Maternal and Child Health Journal (2019) 23:47–53
https://doi.org/10.1007/s10995-018-2590-2

Examining Temporal Trends in Documentation of Pregnancy Intentions in Family Planning Health Centers Using Electronic Health Records

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Published online: 17 July 2018

Abstract
Objectives Few studies have examined the extent to which providers assess pregnancy intentions during clinical encounters. Our objective was to assess temporal trends in documentation of patient pregnancy intentions in electronic health records (EHR). *Methods* In this retrospective observational study using EHR data from 627,399 female patients visiting 214 family planning centers in 2012–2014, we assessed changes in the prevalence of pregnancy intention documentation with piecewise log-binomial regression models. We examined bivariate associations between patient/visit characteristics and pregnancy intention documentation in each year, and associations between patients' pregnancy intentions and contraceptive methods. *Results* The proportion of patients with a documented pregnancy intention increased sharply from the end of 2012 (42%) to the midpoint of 2013 (85%; adjusted quarterly prevalence ratio [APR] = 1.40, 95% CI 1.36–1.45). Thereafter, the rate of change slowed as documentation approached the maximum possible frequency (93%; APR = 1.01, 95% CI 1.00–1.02). Documentation varied by all patient/visit characteristics in 2012 and 2013; in 2014, there were no clinically significant differences. Among patients with a documented intention, 97% were not planning a pregnancy in the next year. Women not planning a pregnancy were more likely to use a most/moderately effective contraceptive method than those planning a pregnancy (73 vs. 35%, $p < 0.0001$). *Conclusions for Practice* Improvements in pregnancy intention documentation co-occurred with changes to EHR templates (e.g., placement of structured data fields) and with provider-focused initiatives promoting reproductive life planning. Patients' pregnancy intentions aligned with contraceptive use; however, these findings cannot address whether assessment of intentions affects contraceptive use.

Keywords Pregnancy intentions · Reproductive life plan · Family planning · Title X · Electronic health records

Significance

What is already known on this subject? Despite recent interest in the integration of pregnancy intention assessment into routine care, little is known about the adoption of this practice in clinical settings utilized by women of reproductive age.

What this study adds? Improving the availability and placement of structured data fields for capturing pregnancy intentions in EHR may lead to improvements in documentation over time. This may ultimately facilitate the integration of pregnancy intention screening into routine clinical practice and allow for greater precision in health outcomes research and health care performance measurement.

Introduction

Nearly half of all pregnancies in the United States are unintended and one-third are mistimed (Finer and Zolna 2016). In clinical settings, assessment of patient pregnancy intentions creates opportunities to address contraceptive use among women not seeking pregnancy and improve pre-pregnancy health among women seeking pregnancy.

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Discussions of pregnancy intentions and desires may ultimately help patients and their partners delay or avoid unwanted pregnancy, realize their desired pregnancy and birth spacing, and optimize their health.

Integration of reproductive life planning (RLP) into clinical care, including provider-focused initiatives for the assessment of patient pregnancy intentions, has garnered significant attention in recent years. In 2010, the Centers for Disease Control and Prevention (CDC) developed a reproductive life plan tool consisting of targeted prompts to inform discussions between patients and their providers. These prompts ask patients to identify their desired number of children, their ideal timing of (next) pregnancy, and their plans to avoid or achieve pregnancy (CDC 2010). Similarly, the Oregon Foundation for Reproductive Health published One Key Question® in 2013 to encourage and facilitate the provision of contraceptive counseling and services and/or pre-pregnancy care in primary care settings (Bellanca and Hunter 2013). In 2014 the Quality of Family Planning Services (QFP) Recommendations, developed by the CDC and the Office of Population Affairs (OPA), put forth a recommendation to assess patients' reproductive life plans during family planning visits (Gavin 2014).

Despite increased interest in the integration of pregnancy intention assessment into routine reproductive and preventive care (CDC 2010; Gavin 2014; Lu 2007), little is known about the adoption of this practice in clinical settings. Two previous observational studies examined the provision of reproductive life planning assessment and counseling, reporting prevalences of 42% among female family planning patients (Bommaraju et al. 2015) and 51% among patients in family planning and other health care settings (Clark 2014). In a recent study that surveyed administrators in publicly-funded health centers, 87% of respondents self-reported frequent assessment of reproductive life plans and 58% reported having written RLP protocols at their health center in 2013–2014 (Robbins et al. 2017). To our knowledge, no published studies have assessed documentation of patient pregnancy intentions in a large health center network.

Using EHR data from family planning and well-woman visits (N = 627,399 patients), our study objectives were to: (1) assess temporal trends in documentation of patient pregnancy intentions from 2012 to 2014 and (2) examine alignment of documented patient intentions with contraceptive use. Our first study objective was exploratory. For the second objective, we hypothesized that patients who were not planning a pregnancy in the next year would be more likely to use an effective contraceptive method than those who were planning a pregnancy.

Methods

Data Source and Study Population

For this retrospective observational study, we used electronic health record (EHR) data from Planned Parenthood affiliates that used a common EHR and data warehouse. The original EHR extract contained data from 34 affiliates. To ensure that our findings were not affected by data quality issues associated with EHR implementation, we first excluded any affiliates with 100% missing data for our focal data field (pregnancy intention) or with an unexpectedly low encounter volume compared to affiliate-reported service data for 2012 (15 affiliates were excluded at this stage).

We then excluded affiliates with similar patterns of missing data at the health center level indicating that the affiliate had not fully adopted EHR in the beginning of the study period or had staggered EHR implementation (seven affiliates were excluded at this stage). The final analyzed dataset included data from 12 affiliates that collectively operated 214 health centers in 11 US states. All affiliates included in this study participated in the Title X public family planning program during the study period.

Our study population included non-pregnant, female patients between the ages of 15 and 49 years who presented for family planning or well-woman (i.e., annual family planning) visits from January 2012 through September 2014 (N = 627,399 unique patients). Patients who were known *not to be at risk* for pregnancy (i.e., patients with documentation of sterilization, menopause, or infertility) and patients who did not have an office visit (e.g., had only a chart update or supply pickup) were excluded. For patients with more than one visit during the study period, we selected the first visit for inclusion in the analysis (see Fig. 1 for a flow diagram of patient encounter exclusions).

Study Variables

The dependent variable, pregnancy intention documentation, was extracted from a structured EHR data field capturing responses to the prompt: "Planning a pregnancy in the next year?" Available response categories were yes or no. A documented pregnancy intention indicated that either a yes *or* no response was selected. The field was neither mandatory nor required for reporting purposes during the study period.

Independent variables included patient age, race/ethnicity, insurance type, and parity. At the visit level, variables included visit type, year (2012–2014), and quarter

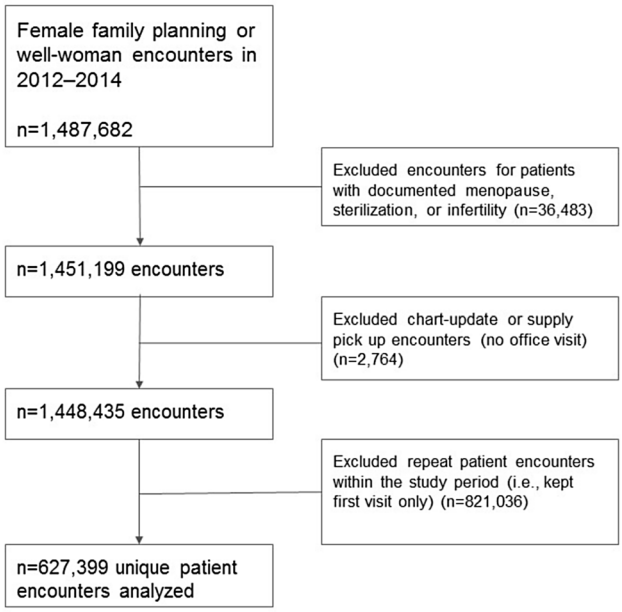

Fig. 1 Flow diagram of patient encounter exclusions

of the year that the visit occurred (Q1–Q4 based on the calendar year). Visit types included initial family planning visit, well-woman (annual family planning) visit, and other family planning visits or procedures, such as visits for sexually-transmitted infection testing and treatment, breast exams, contraceptive device insertion, and pregnancy tests.

We used the contraceptive method documented at the end of the visit to explore alignment of pregnancy intentions (yes vs. no) and contraceptive use. Contraceptive methods could be either selected/initiated at the visit or continued (i.e., already using the method prior to the visit). We grouped methods by tiers of effectiveness adhering to the CDC definitions (CDC 2015; Trussell 2011). Tier I (most effective methods) included intrauterine devices and implants only, as sterilized patients were excluded from the analysis. Tier II (moderately effective methods) included oral contraceptive pills, patch, ring, injectables, and diaphragm. Tier III included only non-hormonal methods (e.g., condoms, natural family planning). We compared Tier I/II (most/moderately effective) method use to Tier III or no method use.

Statistical Analysis

We used univariate statistics to describe the study population. We calculated the percentage of women with a documented pregnancy intention and calculated these percentages by patient and visit characteristics. We used Chi square tests to assess differences in the prevalence of documentation by patient and visit characteristics within each study year.

To examine changes in the documentation of pregnancy intentions over the study period, we constructed piecewise log-binomial regression models in which we estimated the quarterly changes in the prevalence of pregnancy intention documentation (i.e., percent of patients with a documented intention). We chose to utilize piecewise regression to allow for distinct inflection point(s) and to test if the rate of change (i.e., time trend) was significantly different before and after these distinct points in time (Kontopantelis et al. 2015; Taljaard et al. 2014).

As this analysis was exploratory in nature, after an initial examination of the data we used the first quarter of 2014 as the first inflection point and the last quarter of 2014 as the second inflection point. Using these two inflection points, we segmented the data into three time periods: Q1–Q4 2012 (trend 1), Q1–Q3 2013 (trend 2), and Q4 2013–Q3 2014 (trend 3). We calculated the quarterly percentage change in pregnancy intention documentation for each period (i.e., trend 1, 2, and 3) and estimated the difference in the rate of change between the first two periods (trend 1 and 2), and the last two periods (trend 2 and 3). We adjusted for age and race/ethnicity and accounted for clustering within health centers using the *vce* option in Stata. The vce option obtains standard errors that allow for correlation within groups (i.e., health centers), thus relaxing the independent observations requirement for regression modeling.

Last, among patients with a documented pregnancy intention, we assessed the association between patients' intentions (planning a pregnancy in the next year vs. not planning a pregnancy in the next year) and contraceptive use (Tier I/II method use vs. Tier III or no method use) from 2012 to 2014 using Chi square tests.

Due to the large sample size, we chose to emphasize the magnitude of associations and clinical significance over the statistical significance of the results that follow. All analyses were performed with Stata SE 13 (StataCorp LP, College Station, TX). The research was determined to be exempt by the Chesapeake Institutional Review Board.

Results

Study Population Characteristics

Table 1 describes the demographic, reproductive, and visit characteristics of the study population. The majority of the study population was ages 20–29 years (56%), Hispanic or non-Hispanic White (81%), publicly-insured (85%), and nulliparous (65%). About 17% of patients had an initial family planning visit, 13% a well-woman (annual family planning) visit, and about 70% had other types of family planning visits or procedures.

Table 1 Patient and visit characteristics and pregnancy intention documentation by year among female family planning and well-woman patients, 2012–2014 (N = 627,399)

	n (%)	Percentage with a documented pregnancy intention[a]		
		2012	2013	2014
Total	–	41.3	81.2	91.4
Age				
15–19	127,544 (20.3)	23.4	77.0	91.1
20–24	206,068 (32.8)	37.7	80.0	91.1
25–29	146,429 (23.3)	46.4	82.5	91.7
30–34	73,939 (11.8)	52.2	84.2	91.9
35–39	38,280 (6.1)	57.2	85.7	92.4
40–44	23,470 (3.7)	63.9	87.6	92.4
45–49	11,669 (1.9)	69.4	89.9	93.0
Race/ethnicity				
Hispanic	261,339 (41.7)	41.7	83.7	92.2
Non-Hispanic Black	59,130 (9.4)	52.3	84.0	92.6
Non-Hispanic White	247,398 (39.4)	40.1	78.0	90.3
Asian/Pacific Islander	44,473 (7.1)	33.4	82.5	92.3
Native American/Alaskan native	3,584 (0.6)	40.3	72.3	88.7
Multiracial	11,475 (1.8)	35.7	81.8	90.7
Insurance type				
Public	535,128 (85.3)	39.6	82.1	92.0
Private	43,700 (7.0)	46.3	69.3	87.2
Uninsured	48,571 (7.7)	63.4	82.1	91.0
Parity[b]				
Nulliparous	372,458 (65.2)	38.3	81.0	91.9
Parous	199,084 (34.8)	52.1	85.2	92.2
Visit type				
Initial FP visit	108,162 (17.2)	48.8	77.2	93.4
Well-woman visit	81,591 (13.0)	60.5	80.4	90.8
Other FP visit or procedure	437,646 (69.8)	35.7	82.5	90.7

FP family planning

[a]All statistical tests comparing patient and visit sub-groups within each year were significant ($p < 0.0001$)

[b]Counts do not equal total population count due to missing data

Trends in Documentation of Patient Pregnancy Intention Over Time

Figure 2 shows the percentage of patients that had a documented pregnancy intention, regardless of whether the documented response was yes or no, by quarter of the year.

Documentation of patient pregnancy intentions increased from the end of 2012 (42% of all patients) to the midpoint of 2013 (85%), and increased only slightly to the midpoint of 2014 (91%).

Table 2 presents the results regarding the rate of change in pregnancy intention documentation before and after the two inflection points. In the beginning of the study period in 2012 (trend 1), we observed a non-significant 2% increase in the quarterly prevalence of pregnancy intention documentation (adjusted quarterly prevalence ratio [APR] = 1.02, 95% CI 1.00–1.04), followed by a 40% increase from Q1–Q3 of 2013 (trend 2) (APR = 1.40, 95% CI 1.36–1.45).

From the last quarter of 2013 to Q3 of 2014 (trend 3), the prevalence stabilized with a non-significant 1% quarterly increase (APR = 1.01, 95% CI 1.00–1.02). Comparing the first two time periods, we found a significant increase in documentation of patient pregnancy intentions ($APR_{Trend2vs.Trend1} = 1.38$, 95% CI 1.32–1.44). Comparing the last two periods, we found a significant slowing of the rate of change, as documentation approached the maximum possible frequency of 100% ($APR_{Trend3vs.Trend2} = 0.72$, 95% CI 0.70–0.75).

In 2012, documentation of pregnancy intention (regardless of whether it was yes or no) was associated with several patient characteristics. For example, the prevalence of documentation increased with each age category (23% among 15–19 year olds, 46% among 25–29 year olds, 57% among 35–39 year olds, $p < 0.0001$). Parous women were more likely to have a documented intention (52%) than nulliparous women (38%, $p < 0.0001$). We also found differences in the frequency of documentation of patient pregnancy intentions by visit type ($p < 0.0001$) in 2012. For example, 61% of patients who presented for a well-woman visit had a documented pregnancy intention compared to 36% of patients presenting for other family planning visits and procedures (Table 1).

By 2014, there were no clinically significant differences in the prevalence of pregnancy intention documentation; documentation was uniformly high across patient or visit subgroups (Table 1).

Relationship Between Pregnancy Intention and Contraceptive Method

Among those patients with a documented pregnancy intention (n = 410,643), 97% (n = 398,131) had a documented response of 'no' (i.e., were *not* planning a pregnancy in the next year). Three percent (n = 12,512) had a documented response of 'yes' (i.e., were planning a pregnancy in the next year). We examined the bivariate relationship between pregnancy intention and contraceptive use, using the tiers of contraceptive effectiveness. We found a significant difference in the proportion of women using a Tier I or II (most or moderately effective) contraceptive method between women who were not planning a pregnancy in the next year (73%) and women who were planning a pregnancy (35%; $p < 0.0001$) [results not shown].

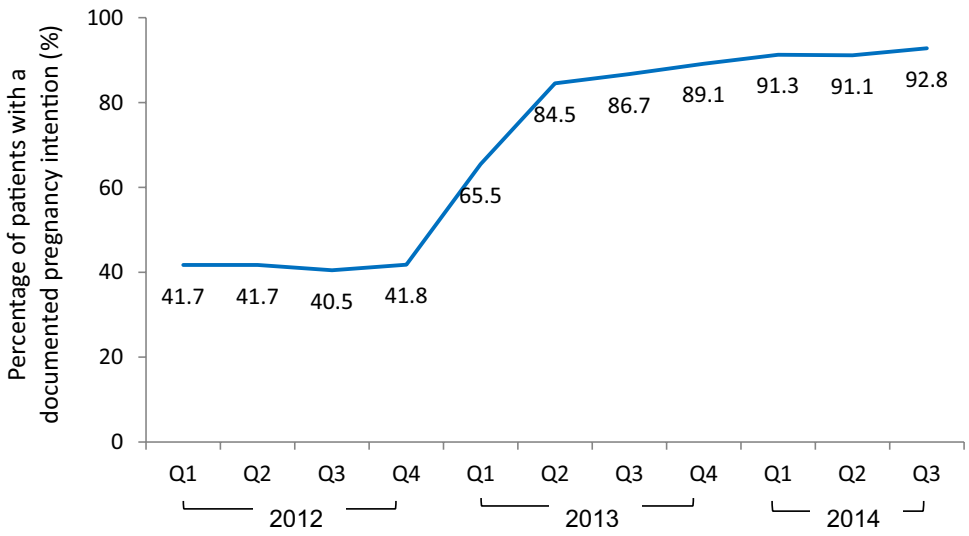

Fig. 2 Quarterly prevalence of pregnancy intention documentation among family planning and well-woman patients, 2012–2014 (N = 627,399). *Q1* quarter 1 (Jan–Mar); *Q2* quarter 2 (Apr–Jun); *Q3* quarter 3 (Jul–Sep), *Q4* quarter 4 (Oct–Dec)

Table 2 Trends in pregnancy intention documentation among family planning and well-woman patients, 2012–2014 (N = 627,399)

	Trend 1 (Q1 2012–Q4 2012)	Trend 2 (Q1 2013–Q3 2013)	Trend 3 (Q4 2013–Q3 2014)
APR (95% CI) per quarter change	1.02 (1.00, 1.04)	1.40 (1.36, 1.45)	1.01 (1.00, 1.02)
Difference in time trend	–	1.38 (1.32, 1.44)	0.72 (0.70, 0.75)

Regression models account for clustering within health centers (n = 214) and are adjusted for age and race/ethnicity

APR adjusted prevalence ratio; *CI* confidence interval

Discussion

Consistent assessment of pregnancy intentions in clinical settings can support the provision of contraceptive and/or pre-pregnancy care. This study found a steep increase in pregnancy intention documentation from 2012 to 2014 among family planning and well-woman patients visiting Planned Parenthood health centers with a common EHR system. Furthermore, the near elimination of observed differences in documentation of pregnancy intention across patient and visit subgroups from 2012 to 2014 suggests that assessment had become a nearly universal practice. These findings suggest that by 2014 providers were not limiting their discussions of pregnancy intentions to certain patients (e.g., older patients) or to specific types of visits (e.g., annual family planning or well-woman visits).

While the prevalence of pregnancy intention documentation observed in our study was comparable to those reported in the two previous observational studies for 2012 (Bommaraju et al. 2015; Clark 2014), the prevalence was considerably higher (81%) in 2013 than that reported by Clark (51%) (Clark 2014). Our prevalence estimates were generally on par with the self-reported frequencies of reproductive life plan assessment reported by Robbins and colleagues for 2013–2014, in which a majority (87%) of respondents indicated frequent assessment in publicly-funded health centers (Robbins et al. 2017).

Both internal and external factors may have contributed to the increasing documentation trend observed in our study. After completing the study analyses, we learned that a key internal change to the common EHR templates was made during the study period. This change, which aimed to increase consistency of documentation of numerous reproductive history fields, involved moving the location of the structured pregnancy intention data field from the comprehensive history template to several commonly-used visit templates in November 2012 (personal communication with Susanne Mauney, August 2016). Although we were not previously aware of the change to the EHR—and therefore did not set out to study it specifically—we believe this change likely contributed to the dramatic increase in documentation observed in the beginning of 2013. Of note, no specific changes regarding pregnancy intention assessment were made to the Planned Parenthood national clinical guidelines during the study period. In the national guidelines, reproductive life planning discussions were encouraged, but not required, throughout the study period.

External to this large family planning provider network, growing interest and awareness of assessment of pregnancy intentions and the proliferation of tools and recommendations for reproductive life planning (e.g., One Key Question®) might have bolstered the effect of the internal EHR changes. Importantly, with the release of the QFP recommendations in 2014, assessment of pregnancy intention became a priority area for the Title X program (U.S. Department of Health and Human Services 2016). All Planned Parenthood affiliates included in this study participated in the Title X program during the study period. While we observed increasing documentation before the release of the QFP recommendations, it is possible that this prioritization may have helped to sustain trends in documentation of pregnancy intentions.

Our findings highlight the importance of aligning services with patients' reproductive needs and desires. As expected, we found greater use of most/moderately effective methods among patients not planning a pregnancy in the next year compared to patients planning a pregnancy. Approximately one quarter of family planning patients who were not planning a pregnancy in the next year were using less effective methods or no method at all. While this finding may simply reflect patient preferences, it is important that all women who are not seeking pregnancy have access to the contraceptive methods of their choice. Additionally, about one-third of women who *were* planning a pregnancy in the next year had a documented most/moderately method at the end of their visit. This finding suggests that a considerable proportion of women who are planning a pregnancy in the next year may have dual needs for pre-pregnancy counseling *and* contraceptive counseling and management (until they are actively seeking pregnancy). Providers can tailor counseling and services based on the patient's immediate and longer-term needs. By design, this study cannot elucidate whether assessing pregnancy intentions has any impact on contraceptive uptake and use. Future research could examine associations of assessment with subsequent health behaviors and pregnancy outcomes.

This study has four main limitations. First, we used a single data field to measure assessment of patient pregnancy intentions and therefore do not know whether pregnancy intention was documented elsewhere in the EHR. Research suggests that up to 60% of clinical care may be documented in notes or other open-text fields that allow clinicians greater space and flexibility for their findings and observations (DataMark 2013). Thus, we may have misclassified patients as not having a documented assessment who may have indeed discussed their pregnancy intentions with a provider, documented elsewhere in the chart. Additionally, the change in location of the focal data field might have reduced the frequency by which clinicians notated pregnancy intention elsewhere in the EHR. These changes could have affected the documentation rates observed in our study. Restricting our analyses to one visit per person also does not allow us to speak to whether providers are documenting intentions with every person every time—a potential area for future research.

Second, the data field was limited to two response options: yes or no. Feelings of ambivalence toward pregnancy have been well documented in the literature (Brückner et al. 2004; Higgins et al. 2012; McQuillan et al. 2011; Santelli et al. 2003; Schwarz et al. 2007), and studies report that some 29–45% of reproductive-aged women experience pregnancy ambivalence (Higgins et al. 2012; Schwarz et al. 2007). Given these findings, it seems reasonable that an EHR data field should include options to capture ambivalence. The absence of more nuanced response options during the study period could have led providers to document a yes/no response despite ambivalent feelings on the part of the patient, or to have documented more nuanced responses in other locations within the EHR (e.g., visit notes). Following the completion of the current study, a 'patient unsure' response option was added to the relevant data field. While this does not fully resolve the complexity of measuring pregnancy intentions, the addition could improve documentation and the provision of patient-centered clinical care.

Third, the findings of this study cannot tell us precisely what took place in the clinical encounter, or how questions related to pregnancy intentions or desires were asked. Our findings are limited to whether a patient's pregnancy intention was documented, and whether the response was yes or no. We cannot know the precise wording used by the provider (e.g., whether or not the word "planning" was used, a concept that may not resonate for some patients) or whether the conversation was initiated by the provider, the patient, or some combination of both. Recent literature has called for use of more open-ended questions, enabling providers to prioritize information delivery based on patient preferences (Callegari 2017). While the data analyzed in this study were extracted from standardized close-ended fields, the conversations leading to those responses were likely varied.

Finally, our study was conducted exclusively in family planning centers, potentially reducing its generalizability. For example, it is possible that women seeking care at family planning centers may differ from those in other settings, such as primary care providers. It is also possible that pregnancy intention assessment and/or documentation may be implemented differently in other clinical contexts.

Nevertheless, the current study is one of the few to examine assessment of pregnancy intentions in clinical settings, and thus has implications for practice and ongoing research efforts. The results suggest that it is feasible to track pregnancy intention screening over time using EHR data in a large family planning network. Improving the availability and placement of structured data fields for capturing patient

pregnancy intentions in electronic health records may lead to improvements in documentation over time, and may facilitate the integration of pregnancy intention assessment into routine clinical practice. Electronic health records should include structured data fields to allow for extraction and analysis, but also allow providers to capture more nuanced patient-reported preferences. Pregnancy ambivalence and the fluidity of pregnancy attitudes and desires requires additional considerations for patient-centered research and quality improvement efforts. Improving data capture on pregnancy intentions may also allow for greater precision in health outcomes research and performance assessment on national quality measures. The present study highlights opportunities to align data capture with clinical quality improvement efforts related to pregnancy intention assessment, contraceptive and pre-pregnancy care, and the targeting of interventions to improve maternal and child health.

Acknowledgements The authors would like to thank Amandi Clarke and Stephanie Küng for their assistance with the literature review; Kellan Smith and Erin Barringer-Sterner for their assistance in identifying EHR data fields and extracting the data and Susanne Mauney for additional consultation; and Zoe Unger and Monika Grzeniewski for their review of the manuscript.

Funding The research received no external funding.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest to disclose.

References

Bellanca, H. K., & Hunter, M. S. (2013). ONE KEY QUESTION®: Preventive reproductive health is part of high quality primary care. *Contraception, 88*(1), 3–6. https://doi.org/10.1016/j.contraception.2013.05.003.

Bommaraju, A., Malat, J., & Mooney, J. L. (2015). Reproductive life plan counseling and effective contraceptive use among urban women utilizing Title X services. *Women's Health Issues, 25*(3), 209–215. https://doi.org/10.1016/j.whi.2015.02.005.

Brückner, H., Martin, A., & Bearman, P. S. (2004). Ambivalence and pregnancy: Adolescents' attitudes, contraceptive use and pregnancy. *Perspectives on Sexual and Reproductive Health, 36*(06), 248–257. https://doi.org/10.1363/3624804.

Callegari, L. S., et al. (2017). Addressing potential pitfalls of reproductive life planning with patient-centered counseling. *American Journal of Obstetrics & Gynecology, 216*(2), 129–134. https://doi.org/10.1016/j.ajog.2016.10.004.

Centers for Disease Control and Prevention. (2010). Preconception health and health care: Reproductive life plan tool for health professionals. Retrieved from https://www.cdc.gov/preconception/documents/rlphealthproviders.pdf.

Centers for Disease Control and Prevention. (2015). Effectiveness of family planning methods. Retrieved from http://www.cdc.gov/reproductivehealth/unintendedpregnancy/pdf/contraceptive_methods_508.pdf.

Clark, M. (2014). Reproductive life plan: Creating healthy families in Ohio. *Contraception, 90*(2), 198–199. https://doi.org/10.1016/j.contraception.2014.06.015.

Datamark Inc. (2013). Unstructured data in electronic health records: Challenges and solutions. White paper. Retrieved from https://www.datamark.net/uploads/files/unstructured_ehr_data_white_paper.pdf.

Finer, L. B., & Zolna, M. R. (2016). Declines in unintended pregnancy in the United States, 2008–2011. *New England Journal of Medicine, 374*(9), 843–852. https://doi.org/10.1056/NEJMsa1506575.

Gavin, L., et al. (2014). Providing quality family planning services: Recommendations of the CDC and the U.S. Office of Population Affairs. *MMWR Recommendations and Reports, 63*(RR04), 1–29.

Higgins, J. A., Popkin, R. A., & Santelli, J. S. (2012). Pregnancy ambivalence and contraceptive use among young adults in the United States. *Perspectives on Sexual and Reproductive Health, 44*(4), 236–243. https://doi.org/10.1363/4423612.

Kontopantelis, E., Doran, T., Springate, D. A., Buchan, I., & Reeves, D. (2015). Regression based quasi-experimental approach when randomization is not an option: Interrupted time series data. *BMJ, 350*, h2750. https://doi.org/10.1136/bmj.h2750.

Lu, M. (2007). Recommendations for preconception care. *American Family Physician, 76* (3), 397–400.

McQuillan, J., Greill, A. L., & Shreffer, K. M. (2011). Pregnancy intentions among women who do not try: Focusing on women who are okay either way. *Maternal Child Health Journal, 15*(2), 178–187.

Robbins, C. L., Gavin, L., Carter, M. W., & Mokosky, S. B. (2017). The link between reproductive life plan assessment and provision of preconception care at publicly funded health centers. *Perspectives on Sexual and Reproductive Health, 49*(3), 167–172. https://doi.org/10.1363/psrh.12030.

Santelli, J., Rochat, R., Hatfield-Timajchy, K., et al. (2003). The measurement and meaning of unintended pregnancy. *Perspectives on Sexual and Reproductive Health, 35*(2), 94–101. https://doi.org/10.1111/j.1931-2393.2003.tb00111.x.

Schwarz, E. B., Lohr, P. A., Gold, M. A., & Gerbert, B. (2007). Prevalence and correlates of ambivalence towards pregnancy among nonpregnant women. *Contraception, 75*(4), 305–310. https://doi.org/10.1016/j.contraception.2006.12.002.

Taljaard, M., Mckenzie, J. E., Ramsay, C. R., & Grimshaw, J. M. (2014). The use of segmented regression in analysing interrupted time series studies: An example in pre-hospital ambulance care. *Implementation Science, 9*(1), 77. https://doi.org/10.1186/1748-5908-9-77.

Trussell, J. (2011). Contraceptive failure in the United States. *Contraception, 83*(5), 397–404. https://doi.org/10.1016/j.contraception.2011.01.021.

U.S. Department of Health and Human Services. (2016). Title X family planning program priorities. Retrieved from http://www.hhs.gov/opa/title-x-family-planning/title-x-policies/program-priorities/.