECPs	<i>n</i> =22 pharmacists and clinical providers interviewed		pharmacies. ~1/5 of state pharmacies enrolled in this system	speakers less successful than English speakers. Pharmacist concern with effect on young girls, whether they were appropriate health professional to prescribe Those who did dispense cited desire to help young women	MC represented understudied adolescent populations	Cannot determine how age related to accessing ability
Glasier et al. 2010 United Kingdom (Scotland) [15]	Qualitative (mystery client)	Clients: <i>n</i> =40 pharmacies visited by mystery clients	ability for youth to obtain ECPs, information provided by pharmacist, perceived attitude, privacy of consultation space	ECPs available for free, without a prescription, from pharmacies to women aged 13+ across Scotland, through nationwide patient group direction	ECP was dispensed in 26 of 40 (65%) pharmacies. In 12 (43%) pharmacies where ECP was offered, MC asked about future plans for contraceptive use. A consultation occurred in 35 pharmacies, 83% in a private consultation room. 31 pharmacists (98%) considered to be nonjudgmental; 12 were very pleasant (34%), 18 pleasant (51%)	Random selection of pharmacies for study inclusion. Single MC visited included pharmacies, completed data collection form immediately following visits	Youth never explicitly explored, study was included because mystery clients are below 25. For all intents and purposes, this is a study of adults
Potter et al. 2010 United States–Mexico border [38]	Cross-sectional (in-person, structured survey)	Clients: <i>n</i> =1046 females, 18–44 accessing OC from a FP clinic in Texas (<i>n</i> =532) or a pharmacy in Ciudad Juarez (<i>n</i> =514)	Experience obtaining pills and perceived advantages and disadvantages of using that source.	oral contraception available free from selected FP clinics in United States. Women can also buy contraception in Mexico without prescription	Age positively associated with crossing the border to access oral contraception from Mexican pharmacies. More US clinic users among 18–24 (34% v 23% using Ciudad Juarez pharmacy)	Study participants contain large number of traditionally understudied women: Spanish-speaking, low income	Many factors explain reluctance to cross international border. Minimal age-disaggregated data
Thomas et al. 2010 United Kingdom [39]	Qualitative (interviews)	Providers: <i>n</i> =26 pharmacists completing questionnaire	Experience providing screening kits to clients, including why many pharmacists did NOT offer	Pharmacies in study area offer free ECPs to women under 25 years of age. Participating	Pharmacists' decision to offer screening was personal rather than financial. None willing to approach a client in a long-term relationship.	Discrepancies in knowledge vs. behavior reported in questionnaire could be probed	Sample was pharmacists who opted to participate in the screening program.

		n=12 pharmacists interviewed	screening to eligible clients	pharmacies also offered postal <i>chlamydia</i> <i>trachomatis</i> screening	Pharmacists felt ideally placed to talk to clients. Less educated clients would not see benefit of screening <20s seen as poorly informed and at higher risk because of “promiscuity,” more likely to take a kit. <16s seen as more reluctant and shy	during the in-depth interview	This group displayed low adherence to protocol, in that many did NOT offer screening to eligible clients
		Recruited from pharmacies participating in <i>Chlamydia trachomatis</i> screening					
Dabrera et al. 2011 United Kingdom [27]	Qualitative (semistructured interviews)	Providers: n=10 pharmacists from pharmacies registered with <i>Chlamydia</i> <i>trachomatis</i> screening program	Challenges to offering <i>chlamydia</i> screening	Nationwide <i>chlamydia</i> <i>trachomatis</i> screening program offers screening opportunistically to young people (aged 15–24) in pharmacies	Concerns about privacy available. Concerns also expressed about offering screening to less- knowledgeable <16s. Perception that screening only appropriate in relation to other SRH services and that it was difficult to bring up screening when clients attended for non-SRH complaints. Suggestion to use leaflets or promotions to encourage screening	Pharmacists interviewed reflected mix of multiple-site and single-site pharmacies in the study area	Very small sample size, subject to volunteer bias — only 10 of 17 pharmacists approached agreed to participate
Mackin et al. 2011 United States (Iowa) [47]	Cross-sectional (telephone survey including closed and open-ended questions)	Providers: n=713 pharmacies, (surveyed 405 before and 308 after policy change allowing sales of ECPs to women 18+)	Availability of ECPs and reasons for continued non-availability	During data collection, ECPs approved for sale without prescription in pharmacies to women 18+	After deregulation, 70% of pharmacies had ECP available. Percentage of pharmacists who agreed that ECP is safe for teens actually decreased significantly, from 43.8% before to 27.9% after deregulation	Statewide study Comparison of stocking practices and pharmacist beliefs before and after policy change	Minimal youth-related data. 21% of pharmacies declined to participate in study, response bias
Ehrle et al. 2011 Nicaragua [48]	Cross-sectional (researcher-administered semistructured survey)	Providers: n=93 pharmacy personnel Random sample of all licensed, operating pharmacies in the city	Knowledge of and attitudes towards ECPs	ECPs not available through public health services, but are available with or without prescription in private pharmacies	Majority of participants (85%) believed that females<16 could not safely take ECPs. Concern selling ECPs because adolescents could abuse it.	Selected pharmacies visited up to three times during study in order to obtain face-to-face interviews with eligible participants	Results not generalizable to rest of the country. Recall and social desirability bias based on topic sensitivity

Table 1 (continued)

Authors/year/ country	Study design and methods	Study population	Relevant outcomes	Regulations	Results	Strengths	Limitations
Maharaj et al. 2011 South Africa [49]	Qualitative (in-depth interviews)	Providers: <i>n</i> =30 retail pharmacists (<i>n</i> =20), health workers from NGO-operated FP clinics (<i>n</i> =2), nurses from public general clinics (<i>n</i> =6), nurses from public FP clinics (<i>n</i> =2)	Health workers' views and experiences supplying ECPs	ECPs available without a doctor's prescription. Accessible in public health facilities at no cost and are sold in commercial pharmacies	13% would sell to a minor without parental consent. Men more willing than women to provide to minors Providers in private facilities report that requests for ECP on the rise among young women. Concern of ECP promoting sexual promiscuity among young people. Private sector (pharmacists) only stock dedicated ECPs because the product is more expensive so people need to "think twice"	In-depth perspectives of public sector health providers, commercial pharmacists, and specialized FP providers Study provides opportunity to explore lingering barriers to ECP provision	Limited youth-related data Lack of privacy, frequent interruptions, and suspicion towards the research. Social desirability and recall bias
Rafie et al. 2011 United States (California) [52]	Cross-sectional (self-administered, web-based or paper survey)	Providers: <i>n</i> =502 pharmacy students recruited from all California schools of pharmacy	Willingness to provide contraception to minors	ECPs available without prescription in pharmacies to women 18+. State regulation allows trained pharmacists to sell ECPs to all women.	Providers reported refusing to supply ECPs because unsure about age at which a client can purchase EC products without a guardian's consent Student pharmacists indicated interest (96.2%) in providing hormonal contraception (pill, patch, and ring) under statewide protocol to both minors and adults (53.3%), adults only (40.6%), or minors only (6.2%) Participants obtaining ECPs without prescription more likely to use within 24h of unprotected sex than those who obtaining with prescription (OR: 2.17, <i>p</i> <.05).	Opportunity to assess views of new pharmacy practitioners Comprehensive coverage of all schools of pharmacy in state Ability to compare experiences of adolescents in states with and without pharmacy access	Limited youth-related data, as questionnaire contained only one question about willingness to provide to minors Not able to calculate a response rate. Response bias Social desirability bias
Rubin et al. 2011 United States (nationwide) [16]	Cross-sectional (self-administered, web-based survey)	Clients: <i>n</i> =531 females, aged 14–19, who had engaged in unprotected intercourse when they were aware of ECPs	Access to ECPs, barriers to use, satisfaction with access experience	ECPs available without prescription in pharmacies to women 18+ nationwide (17+ by study end) 9 states allow access without age limits			

Apikoglu-Rabus et al. 2012 Turkey [50]	Cross-sectional (self-administered, web-based survey)	Providers: $n=667$ pharmacists recruited from a professional networking website/online forum for pharmacists	Counseling practices and attitudes regarding ECP	ECPs are meant to be dispensed with a physician's prescription. In practice, customers can purchase products directly from community pharmacies	Minors who obtained in pharmacist access states more likely to report satisfaction with their experience (OR: 3.05 $p<.05$) Only 52%–57% of pharmacists had positive attitude towards: “teenagers and youngsters can take responsibility for the use of ECPs”; “ECPs give women increased sexual safety”; and “ECPs increase women's control of reproduction”. 58% of pharmacists agreed ECP should be limited for sale to 18+. 52% agreed that teenagers can responsibly use ECP	Comparisons between pharmacist practices based on sex and age of pharmacists Insight into practice when policy does not permit dispensing without a prescription	Recall/social desirability bias — self-completed survey on sensitive topic Limited focus on youth as study asked ECP dispensing in general
Raine et al. 2012 United States (various) [24]	Longitudinal Pharmacy availability of ECPs simulated, eligible participants read study product label and self-determined whether to use the product (and how)	Clients: $n=345$ females, aged 11–17, requesting ECPs	ECP use, pregnancy, and adverse events	ECPs approved for sale without prescription in pharmacies to women 17+ nationwide during data collection. Study simulates access for women 11+	96.7% (298) of participants who received product used it by the 1-week follow-up. 274 (92.9%) correctly used it <72 h after unprotected sex. Neither age nor previous use of emergency contraception associated with correct use.	Participant self-screen on ECP offers detailed data on label comprehension and access competency for young adolescents. Special focus on including young adolescents in sample	Response bias — recruitment from FP clinics, means recruiting care-seeking youth
Richman et al. 2012 United States (Florida) [53]	Cross-sectional (self-administered, mail-in survey)	Providers: $n=272$ random sample of registered pharmacists in the state of Florida	Knowledge and attitudes around ECP dispensing as well as actual dispensing experience	ECPs approved for sale without prescription in pharmacies to women 18+ nationwide. State conscience clauses	1 in 5 participants who used study product reported additional ECP use within the follow-up period Reported comfort in dispensing ECPs varied: 67% reported comfort dispensing to adult women; 42% to men, 39% to adolescents	Randomly selected sample of pharmacies. Survey instrument was pilot tested for face validity. Construct	Selection bias — only English-speaking pharmacists. Low generalizability.

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Table 1 (continued)

Authors/year/ country	Study design and methods	Study population	Relevant outcomes	Regulations	Results	Strengths	Limitations
				allows for refusal to dispense		validity and reliability also established	Limited youth-related data
Wilkinson et al. 2012 United States (various) [62]	Qualitative (mystery caller) Mystery client telephone calls to pharmacies posing as 17-year-old in need of ECP or the physician of a 17-year-old patient in need of ECP	Clients: $n=943$ every commercial pharmacy in five US cities, called by mystery client	Accuracy of information provided to adolescents and physicians of adolescents when requesting ECPs	ECPs approved for sale without prescription in pharmacies to women 17+ nationwide	Average estimated time for medication to be available significantly higher for adolescents than physicians (45 vs. 39 h, $p<.0001$). Adolescent callers placed on hold more (54% vs. 26%, $p<.0001$) and less likely to talk to pharmacist (3% vs. 12%, $p<.0001$) than physicians. 19% adolescent callers told they could not obtain ECP at all (vs. 3% in physician calls, $p<.0001$)	Comprehensive sampling of commercial pharmacies. Adolescent vs. physician MC calls separated by at least 2 weeks	Calls made only during normal business hours. Cannot know how evening/weekend calls would have been answered
Samartzis et al. 2012 Switzerland [32]	Pharmacy record review Retrospective analysis of one-page patient assessment forms and protocol	Clients: $n=1500$ (750 in 2004, 750 in 2009) females, aged 15–49, requesting ECPs	Profiles of ECP users following deregulation	ECPs available for free without prescription for all women 15+, following a medical history and a pregnancy test	Most ECP users who had never visited a gynecologist were <21 . Number of repeat ECP users rose between 2004 and 2009. For <20 s, condom rupture reported significantly more frequently as reason for ECP use	Ability to assess profiles of ECP users over time — shortly after deregulation of ECPs and five years later	Generalizability — recruitment took place in only one pharmacy
Parsons et al. 2013 United Kingdom (London) [17]	Mixed methods (pharmacy record review, structured questionnaire, mystery client) MC evaluations conducted at three pharmacies, using trained adolescent women	Clients: $n=741$ consultations $n=99$ females client intercept questionnaire $n=19$ pharmacy visits by MC	Data on consultations, client satisfaction with pharmacy experience	Special program in select pharmacies to supply oral contraceptives without prescription to eligible women 16+, following pharmacist training	Over 40% of consultations were with 20–24-year-olds (largest proportion), 22.5% were with <19 s. A majority of adolescent mystery clients rated counter staff as helpful, no one felt uncomfortable at the	Combination of pharmacy consultation data, client intercept interviews, and mystery client visits offers ability to contextualize provision data with reported contraceptive-	MC data is the only extractable data — other data not presented with age disaggregation. Small sample size for mystery client exercise

					counter, all were happy with the privacy, most were happy with the wait time.	accessing experiences	
					Overall, majority of MCs were satisfied by experience.		
Both et al. 2014 Ethiopia [19]	Qualitative (observations, survey, interviews)	Both: <i>n</i> =36 (survey) females and males, aged 18–29 <i>n</i> =41 (interviews) males and females (aged 15–29), adult stakeholders, health care providers	Youth experiences accessing ECPs, attitudes and beliefs of policymakers and providers around ECP access	ECPs available in private sector pharmacies and drug stores without prescription	Pharmacists worried about side effects (e.g., infertility or cancer), concerned that young people think only of pregnancy and not preventing HIV/AIDS. Sundays and Mondays were popular for ECP selling, along with holidays. Providers intimidated to counsel youth who want to be in and out quickly.	Combination of observation, questionnaire, and interviews offer the opportunity to contextualize observed and reported behavior. Detailed observations and surveys of both young men and women accessing ECPs in pharmacies	Survey data not age disaggregated, making only some of the qualitative data usable. Limited generalizability. Recall bias given the sensitivity of the topic
Rafie et al. 2014 United States (California) [54]	Cross-sectional (self-administered, web-based or paper survey)	Providers: <i>n</i> =502 pharmacy students recruited from all California schools of pharmacy	Confidence ordering HC for minors	ECPs for sale without prescription in pharmacies to women 18+. Agreement allows trained pharmacists to sell ECPs to all women	Nearly all young people ensured visit was discreet. Secrecy and shame identified as key to young people's experiences of sexuality 68.7% of pharmacy students claimed to be moderately to extremely confident ordering HC for minors	Opportunity to assess views of new pharmacy practitioners. Comprehensive coverage of all pharmacy schools in state	Limited youth-related data
Wilkinson et al. 2014 United States (various) [61]	Qualitative (mystery client) Mystery client telephone call, posing as 17 year old needing ECP and asking about availability of ECP	Clients: <i>n</i> =943 every commercial pharmacy in five US cities, called by mystery client	Experiences of adolescents attempting to obtain ECPs from pharmacies	ECPs approved for sale without prescription in pharmacies to women 17+ nationwide	80% of pharmacies had ECP available on the day the call was made, 57% of available pharmacies provided correct information to the caller regarding ECP access.	Comprehensive sampling of commercial pharmacies. Investigator, expert and informant triangulation were all used to ensure	In-depth discussions with pharmacy staff not possible due to study design

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Table 1 (continued)

Authors/year/ country	Study design and methods	Study population	Relevant outcomes	Regulations	Results	Strengths	Limitations
					Pharmacy staff used ethics-laden terminology to explain policies on dispensing ECP.	credibility of the data analysis	
Barlassina et al. 2015 Republic of Ireland [21]	Cross-sectional (self-administered survey with both closed and open-ended questions)	Clients: <i>n</i> =488 females, aged 18–50, presenting a prescription for oral contraception for personal use	Attitudes and views on making oral contraceptives available without prescription	Oral contraception available with prescription	Pharmacy staff attempting to help the caller by clarifying regulations often created barriers Main reason for having missed a pill for youth (18–25) was for prescription running out (50.3%). 32.8% reported inability to renew a prescription as a reason for missing a pill.	Pharmacies were located in both rural and urban areas. Participants were existing OC users, and could therefore comment on related personal experiences	Selection bias — participants were only current OC users Target sample size was not reached
Fakih et al. 2015 United States (Michigan) [55]	Cross-sectional (self-administered survey)	Both: <i>n</i> =343 female, aged 23–24 <i>n</i> =94 all community pharmacies in the selected county	Young women's perceptions and experiences with contraception supply	ECPs approved for sale without prescription and age limit nationwide. Hormonal contraception requires prescription	Youth in favor of making hormonal contraception available without a prescription (85.6%) and likely to obtain hormonal contraception without a prescription (89.7%) Young women in this study did not feel as comfortable talking about contraceptives with pharmacists as with others. Overall, 51.3% of young women had a positive attitude towards pharmacy purchase of contraception 41.8% (69/165) declined ECP supply. Reasons pharmacists were unwilling to supply: - woman was <16; or	Linking client survey data with pharmacy survey data allowed for an examination of a woman's experience in the specific pharmacy she visited	Very narrow age range (23–24), not a random sample, homogenous participants demographics limit generalizability
Hussainy et al. 2015 Australia [60]	Qualitative (mystery client) Mystery client telephone calls to pharmacies including	Clients: <i>n</i> =168 pharmacies contacted by mystery caller	Pharmacist decisions to provide ECPs or not, justifications for decisions	ECPs available without prescription in pharmacies without age restriction (if competence can be demonstrated)	41.8% (69/165) declined ECP supply. Reasons pharmacists were unwilling to supply: - woman was <16; or	Telephone scripts narrow on specific component of ECP provision by pharmacists: assessing	Hawthorne effect from participants receiving mystery client calls soon after being alerted to the study.

	one scenario where a woman under 16 years requested ECPs				- woman was under another specified age Other justifications included: - uncertainty of the safety of the ECP or limited data regarding its use in 14–16 year olds	pharmacists' persistent myths/misconceptions around ECP provision.	Calls (during normal business hours) may have affected the number of referrals
Manski et al. 2015 United States (nationwide) [22]	Cross-sectional (self-administered, web-based survey, following review of a mock-up label for over-the-counter oral contraceptives)	Clients: <i>n</i> =348 female, aged 14–17 recruited via Facebook advertisements	Teenagers' attitudes towards over-the-counter access to oral contraceptives	Hormonal contraception available only with prescription	Nearly 80% supported pharmacy access to oral contraceptives, 73% supported OTC access to contraceptives (60.9% indicating they would likely use the service). Greatest perceived advantages of increased access: fewer teen pregnancies (44.5%), easier for teens to get OC (22.4%), and more confidential (13.5%). Greatest perceived disadvantages of increased access: teenagers might not use condoms to protect against STDs (21.6%), need a doctor to decide if oral contraceptives are safe for teens (18.7%), teens might have sex at a younger age (18.%), teens might use oral contraceptives incorrectly (15.8%)	Random sample of pharmacies selected Focus on younger adolescents (14–17). Participants asked to distinguish between OTC access and behind-the-counter access. Study provides data both on younger adolescents' interest and ability to access OC in a pharmacy	Convenience sample impacts generalizability Selection bias — having to actively select (via online clicks) to participate in the survey

Abbreviations: FP=family planning; GP=general practitioner; FGD=focus group discussion; OTC=over-the-counter; CT=chlamydia trachomatis; STI=sexually transmitted infections; MC=mystery client; OC=oral contraceptives.

commodities on a variety of SRH outcomes. While updated evidence-based recommendations dismiss the notion that repeat use of ECPs is detrimental to women's health [28], concerns about repeat use were common at the time of data collection for a number of studies. In two studies, easing access to ECPs did not result in repeat use among young women when compared to older women [29] or compared to traditional clinic access [30]. In particular, 2 articles from a randomized controlled trial of 15–24-year-olds as well as a 15–19-year-old subpopulation found that young women with access to ECPs through pharmacies were no more likely to use them than those who obtained their ECPs through traditional family planning clinics [30,31]. However, two Swiss studies found an increase in repeat use among young women accessing ECPs in pharmacies following deregulation [32,33].

Evidence from three articles found that increasing access to ECPs through pharmacies did not result in a rise in sexually risky behaviors such as age at first sex, number of partners, or frequency and consistency of condom use [30,31,34]. Additionally, increased access had no adverse effect on unintended pregnancy and STIs [31,34].

3.2.2. *Appropriate self-screen and product use*

When provided the opportunity, young women proved capable of accessing and correctly using emergency contraception without pharmacist assistance [16,24,34]. Using “simulated” over-the-counter conditions, minors (girls under age 18 years) could self-screen and use ECPs [24] and were no more likely than older women to use the product incorrectly [34].

Importantly, based on pharmacy-level surveys and questionnaires, those under 25 years of age comprised a substantial proportion of total users in settings where pharmacies provided access to SRH commodities such as ECPs and oral contraception [17,35–37]. The only example where this was not the case was in a study that took place at the United States–Mexico border, which found that older women were more likely than younger women to cross the border to access oral contraception over-the-counter at a pharmacy [38]. However, these results likely reflect the complex dynamics associated with international border crossings for younger women.

It is worth noting that three studies explored opportunities for expanding youth-targeted SRH services, namely, through provision of self-test, mail-in STI (chlamydia) screening. One UK study offered chlamydia screening to young women requesting ECPs at pharmacies [39,40], a second UK study followed a national chlamydia screening program offered opportunistically to young people between 15 and 24 years [27], while a third Dutch study targeted mainly ethnic minority young (15–29 years) women visiting pharmacies to collect contraception [41]. These studies had mixed results and low rates of kit acceptance — often due to reluctance on the part of the pharmacist to offer the kit [27,39] — and kit return (between 17% and 27% of offered kits were returned, as reported by the Dutch and one UK study) [40,41].

3.3. *Reservations around increased access to SRH commodities*

As detailed above, lowering barriers to SRH commodity access does not translate to increases in sexually risky behavior. Yet, a persistent reservation expressed by both pharmacy personnel and clients was that increased access was unsafe for young people and would result in poor decision-making [19,22,42–50]. In two US studies, for example, adolescent girl participants voiced concerns that increased commodity availability might lead to teenagers having sex at an earlier age [22] and engaging in unprotected sex [22,46].

Similarly, reservations by pharmacy personnel and other health care providers (including general practitioners and nurses) could be largely categorized in two ways. First, they believed that increasing availability of SRH commodities (ECPs, in particular) could result in “risky and promiscuous” behavior among youth [42,43,45,49]. This notion that ECP availability condones or even encourages promiscuity among younger people persisted for some time after deregulation [45,49]. A second key reservation of pharmacists and other health care providers centered around a general concern that SRH commodities (ECPs, in particular) were not safe for youth [19,47] or that youth would not be able to take them as directed [48,50].

Compounding these concerns about effects on health and behavior are additional reservations on the appropriateness of pharmacy personnel themselves to provide expanded SRH services [18,22,51–55]. Pharmacists did not always feel that it was their place to prescribe medicine due to time constraints [56], limited availability and privacy to provide quality counseling [18], and feeling that they had not been well trained in adolescent-specific issues [51]. Meanwhile, some clients were concerned about leaving the pharmacy without enough information [20].

Especially variable was the quality of reported interactions with clients around the offering or dispensing of SRH services and commodities [18,19,26,27,39,55,57]. Studies noted pharmacy staff's discomfort [27,39], even intimidation [19], in approaching clients as a reason that pharmacy interactions suffered. Several studies cited the pharmacy environment as a suboptimal setting to provide proper counseling on SRH-related issues [18–20,27,51,55]. In particular, the lack of space and privacy [18,27], especially when a pharmacy was busy [18,19], could be hindrances to meaningful pharmacist–client interactions and counseling.

3.4. *Pharmacy access in theory is not pharmacy access in practice*

Even when made available through pharmacies, SRH commodity access was not uniform across age groups, with adolescents' (ages 19 years and under) access and uptake often less than that of older youth [23,37,50,58–60]; this was despite implied similar levels of need for the two groups, as indicated by ECP use [31] in an experimental setting. Two studies found that younger youth (especially those 18 years

and under) were consistently and significantly slower to access ECPs than older youth and adult women [23,37].

Evidence indicated that other subpopulations of youth may face additional challenges to access; two studies from the United States underlined added barriers encountered by rural communities and certain minority groups (particularly those for whom language is a barrier) from pharmacies which may opt not to stock desired commodities or from pharmacists who may not be able to provide proper screening or counseling [47,56]. Additionally, two studies revealed a reluctance on the part of pharmacists to provide commodities (ECPs) to men [18,61], in one case out of concern that they may not be well informed about their partner's health history or may take advantage of ECP access for use after rape [18]. Finally, in settings where SRH commodities are not subsidized or covered by insurance, commodity cost may serve as yet another barrier for youth. One South African study found that many pharmacists opted to only stock dedicated ECP products because they were significantly more expensive than cut-up combined oral contraceptives, and would therefore discourage overuse by young people [49].

Pharmacists themselves could be an insurmountable obstacle for young people [15,26,40,44,45,49,58,60–62]. Six studies using mystery clients found that, anywhere between 20% and 65% of the time, youth clients could not obtain the selected SRH commodity (ECPs or oral contraception) despite regulations allowing access [15,26,56,58,60–62]. Some evidence indicated differences in dispensing practices by sex; two studies found male pharmacists more willing than female pharmacists to provide ECPs to minors [26,48]. Pharmacists reported using personal comfort and bias to decide whether or not to dispense commodities [19,27,39,48]. Pharmacist biases about the appropriate age to dispense commodities were common [50,58–60]. A study from Jamaica, where certain oral contraceptives were legally available without prescription in pharmacies, found that an adolescent mystery client was refused contraception in 60% of pharmacy visits [58]. An Australian study using telephone scripts found that, following a revision of the national ECP-dispensing protocol clarifying that there was no reason for ECPs to be restricted on the basis of age, pharmacists still declined dispensing ECPs over 40% of the time when the caller was under the age of 16 [60].

Confusion or misinformation about various SRH commodities and their dispensing guidelines also created unnecessary barriers to quality commodity provision and counseling for young people [15,18,19,26,48,49,57,60–63]. Studies in the United States and South Africa revealed that uncertainty as to when young people were legally entitled to access ECPs resulted in pharmacists incorrectly denying access to eligible youth [49,61,62]. Young mystery clients requesting ECPs in France found — in contrast to French regulations — *no* pharmacies gave information on regular methods of contraception, on prevention of STIs or

follow-up medical care or communicated any other place for full contraception education; additionally, fewer than half the pharmacies that dispensed ECPs dispensed it with information on how to use it or side effects [26]. A study on pharmacy provision of abortifacients in a Latin American city found that only 17% of pharmacists who correctly recommended misoprostol as an abortifacient to young mystery clients recommended a dosage potentially effective for causing a medical abortion [63].

4. Discussion

The evidence from this review suggests that pharmacies have qualities which make them convenient points of SRH commodity access for young clients. Between 2000 and 2016, the period covered by this review, there was a clear and steady shift towards legal policies and regulations becoming more favorable to over-the-counter or pharmacist access of SRH commodities for youth. Contrary to both young client and pharmacist concerns, there has been no corresponding increase in sexually risky behavior or adverse health outcomes. A population-based study in France found that 5 years after the deregulation of ECPs, there had been no decrease in the use of other methods of contraception or determinants of ECP use [64]; in fact, there was an increase in the use of highly effective contraceptive methods, especially among young people [65]. There is, however, clear evidence that increasing access to SRH commodities through pharmacies can result in improved access, with trends of SRH commodity use (ECP use, in particular) being especially high among youth [64–69], a population that faces added barriers to obtaining accurate, high-quality SRH information and services.

Despite the convergence of a number of encouraging factors facilitating access to SRH commodities through pharmacies — youth expressed and demonstrated willingness to use pharmacies, increasing numbers of policies supporting youth access and no evidence of adverse effects as a result of pharmacy access — there is still much to be improved in the access experience itself. Lingering and persistent concerns about commodity provision are often rooted in pharmacy personnel's personal biases, distrust of their young clients' judgment, or general discomfort with providing SRH commodities and any accompanying counseling. As a result, young clients can receive subpar, incorrect or no information on their commodity of choice; can encounter arbitrary and unnecessary barriers to access; or can be denied access entirely.

As the positive impetus towards increasing access continues, and policymakers and medical communities become more comfortable with and confident in the ability of pharmacists to be a valuable SRH resource to young people worldwide, we must strengthen the quality and coverage of the commodity-accessing experience. Pharmacy personnel have enormous potential to become trusted

sources of SRH commodities for the young people in their communities but only if provided with adequate training and support.

Many earlier studies taking place before a given country deregulated ECPs assessed smaller programs that often required pharmacy personnel to undergo special training in order to be certified to dispense. As SRH commodities become more readily available through pharmacies, pharmacy personnel should have access to pre-service and in-service training to ensure that they have accurate understandings of appropriate use, dosing and side effects of the SRH products they dispense.

On the other side of the counter is the young client. More efforts are needed to ensure that existing programs can achieve full coverage to *all* populations of young people — including younger adolescents, those living in rural areas and minorities — who face added barriers which might delay or prevent their ability to access a commodity even when legally permitted. Additionally, more research is needed in low- and middle-income settings — only 6 of the 49 studies in this review took place in LMICs. It is also telling that 33 of the 49 articles presented focused on the provision of ECPs. This demonstrates a dearth of documented exploration of the other SRH commodities that young people access through pharmacies, such as other methods of contraception; misoprostol for medical abortions; or related SRH services, including STI self-testing kits.

It is critically important to improve our understanding of how young people engage with existing pharmacy-provision services. There is a fine line between capitalizing on the potential of pharmacies and losing youth engagement; well-intentioned efforts to incorporate compulsory counseling, testing or referrals could make pharmacies lose their fast and discreet appeal that draw in young clients in the first place. A UK study from this review provides a positive example of improving the pharmacy as an SRH resource without losing youth engagement; pharmacies offer chlamydia screening kits to young women already requesting ECPs, bundling commodities with services needed following a discreet SRH event (unintended unprotected sex) but minimizing added time in the pharmacy, as the kits can be used at home [39,40]. Strategies for discretely making youth aware of their pharmacy as an SRH resource are also worth exploring; a few articles mentioned provision of leaflets (discretely slipped in a shopping bag) as an option [15,19,27]. The proliferation of mobile phones among this age group is also an opportunity to provide young people with SRH information or resources when needed, at their convenience, and with respect to their privacy.

This review has a number of limitations. First, as this is one of the first systematic reviews of pharmacy provision of SRH commodities, we aimed for broad inclusion criteria to allow for a full description of what is known about young people's experiences in pharmacies and providers' experiences providing commodities to young people. Many of the included studies have weak designs (if randomized clinical

trials are the “gold standard”), and few studies included interventions or statistical analyses. However, our aim was to describe these experiences rather than draw on statistical inference and generalizability. The trade-off with a broad approach is that we could not use a single methodology to assess quality; most studies were descriptive in nature, and standard scoring methodology was difficult to apply consistently. Instead, key limitations (and strengths) of the studies are described in [Table 1](#). Future research should consider refining our review and assessing quality. This limitation notwithstanding, the review does indicate the context for pharmacy provision of SRH commodities for young people.

We also had to exclude a number of studies (or components of studies) that included young people as part of a broader age range of participants but did not disaggregate data by age group. Additionally, some included studies are only technically youth relevant (for example, studies featuring mystery clients 25 years and under in age) but have no primary or even secondary focus on youth access. A number of studies reported on trends in pharmacy use but did not provide information on the direct experiences of youth or providers. The breadth of studies uncovered reflects a key strength of this review; our search strategy did not include age-related search terms; therefore, we were able to screen a wide range of SRH commodity-pharmacy articles which may not have explicitly addressed youth in the title or abstract but which contained relevant data in the text. We also conducted a global search for studies, and although many came from high-income settings and focused on ECPs, we were able to identify several that included lower-income settings and a range of commodities.

5. Conclusion

Pharmacies have been demonstrated to be a resource young people are willing to use if permitted; however, there is a need for additional study in this field to understand how to most effectively harness pharmacies to improve young people's access to SRH commodities. The pharmacy makes for an excellent SRH resource to young clients but should take care not to exactly replicate the health facility experience — to do so would risk pharmacies losing the unique qualities that make them so appealing to youth in the first place. Instead, pharmacists and pharmacy personnel should be recognized as important complements to the role that physicians and other medical practitioners play in the delivery of SRH services. For young people especially, seeking commodities from pharmacies may be their only option. It is important that future research consider adolescents and young people specifically, as they represent a population most in need of alternate forms of access to SRH information, services and commodities. It is also important that pharmacy personnel are provided with clear information on the guidelines for provision and do not serve as an unnecessary barrier to access.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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Appendix A. Search strategy

Our search strategy included papers published in any language and had a lower date limit of 1 January 2000 and an upper date limit of 1 May 2016.

The following search strategy was used for PubMed: “(“Contraception”[Mesh:noexp] OR “Contraception, Barrier” [Mesh] OR “Contraception, Postcoital”[Mesh] OR “Natural Family Planning Methods”[Mesh] OR “Ovulation Inhibition”[Mesh] OR “Contraceptive Devices”[Mesh] OR “Contraceptive Agents”[Mesh] OR “Abortion, Induced” [Mesh:noexp] OR “Abortifacient Agents”[Mesh] OR (“misoprostol”[MeSH] AND “Abortifacient Agents”[Mesh]) OR (“Mifepristone”[Mesh] AND “Abortifacient Agents” [Mesh])) AND (“Community Pharmacy Services”[Mesh] OR “Legislation, Pharmacy”[Mesh] OR “Education, Pharmacy”[Mesh] OR “Pharmacies”[Mesh]).

The following search strategy was used for Embase: (‘contraception’/exp. NOT (‘female sterilization’/exp. OR ‘male sterilization’/exp) OR ‘family planning’/exp. OR ‘contraceptive device’/exp. OR ‘contraceptive agent’/exp. OR ‘abortive agent’/exp. OR ‘induced abortion’/exp) AND (‘pharmacy’/exp. OR ‘pharmacist’/exp. OR ‘pharmacist attitude’/exp. OR ‘hospital department’/exp).

The following keyword search strategy was used for Popline: (Fertility Control Postconception, Abortion, RU486, Misoprostol, Contraceptive Agents Female, Contraceptive Agents Male, Contraceptive Agents Progestin, Contraceptive Agents Postcoital, Contraceptive Methods, Emergency Contraception, Female Contraception, Male Contraception) AND Administration and Dosage, Pharmacy Distribution, Pharmacies, Pharmacists.

The following search strategy was used for Scopus: KEY (“Contraception” OR “Contraception, Barrier” OR “Contraception, Postcoital” OR “Natural Family Planning Methods” OR “Ovulation Inhibition” OR “Contraceptive Devices” OR “Contraceptive Agents” OR “Abortion, Induced” OR “Abortifacient Agents” OR “misoprostol” OR “mifepristone” OR “family planning” OR “contraceptive agent” OR “contraceptive device” OR “induced abortion” OR “abortive agent” OR “emergency contraception”) AND KEY (“Pharmacy” OR “Pharmacists” OR “Pharmacies” OR “Chemist” OR “Apothecary”).

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