2012

Preconception Health and Health Care Environmental Scan

Report on Clinical Screening Tools and Interventions

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Prepared for the Clinical Work Group on Preconception Health and Health Care

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BACKGROUND & PURPOSE

Background of the Preconception Care Initiative

The aim of preconception care is to promote the health of women before conception occurs in order to reduce preventable adverse pregnancy outcomes. In 2006, the CDC/ATSDR Preconception Care Work Group and the Select Panel on Preconception Care published an MMWR on *Recommendations on Improving Preconception Health and Health Care – U.S.*, and defined preconception care as 'interventions that aim to identify and modify biomedical, behavioral, and social risks to a woman's health or pregnancy outcome through prevention and management, emphasizing those factors which must be acted on before conception or early in pregnancy to have maximal impact' (Johnson, Posner, Biermann et al., 2006). That same report included 10 recommendations that could lead to successful development and delivery of an array of evidence-based services and support that could improve the health of women in the preconception period (Johnson, Posner, Biermann et al., 2006).

To assist in moving these recommendations forward, five work groups were designated to address clinical, consumer, public health, policy and finance, and research and surveillance components of preconception health and health care. Over the past six years, a national Preconception Health and Health Care (PCHHC) Initiative has evolved , including these work groups, creating substantial research, publications, policy changes, and community action implementing many of the plans and strategies proposed in 2006.

Purpose of the Environmental Scan

After the 3rd National Summit on Preconception Health and Health Care in Tampa, Florida, June 12-14, 2011, the PCHHC Initiative Leadership decided to convene a strategic planning meeting in order to reaffirm the goals of the initiative and to develop a PCHHC Action Plan for 2012-2015. This report was developed in response to a request for an environmental scan that emerged from the Clinical Work Group at the strategic meeting, calling for collection, review, and compilation of promising tools with an existing evidence base, including both screening instruments and brief interventions.

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METHODOLOGY

This environmental scan was conducted from December 2011 – March 2012 to identify preconception or interconception screening tools and brief interventions that had been previously evaluated. The goal of the environmental scan was to summarize the evidence base available for preconception/interconception screening tools and brief interventions. The process included: searches of the peer-reviewed and non-peer reviewed literature (e.g., grey literature issue briefs), collection of screening instruments available on-line and from published sources, discussions with content experts using a "snowball" method, and review by members of the PCHHC Initiative Clinical Work Group. Most of the peer-reviewed tools/interventions were obtained via one of several scanned databases, an Internet search engine, and through communication with content experts for non-peer reviewed tools/interventions. Pertinent information from the scan was consolidated into a database, which included evaluation information on the tools' and interventions' implementation setting, design, sample size, measures, and outcomes. The Clinical PCHHC Work Group members and the CDC liaison to the Work Group reviewed the database to verify entries relevant to the scan and identify missing entries from the database. The scan was limited to tools that had either been evaluated or were in the process of being evaluated as indicated by peer-reviewed and non-peer reviewed sources of information.

Inclusion Criteria

The inclusion criteria were developed prior to the scan to identify multiple risk factors that could be addressed by preconception screening tools (e.g. checklists) and interventions. The peer-reviewed and non-peer reviewed tools and interventions that were included met all of the following criteria: 1) a screening tool or intervention that assessed multiple risk factors and conditions that occur during the preconception or interconception period 2) a free, printable tool available online in a print material, or accessible upon request from the author 3) evaluation of the tool was conducted or in progress as a validity study, process or outcome evaluation 4) information on its evaluation was available in peer-reviewed or non-peer-reviewed literature , or upon request from a preconception care content expert with knowledge about existing preconception screening tools and interventions. In some cases, tools and interventions were identified that were part of a larger study or randomized clinical trial.

Some content experts were contacted directly via email or telephone to obtain more information about the purpose of a specific intervention or screening tool. During telephone calls, co-authors of this report took notes to document relevant information that was presented. These notes were used to complete the information necessary for entries in the environmental scan database. Similarly, information that was sent in an email or postal mail was also used to complete entries within the database.

Each article that was selected using the search strategy and criteria was entered into the environmental scan database in **Appendix A - Table 1**. A double author review was implemented with the co-authors of this report to verify the accuracy of the information that was included for each tool or intervention. Each author reviewed the corresponding article(s), report(s), or other information collected from the scan to the entries in the database. In order to

resolve any discrepancies, the co-authors referred to the appropriate article or source for clarification and/or emailed the relevant database entry to its content expert for review and edits. The database was also sent through two rounds of review to members of the preconception care Clinical Work Group and edited as appropriate after each review. Entries with limited information on its evaluation were excluded from the database.

Search Strategy

Relevant tools and interventions were identified by using different search strategies. The search for peer-reviewed sources was used to identify preconception screening tools and interventions with published evaluation data. Similarly, the search for non-peer reviewed sources was used to identify preconception screening tools and interventions with unpublished evaluation data, as well as preliminary information on the screening tools and interventions with evaluation activities that were underway. Both sources were sought in order to broaden the scan's representation to include available and promising preconception screening tools and interventions for preconception care and their evaluation activities.

Peer-reviewed sources

The following key words were used to identify tools and interventions in the peer-reviewed literature: "*preconception health assessment*", "*interconception health assessment*", "*preconception screening tool*", "*preconception tool*", "*interconception screening tool*", "*interconception tool*", "*preconception intervention*", "*interconception intervention*", "*contraceptive screening tool*", "*reproductive life plan*", "*family planning tool*" and "*family planning assessment*". Each set of keywords was used to conduct online journal and database searches through several electronic resources including Health and Psychosocial Instruments (HAPI), MEDLINE, PubMed, Scirus, The Cochrane Library, and Google Scholar. An electronic record of the number of results that were generated for each keyword and within each database was kept. The number of articles of interest from each source was also tracked. In addition, the reference lists of relevant articles were scanned to detect any additional literature on screening tools and interventions.

Non-peer-reviewed sources

Searches were performed using the Google search engine and the same keywords used for the peer-reviewed searches to identify non-peer reviewed screening tools and interventions. Some external content experts were also contacted by phone and/or email to collect information on the implementation of these unpublished tools, interventions and/or the physical screening tool. Contact information found online helped to identify the external experts for some tools. Other tools were referred to us by internal and external experts with knowledge of individuals in the field who could provide additional information about a specific tool.

RESULTS

More than 3,500 reports were identified during the online database searches for peer-reviewed literature using a predetermined set of keywords. These articles were systematically reviewed based on an a priori set of criteria that included a first phase of scanning article titles and abstracts and a second phase of full-text review. Twenty-three articles were identified from the first phase review as qualifying for full review. These included some duplicates. After removing the duplicates, 15 articles were fully reviewed for their relevance to this environmental scan. From this second phase review, nine of these peer-reviewed tools/interventions were found to be relevant. From the non-peer reviewed search, an additional six tools/interventions were identified. Thus, in all, the peer-reviewed and non-peer reviewed searches resulted in the identification of 15 unique tools and interventions. For four of these tools/interventions, more than one article or report was included in this environmental scan because the information in the distinct reports was not duplicative, but rather each provided information or assessment of a different aspect of the identified tool/intervention.

Environmental Scan Database

A detailed summary of information abstracted from the 19 evaluation and implementation reports for the 15 screening tools/intervention projects included in this review is provided in **Appendix A -Table 1.**

Of the 15 unique screening tools/interventions identified, 11 were screening tools, two were interventions, and two projects combined a screening and an intervention. The two intervention-only projects were the Los Angeles Mommy and Baby Project and the *Strong Healthy Women* intervention. The two projects that included a screening tool to assess risk status followed by an intervention program to reduce these risks were the Interpregnancy Care Assessment and Care Plan Tools and the Preconception Risk Assessment for the Gabby Intervention. All remaining entries consisted of screening tools only.

Preconception screening tools were available in different formats including checklists with multiple risk factors, paper and online questionnaires, toolkits, and interactive wheels used to identify specific risk factors. Interventions were developed as programs that could modify a number of risk factors within a particular population. These programs were implemented using health education, counseling, or community outreach activities to change high risk behaviors in women.

The identified screening tools and intervention programs were implemented in a variety of settings including health departments, primary care settings, clinics, community settings, hospitals, private practices, or HMOs. Additionally, several themes emerged on the measures assessed across programs. Most programs primarily focused on identifying risk factors and health status in women during the preconception/interconception period and many also measured patient or provider perceptions about the preconception tool or program. Additional measures included in various programs were pregnancy intention and readiness, providers' delivery of preconception care, validity of items on screening tools, birth spacing, pregnancy outcomes, and preconception knowledge and behaviors. Thus, evaluation efforts for the

identified projects related to the screening and interventions focused on both process and outcome measures.

Environmental Scan Matrices

A detailed look at the components and topics of preconception care covered across the screening tools and interventions identified during the scan are presented in **Appendix A-Table 2.**

In sum, the individual programs were compared to the recommendations for preconception care, as outlined in the American Journal of Obstetricians and Gynecologists (AJOG) supplement, "Preconception Health and Health Care: The Clinical Content of Preconception Care" (Jack, Atrash, and Coonrod et al., 2008). The recommended components of care were health promotion, immunization, infectious disease, medical conditions, psychiatric condition, parental exposure, family and genetic history, nutrition, environmental exposure, psychosocial risk, medication, reproductive history, and special populations. The corresponding topics for each component were added to a matrix, along with similar information from the screening tools and interventions to highlight the extent to which each tool/intervention aligned with the recommendations. Overall, the major recommended components of preconception care were found to align across a majority of the screening tools and interventions that were identified.

The components that most consistently appeared across programs (included in at least 14 out of 15 tools/interventions) were health promotion (e.g., family planning, weight status, and immunizations), infectious disease (e.g., HIV, hepatitis C, and toxoplasmosis), medical conditions (e.g., diabetes mellitus, hypertension, and asthma), parental exposures (e.g., alcohol, tobacco, and illicit substances), and nutrition (e.g., dietary supplements, folic acid, and eating disorders).

A few components were less well covered (included in five to 10 of the tools/interventions). These components were special populations (e.g., women with disabilities, cancer, and men), environmental exposures (e.g., mercury, lead, soil and water hazards) and family & genetic history (e.g., ethnicity based, previous pregnancies, and known genetic conditions). The limited inclusion of these components within preconception screening tools and brief interventions presents a gap that should be considered in the development of new screening tools and interventions.

One of the most comprehensive programs identified was the Preconception Risk Assessment for the Gabby Intervention (Jack, 2012). This program incorporated each component of preconception care recommendations and nearly all topics within each area.

CONCLUSIONS

In this environmental scan of preconception and interconception screening tools and brief interventions, several instruments for implementing preconception care were identified and reviewed. Various screening tools have been developed since the first preconception screening tool was created in 1985 by Moos & Cefalo. The continued development of tools into present day suggests that the field is continuing to expand the number of available programs for screening women of childbearing age for pregnancy risk factors and intervening to reduce those risks.

The environmental scan revealed several promising preconception screening tools, but also the paucity of screening tools and interventions that have been formally and rigorously evaluated in the field. The absence of evaluation efforts impacts the availability of published research on the effectiveness of preconception or interconception screening tools and interventions in improving pregnancy outcomes for mothers and infants. Although several tools and interventions were identified through this environmental scan, some tools were not included in this report because there was no indication that the tool had been validated or undergone any other type of evaluation and therefore did not meet our inclusion criteria. The limited information in this area presents a challenge of identifying model tools and programs for improving the health of women and children through preconception care.

This report has been shared with the Preconception Health and Health Care Clinical Work Group. The information serves as a snapshot of screening instruments and brief interventions known to have evaluation data and is not an exhaustive list of all screening tools for preconception and/or interconception care. We will also continue to monitor new evaluated tools and interventions and make the findings available as deemed important.

"The absence of evaluation efforts impacts the availability of published research on the effectiveness of preconception or interconception screening tools and interventions in improving pregnancy outcomes for mothers and infants."

REFERENCES

1. Bernstein PS, Sanghvi T, Merkatz IR. Improving preconception care. *J Reprod Med*. 2000; 45:546 52.
2. Boston Public Health Commission. Women's health questionnaire [Internet]. http://www.naccho.org/topics/modelpractices/database/practice.cfm?practiceID=43. Accessed January 12, 2012.
3. County of San Diego Health and Human Services Agency. Preconception WHEELS. [Telephone and email correspondence with Rhonda Freeman}. 2012.
4. Cullum AS. Changing provider practices to enhance preconceptional wellness. *J Obstet Gynecol Neonatal Nurs*. 2003; Jul-Aug, 32: 543-9.
5. De Weerd S, Van Der Bij AK, Cikot RJ, *et al*. Preconception care: a screening tool for health assessment and risk detection. *Prev Med*. 2002; 34: 505-11.
6. Dunlop A, Dubin C, Raynor B, *et al*. Interpregnancy primary care and social support for African-American women at risk for recurrent very-low-birthweight delivery: a pilot evaluation. *Matern Child Healt J*. 2008; 12: 461-68.
7. Dunlop AL, Logue KM, Miranda MC, *et al*. Integrating reproductive planning with primary health care: an exploration among low-income, minority women and men. *Sex Reprod Healthc*. 2010; 1: 37-43.
8. Health Team Works. Colorado guidelines for preconception and interconception care. [Email correspondence with Thea Carruth]. 2012.
9. Hillemeier MM, Downs DS, Feinberg ME, *et al*. Improving women's preconceptional health: findings from a randomized trial of the strong healthy women intervention in the Central Pennsylvania women's health study. *Women's Health*. 18S 2008; S87-S96.
10. Integration of preconception and primary health care: evaluation of a preconception care toolkit. [Email Correspondence with Anne Dunlop]. 2012.
11. Jack BW, Atrash H, Coonrod DV, *et al*. The clinical content of preconception care: an overview and preparation of this supplement. *Am J Obstet Gynecol*. 2008; 199(6 suppl 2):S266-S79.
12. Jack BW, Campanile C, Mcquade W, *et al*. The negative pregnancy test: an opportunity for preconception care. *Arch Fam Med*. 1995; 4: 340-5.
13. Jack BW, Culpepper L, Babcock J, *et al*. Addressing preconception risks identified at the time of a negative pregnancy test: a randomized trial. *J Fam Practice*. 1998; 47:33-8.
14. Jack BW. Reaching women through health information technology: the gabby preconception care system. Accepted in *Am J Health Promot*. 2012; [In press].
15. Johnson K, Posner SF, Biermann J, *et al*. Recommendations to improve preconception health and health care--United States. a report of the CDC/ATSDR Preconception Care Work Group and the Select Panel on Preconception Care. *MMWR Morb Mortality Weekly Rep*. 2006; 55:1-23.

16. Landkroon AP, De Weerd S, Van Vliet-Lachotzki E, *et al*. Validation of an internet questionnaire for risk assessment in preconception care. *Public Health Genomi*. 2010; 13: 89-94.

17. Los Angeles County Department of Public Health, Maternal, Child, and Adolescent Health Programs (MCAH). Los Angeles mommy and baby project - 2007 surveillance report. [Internet] http://www.publichealth.lacounty.gov/mch/LAMB/LAMBReport/FinalLAMB2007Databook_web.pdf

18. Los Angeles County Public Health. Interconception care project of California. [Telephone and email correspondence with Jeanne Conry and Diana Ramos]. 2012.

19. Moos MK, Cefalo RC. Preconception health appraisal. University of North Carolina at Chapel Hill. 1985; Form No: 3236.

20. Moos MK. Preconceptional health promotion: a health education opportunity for all women. *Women Health*. 1989; 15: 55-68.

21. Moos MK, Bangdiwala SI, Meibohm AR, *et al.* The impact of a preconceptional health promotion program on intendedness of pregnancy. *Am J Perinat*. 1996; 13: 103-8.

22. Weisman CS, Hillemeier MM, Chase GA, *et al*. Preconceptional health: risks of adverse pregnancy outcomes by reproductive life stage in the Central Pennsylvania Women's Health Study (CePAWHS). *Women's Health Iss*. 2006; 16: 216-24.

23. Weisman CS, Hillemeier MM, Downs DS, *et al*. Improving women's preconceptional health: long-term effects of the Strong Healthy Women behavior change intervention in the Central Pennsylvania Women's Health Study. *Women's Health Iss*. 2011; 21: 265-71.

24. Wisconsin Association for Perinatal Care & Perinatal Foundation. Becoming a parent checklist. [Telephone and email correspondence with Ann Conway and Mary Rolloff]. 2012.

APPENDIX

ABOUT THE DATABASE

The following tables (Table 1) include the types of information that was gathered on each screening tool or intervention that was identified in the environmental scan. The programs with multiple articles have been grouped and are listed in the first few tables. For the purposes of this report, general information about each entry has been extracted and summarized below. The sources for each tool were primarily peer-reviewed articles, but also included an in press manuscript, webpage database, as well as information gathered through mail, telephone, and email correspondence shared by individuals with knowledge of the tools' implementation and evaluation activities. More than one article was included for some tools, indicating that multiple publications on an individual tool or intervention were available. At the time of this environmental scan, there were no published evaluation reports identified for entries 8, 14 - 19, therefore in some cases the organization responsible for the development of the tool has been listed, along with the year that the authors collected information from an individual or other source with information about the tool. The two exceptions were entries 8 and 14, which have reports that are either in press or pending publication. Please note that the entries in this database only reflect the results from this scan, which was conducted from December 2011 – March 2012.

Table 1: Development and Evaluation of Preconception Screening Tools & Interventions

1. Preconceptional Health Promotion: A Health Education Opportunity for All Women *(Moos, 1989)* *Topics: Family, medical, reproductive, and drug histories, nutrition, and lifestyle choices*	**Purpose**	To describe a model program for preconceptional counseling and provide findings for a low-socioeconomic population involved in the model program
	Tool/Intervention	Preconception Health Appraisal[1]
	Population	Low-income women
	Settings	Family planning programs in health departments
	Design/Sample Size	• Cross-sectional • n = 344 patients randomly surveyed from 10 health departments provided responses regarding the appraisal
	Measures	Self-reported interest in information presented and frequency of risk factors
	Outcomes	• 89% of patients indicated interest in the information presented in preconception counseling • 62% of respondents indicated that they learned new information • An average of 6.8 potential reproductive risk factors were identified through the health appraisal
	Time to Implement	3 to 5 minutes
2. The Impact of a Preconceptional Health Promotion Program on Intendedness of Pregnancy *(Moos, 1996)* *Topics: Family, medical, reproductive, and drug histories, nutrition, and lifestyle choices*	**Purpose**	To determine whether a brief preconceptional health promotion program for low-income women attending family planning clinics impacts intendedness of pregnancy
	Tool/Intervention	Preconception Health Appraisal
	Population	• Low-income women attending family planning clinics • Mean age = 21.2 years
	Settings	3 local health departments
	Design/Sample Size	• Prospective study of three groups of women • Those known to the health departments' family planning programs and exposed to the preconceptional health promotion in the clinic (E= 456 women) • Those known to the health department planning program but not exposed to the service(C1 = 309 women) • Those seeking maternity care who were unknown to the health department (C2 = 613 women)
	Measures	Effect of exposure to a family planning preconception program on intentions of getting pregnant
	Outcomes	• The experimental group had a 51.8% greater likelihood of identifying their pregnancies as intended, compared to the control group of women (C1) known to the health departments • The experimental group had a 64.2% greater likelihood of intendedness than the control group of women (C2) not known to the health departments
	Time to Implement	3 to 5 minutes

[1] The Preconception Health Appraisal includes two unique articles (Moos 1989, 1996) that present different information on the tool.

3. The Negative Pregnancy Test: An Opportunity for Preconception Care *(Jack, 1995)* *Topics: Baseline health assessment, nutrition, environmental exposures, reproductive history, lifestyle factors, pregnancy planning, psychosocial factors, barriers to care, infectious disease risk, and family history*	**Purpose**	To identify women who would likely benefit from preconception care
	Tool/Intervention	Preconception Risk Survey[2]
	Population	• Women with a negative pregnancy test • Mean age 19.8 years, predominantly white (20% non-white) and single (21.5% were married)
	Settings	Family practice residency ambulatory and primary care settings
	Design/Sample Size	• Cross-sectional • n=136 women
	Measures	Self-reported risk variables associated with maternal conditions related to poor obstetric outcome, risk factors for poor obstetric outcome, and risks for developing these conditions
	Outcomes	• 51.5% reported a medical or reproductive risk that could adversely affect pregnancy • 50% reported a genetic risk • 28.7% reported a risk for HIV infection • 25.7% reported an indication for hepatitis B vaccine, and recent use of illegal substances • 16.9% reported at least one affirmative answer to the CAGE questionnaire, to screen for alcoholism • 58.5% smoked cigarettes • 54.4% reported a nutrition risk • 92.6% reported a psychosocial risk • 28.7% reported a perceived barrier to ongoing care
	Time to Implement	25 minutes

4. Addressing Preconception Risks Identified at the Time of a Negative Pregnancy Test: A Randomized Trial *(Jack 1998)* *Topics: Baseline health assessment, nutrition, environmental exposures, reproductive history, lifestyle factors, pregnancy planning, psychosocial factors, barriers to care, infectious disease risk, and family history*	**Purpose**	To determine whether comprehensive preconception risk assessment at the time of a negative pregnancy test followed by referral to primary care services is effective in initiating treatment for women with preconception risk factors
	Tool/Intervention	Preconception Risk Survey
	Population	An urban population of women who received a negative pregnancy test between March 9, 1993 and May 31, 1995
	Settings	Primary care setting

[2] The Preconception Risk Survey includes two unique articles (Jack 1995, 1998) that present different information on the tool.

Design/Sample Size	• Randomized control trial • n=170
Measures	• Readiness for pregnancy • The number of identified medical and psychosocial risks to future pregnancies
Outcomes	• On average, 8.96 risks were identified per woman • Of 100 women who returned within a year, 18% of these women had a psychosocial risk addressed and 48% received attention for potential fetal exposures (smoking, alcohol, and drug use) • There was no difference between intervention and controls groups in the percentage of risks addressed
Time to Implement	25 minutes

5. Improving Women's Preconceptional Health: Findings from a Randomized Trial of the Strong Healthy Women Intervention in the Central Pennsylvania Women's Health Study
(Hillemeier et al., 2008)
Topics: Pregnancy and conception, managing stress, physical activity, nutrition, preventing gynecologic infection, tobacco exposure, and alcohol use

Purpose	To investigate the pretest-posttest effects of the Strong Healthy Women intervention on health behaviors and health status of preconceptional and interconceptional women.
Tool/Intervention	*Strong Healthy Women* Intervention[3]
Population	• Majority white, non-pregnant, pre- and interconceptional women • Ages 18-35
Settings	15 low-income rural communities of Central Pennsylvania
Design/Sample Size	• Randomized controlled trial of 692 women with 14 week posttest • n= 362 women completed both pretest and posttest assessments with all biomarkers
Measures	• Self-reported measures of self-efficacy, behavioral intent, and behaviors associated with pregnancy, conception, stress management, physical activity, nutrition, gynecologic infection, tobacco exposure, and alcohol use • Anthropometric and biomarker indicators of health status
Outcomes	• Women in the intervention group were significantly more likely than controls to report higher self-efficacy and intent for eating healthy food (p=.018) (p=.008) and intent to be more physically active (p=.000) • Statistically significant behavior changes included greater likelihood of reading food labels (p=.01), using a daily multivitamin containing folic acid (p=.000), and meeting recommended levels of physical activity (p=.019) • Significant dose effects were found for preconceptional control of birth outcomes, indicating significant improvement with each additional session attended (p=.031)
Time to Implement	20 minutes for pretest and posttest questionnaires + time to collect biomarkers; intervention provided in six 2-hour sessions over a 12-week period

[3] The *Strong Healthy Women* Intervention includes two unique articles (Hillemeier et al., 2008 and Weisman et al., 2011) that present different information on the intervention.

6. Improving Women's Preconceptional Health: Long-Term Effects of the Strong Healthy Women Behavior Change Intervention in the Central Pennsylvania Women's Health Study *(Weisman et al., 2011)* *Topics: Pregnancy and conception, managing stress, physical activity, nutrition, preventing gynecologic infection, tobacco exposure, and alcohol use*	**Purpose**	To investigate the long-term (6- and 12-month) effects of the Strong Healthy Women intervention on health-related behaviors, weight and body mass index, and weight gain during pregnancy
	Tool/Intervention	*Strong Healthy Women* Intervention
	Population	• Women in the original trial of the *Strong Healthy Women* intervention • Majority white, non-pregnant, pre- and interconceptional women • Ages 18-35 at enrollment
	Settings	15 low-income rural communities of Central Pennsylvania
	Design/Sample Size	• 6- and 12-month follow-up telephone interviews with participants of a randomized control trial; birth records obtained for those giving birth during 12-month follow-up • n=362
	Measures	Self-report of pregnancy incidence and outcomes, reading food labels, using a daily multivitamin with folic acid, meeting recommended physical activity levels, consuming fruits and vegetables daily, weight, and BMI; birth record data on pregnancy outcomes and pregnancy weight gain
	Outcomes	• At 12-month follow up, participants in the intervention group were significantly more likely than controls to use a daily multivitamin with folic acid and to have lower weight and BMI • Among those who had given birth during the follow-up period, women in the intervention had lower average pregnancy weight gain compared with controls • The intervention's effects on reading food labels dropped off between the 6- and 12-month follow up
	Time to Implement	Two 30-minute telephone surveys

7. Integrating Reproductive Planning with Primary Health Care: An Exploration Among Low-Income, Minority Women and Men *(Dunlop et al., 2010)*[4] *Topics: Women 's and men's desires for a child and when they would like to have a child, and contraceptive practices to prevent pregnancy*	**Purpose**	To explore the acceptability and utility of integrating an assessment of reproductive plans into primary care encounters
	Tool/Intervention	Reproductive Plans Assessment (A part of the Georgia Preconception Care Toolkit)
	Population	• African-American and Hispanic females and males
	Settings	Publicly-funded, primary care clinics in metropolitan Atlanta, GA
	Design/Sample Size	• Cross-sectional • n=144
	Measures	• Demographic information form • A reproductive plans assessment questionnaire • An open-ended interview regarding comfort level with questions asked in the interview
	Outcomes	• Overall 81% of females and 42% of males reported that the reproductive plans

[4] The Georgia Preconception Care Toolkit includes two unique articles (Dunlop et al., 2010, 2012) that present different information on the program.

		assessment was important to their encounter • More than 45% who reported never wanting a child or not wanting a child for at least one year were at risk for unintended pregnancy • Only 1.4% of females and males reported that they currently desired to have a child
	Time to Implement	1.1 minutes

8. Integration of Preconception and Primary Health Care: Evaluation of a Preconception Care Toolkit *(Dunlop et al., 2012)* *Topics: Includes; (1) Reproductive plans assessment; (2) Reproductive health risk assessment; (3) Provider monograph; (4) Counseling guides; (5) Chart checklist. (Also adapted to EPIC EMR for Grady setting.)*	**Purpose**	(1) To implement a Preconception Care Toolkit in publicly-funded primary care clinics; (2) To conduct an outcome evaluation of implementation of the Preconception Care Toolkit to assess its effect on specific provider practices and patient outcomes
	Tool/Intervention	Georgia Preconception Care Toolkit
	Population	600 African-American and Hispanic women of reproductive age
	Settings	Publicly-funded primary care clinics in metropolitan Atlanta, GA
	Design/Sample Size	• Cohort study: comparison of prospective intervention cohort to minimal intervention comparison group using 'difference-in-difference' between cohorts at 3-, 6-, 12-months post-intervention; as well as translatability evaluation using RE-AIM framework. • n=600
	Measures	• Change in general and individual preconception health knowledge • Change in provider practices • Change in women's behaviors (folic acid, contraceptive adherence, condom use, risk of unintended and "exposed" pregnancies)
	Outcomes	• 12-month follow-up assessments for patients to ascertain change in behaviors are currently underway • 12-month abstraction of clinical records to ascertain change in provider practices are also underway
	Time to Implement	Not reported

9. Improving Preconception Care *(Bernstein et al., 2000)* *Topics: Family planning services, domestic violence, nutrition, medical risk factors, medication use, counseling, and use of referral services*	**Purpose**	To develop and test an educational intervention for health providers to promote preconception care for all women of reproductive age
	Tool/Intervention	Preconception Health Screening/Counseling Checklist
	Population	Non-pregnant women with reproductive potential
	Settings	Inner-city hospital gynecology clinic
	Design/Sample Size	• A baseline chart review of a convenience sample of 100 women pre-intervention was conducted • Thirty-five providers of routine gynecologic care (attending physicians, residents, certified nurse midwives, and nurse practitioners) were administered a survey of knowledge and attitudes about PCC • A convenience sample of an additional 100 women was obtained to compare PCC dissemination before and after the intervention

Measures	Documentation of the delivery of preconception care by reporting family planning services, domestic violence, nutrition and medical risk factors, medication use, appropriate counseling and use of referral services
Outcomes	• Documentation of screening in almost all categories was significantly improved (P<.05) • The greatest improvements were noted in screening for medical risk factors (from 15% to 44%), over-the-counter and prescription medication use (from 10% to 70% and 30% to 77% respectively), domestic violence (from 10% to 57%) and nutrition (from 9% to 50%) • No significant changes in documentation of screening for infectious diseases • Provider attitudes toward preconception care were not significant
Time to Implement	Not reported

10. Preconception Care: A Screening Tool for Health Assessment and Risk Detection *(de Weerd et al., 2002)* *Topics: Social, nutritional, and medical histories, infectious disease, medication, reproductive and family histories*	**Purpose**	To compare self-administered questionnaires to history taking by a physician to evaluate the reliability of such a screening tool for prepregnancy risk detection
	Tool/Intervention	Preconception Health Assessment and an oral Family History Survey
	Population	• Couples who intended to conceive were recruited from a fertility clinic (n=121) and the clinic for preconception care (n=65) of the University Medical Center Nijmegen, Netherlands • Mean age = 32.5 years
	Settings	Outpatient fertility and preconception care clinic
	Design/Sample Size	• Questionnaire validation study • n=186 couples • Sample of convenience drawn from targeted clinics • Participants were given the preconception questionnaire for women and family history form for both women and men • Forms were taken home for completion and returned by participants at the first preconception meeting • Responses on the written form were verified by trained interviewers (physicians)
	Measures	Level of agreement (Kappa Statistic) between the written information from the couples and the responses to the oral verification of responses given to the trained interviewers on social, nutritional, medical history, infectious disease, medication, reproductive and family history variables
	Outcomes	• There was a high agreement level between written and oral versions of the questionnaire* • An excellent agreement level (overall κ= 0.88) was found for all sections of the Preconceptional Health Assessment form except for the nutritional history sections (κ = 0.70) • Family history surveys also showed a high agreement level (κ= 0.92 for women and κ= 0.90 for men) *κ = ≥ (0.75) considered excellent
	Time to Implement	Not reported

11. Validation of an Internet Questionnaire for Risk Assessment in Preconception Care *(Landkroon et al., 2010)* *Topics: Social, nutritional, medical, infectious disease, medication, reproductive, and family histories, and toxic exposures*	**Purpose**	To compare information elicited by www.zwangerwijzer.nl with information gained by history taking by a healthcare provider among women planning to conceive
	Tool/Intervention	Zwangerzijzer.nl, an online version of the Preconception Health Assessment Form (Dutch version)
	Population	Women who had an appointment at the outpatient or fertility clinics for preconception care
	Settings	Outpatient fertility and preconception clinic
	Design/Sample Size	• Validation study • n= 159 women completed the online questionnaire • n=106 also completed the oral verification interview for the questionnaire
	Measures	Level of agreement between responses to the online preconception questionnaire and oral history taking
	Outcomes	• Most lifestyle variables, including smoking, alcohol, and dietary items, showed a good to high level of agreement when compared to the oral interview • The medical history and obstetric history items also showed a good to high level of agreement with the exception of the item "uterine or cervical anomalies" (κ= 0.38) • The use of over-the-counter drugs revealed a poor level of agreement (κ= 0.21)
	Time to Implement	10 minutes

12. Interpregnancy primary care and social support for African-American women. at risk for recurrent very-low-birthweight delivery: a pilot evaluation *(Dunlop et al., 2008)* *Topics: Includes forms for targeted review of systems, clinical assessment, interpregnancy care plan for 7 areas epidemiologically-linked with poor reproductive health outcomes, and a range of tools for Resource Mother assessment and client intervention*	**Purpose**	To explore whether the provision of primary health care and social support following a VLBW delivery improves subsequent reproductive health outcomes for low-income, African-American women
	Tool/Intervention	Interpregnancy Care Assessment and Care Plan Tools
	Population	• Women in the Grady Interpregnancy Care Program • 29 African-American women receiving no-cost primary care, social support, and care coordination for 24 months following a VLBW delivery
	Settings	Publicly-funded hospital setting in metropolitan Atlanta
	Design/Sample Size	• Cohort study: comparison of prospective intervention cohort to retrospective/historical control group • n=29
	Measures	• Pregnancies conceived within 18 months of index VLBW delivery • Adverse pregnancy outcomes for pregnancies conceived within 18 months of index VLBW delivery
	Outcomes	Women in the control cohort had, on average, 2.57 (95% CI: 1.14 – 5.78) times as many pregnancies within 18 months of the index VLBW delivery and 3.51 (95% CI: 1.04 – 11.73) times as many adverse pregnancy outcomes as women in the intervention cohort

	Time to Implement	Not reported

13. 2007 Surveillance Report: A Survey of the Health of Mothers and Babies in Los Angeles County *(Los Angeles County Department of Public Health, 2007)* *Topics: Preconception health, prenatal care and maternal medical conditions during pregnancy, psychosocial conditions during pregnancy, behavioral risk factors, postpartum care and infant health*	**Purpose**	To improve understanding of why some women have better birth outcomes than others.
	Tool/Intervention	Los Angeles Mommy and Baby (L.A.M.B.) Project
	Population	Mothers who are LA county residents who delivered a baby during the preceding 2 to 6 months in 2007.
	Settings	Participants' home setting
	Design/Sample Size	• Cross-sectional survey • Mixed-methods public health surveillance project to collect data using CDC's Pregnancy Risk Assessment Monitoring System (PRAMS) and population-based mail surveys. • Reminders were mailed two weeks after enrollment to nonresponders, as well as a second survey packet 7 to 10 days later. • Nonrespondents are called for a telephone interview two weeks after the second survey packet is mailed. • n= 6,264 mothers
	Measures	• Measures of prepregnancy health status, prenatal care and maternal risk factors, psychosocial and behavioral risk factors, postpartum health, prepregnancy health • All measures were estimated by race/ethnicity, service planning area, or supervisorial district
	Outcomes	• 70.7% of women in Los Angeles County reported not having received preconception health counseling. • 10.1% of women in Los Angeles County entered prenatal care after the 1st trimester of pregnancy. • The highest percentage for a medical condition in Los Angeles County was periodontal disease (18.9%). • 19.9% of women in Los Angeles County self-reported that they had depression. • Most women (75.7%) in Los Angeles County reported that they would have someone around to listen to their problems. • 91.5% of women in Los Angeles County received a postpartum check-up. • 98.3% of women had a well-baby check-up
	Time to Implement	Not reported

14. Reaching Women Through Health Information Technology: The Gabby Preconception Care System *(Jack, 2012)* *Topics: Healthcare promotion, immunizations, infectious diseases, medical conditions, parental exposures, family genetic history, nutrition, environmental exposures, psychosocial risks, medications, reproductive history, and special populations*	**Purpose**	To perfect a virtual patient education advocate (VPA) that screens for and addresses preconception risks, targeting young African-American women to address high rates of poor birth outcomes
	Tool/Intervention	Preconception Risk Assessment
	Population	• Focus groups participants were women ages 15 to 22 years old, African-American, and not pregnant at the time of enrollment • Participants in the usability testing group were women between the ages of 15 and 25 years old and African-American • Pilot testers were women enrolled in the Office of Minority Health Preconception Peer Educator (OHM PPE) program between the ages of 18 and 25 years old, with home or school internet access, a telephone, and willing to participate in a two-month follow-up telephone call
	Settings	• An urban safety net hospital and university
	Design/Sample Size	• 8 focus groups equaling 31 participants were conducted to gather input on the online risk assessment • 15 women participated in usability testing of the program, consisting of a quantitative survey and 30 minute one-on-one interview about their experiences and impressions with the Gabby system • 9 nursing students pilot tested the system at home for two months
	Measures	• Usability of the system by reviewing transcripts from audio-recordings of the focus groups and one-on-one interviews • Frequencies of individual risks identified and the percentage of risks per domain from the preconception risk assessment • Participant satisfaction with the system assessed through self-administered surveys in the usability and pilot testing groups • Stage of change for each risk was assessed during two-month follow-up phone calls
	Outcomes	• Results have been compiled and a report developed that is currently under review for publication • A randomized controlled trial has been planned with funding from the federal government
	Time to Implement	12 minutes

15. County of San Diego Health and Human Services (HHS) Agency*, 2012* *Topics: Nutrition, weight and exercise, stress management, family planning, medical and dental check-ups, communicating with a health care provider, smoking/alcohol/drug use and environmental exposures, and resources*	**Purpose**	To gather client (consumer) and staff feedback on materials for the Preconception Health Awareness Project consisting of three versions of the Preconception WHEELS tool and fact sheets

Tool/Intervention	Preconception WHEELS
Population	**Clients:** African-American and Hispanic women, as well as women in the general population **Staff:** Case Manager/Client Service Specialist, Community Perinatal Health Worker, Program Manager, Program Director, and Educator **Focus Groups:** African-American and Hispanic women, as well as women in the general population from various organizations
Settings	**Clients:** Private provider, health clinic, community, and county organizations **Staff:** Lifetime Women's Healthcare, Black Infant Health Program, SAY San Diego-Start Smart, Horn of Africa-Family Together Program, and Family Health Centers San Diego-Logan Heights **Focus Groups:** Various settings including a community baby shower, home visits, clinics, classroom and health fairs
Design/Sample Size	Pilot project to assess feedback from consumers and staff through surveys and focus groups about program materials **Clients:** n= 15 organizations submitted 321 client surveys **Staff:** n=5 organizations submitted 13 client surveys ·**Focus Groups:** n= 4 focus groups with a total of 22 participants
Measures	**Client and Staff:** Client and staff feedback on the program materials through focus groups, a client survey, and a staff survey **Staff:** Staff feedback on how the wheels and fact sheets fit into their routine practices working with clients
Outcomes	**Clients:** •88% of clients felt they learned new information •The most helpful sections of the tools reported were: eat right (63%), take care (52%), manage stress (52%) and get moving (47%) **Staff:** 91% of staff stated it was easy to incorporate the wheels into their routine practices and that they facilitated health behavior and lifestyle discussions with clients **Focus Groups:** •59% of focus group participants reported using information or tips from the wheel •77% of focus group participants learned something new
Time to Implement	Less than 9 minutes

16. Health Team Works, *2012* *Topics: Folic acid, body weight, smoking, alcohol & drugs, STIs & other infectious diseases, immunizations, psychosocial risks, reproductive history, family & genetic history, environmental exposures, medical & psychiatric history, and medications*	**Purpose**	To imbed guideline content into the practice setting and/or initiate the facilitation of a clinic's process change
	Tool/Intervention	Colorado Guidelines for Preconception and Interconception Care
	Population	Clinical and non-clinical staff
	Settings	Public health-family planning clinic, pediatric practice, OB/GYN practice, and a college health services clinic
	Design/Sample Size	• Recruited 5 Health Team Works Rapid Improvement Activities (RIA) training sites • Implemented RIA within the women's health teams with a focus on preconception care and the Colorado Guidelines • Each health site created implementation plans with supporting goals
	Measures	• The percentage of goals that were achieved at follow-up • Examples of goals included collecting BMI as well as counseling and tracking patients on overweight and obesity
	Outcomes	At 3 month follow-up, 70% of the goals set at the time of the initial RIA had been sustained
	Time to Implement	1 hour

17. Los Angeles (LA) County Public Health, *2012* *Topics: Alcohol use, anemia, chronic hypertension, domestic violence, gestational diabetes, gonorrhea, chlamydia, hepatitis B & C, HIV, immunizations, migraine, overweight, postpartum depression, preeclampsia, premature birth, prior caesarean, seizure, substance use, syphilis, thrombocytopenia, thyroid disorder, and tobacco use*	**Purpose**	To enable all women to have at least one clinical visit before their next conception
	Tool/Intervention	Interconception Care Project of California (California Algorithms)
	Population	Various levels of providers including nurses, doctors, and social workers
	Settings	Kaiser Permanente of California, HMO, MMO, and Medicare clinic settings
	Design/Sample Size	• ACOG volunteers were split into teams to research specific topics and develop recommendations for the algorithms • n=200 volunteers
	Measures	• Patient and provider feedback on the tools • California Department of Public Health is trying to track downloads of the tool
	Outcomes	• Changes were made to the tool based on feedback from the volunteers • The tool will be submitted as a California March of Dimes Big 5 Project for TX, FL, NY, CA, and IL
	Time to Implement	Not reported

***18. Wisconsin (WI) Association for Perinatal Care & Perinatal Foundation**, 2012* *Topics: Family medical history, maternal/paternal medical history, reproductive health, nutrition, home, work, or social hazards, and parenting considerations*	**Purpose**	To help women and men identify health risks and take action before pregnancy
	Tool/Intervention	Becoming A Parent Checklist
	Population	Prenatal, interconception, and postpartum women
	Settings	HMOs, prenatal clinics (high risk groups), Planned Parenthood of Wisconsin, and Bellin College
	Design/Sample Size	• Baccalaureate nursing class project at Bellin College • Students completed the checklist as consumers, and then assessed their responses as providers • n= 100+
	Measures	• Students were tasked with identifying problems revealed by completed checklists, why the problem was a concern, and assessing the impact of the problem on pregnancy • Personal reflections were written to determine what students learned and what they would suggest to increase preconception planning in the health care system
	Outcomes	• Two to three students out of every 100 would say that their providers had asked about their plans to become pregnant • Students were surprised at the list of things to consider about pregnancy and the implications of not planning a pregnancy • Students emphasized the need for more consumer education and incorporating the question, "Are you thinking of becoming pregnant?" to increase preconception planning through the health care system
	Time to Implement	Not reported

***19. Boston Public Health Commission**, 2012* *Topics: Medical history, patient-provider communication, health care access, psychosocial risks, safety, stress, environmental exposures, neighborhood safety, violence, economic concerns, and patient care satisfaction*	**Purpose**	To identify medical and social risk factors among women of childbearing age in an effort to improve health prior to conception
	Tool/Intervention	Women's Health Questionnaire
	Population	Pregnant and parenting African-American women
	Settings	Boston community health centers, hospital outpatient clinics, and Healthy Start Initiative agencies
	Design/Sample Size	Not reported
	Measures	• Risk factors included nontraditional topic areas such as environmental health exposures, neighborhood safety, violence, economic concerns, and patient satisfaction with care • Assessed at intake, and at the end of the first and second years after delivery
	Outcomes	Not reported
	Time to Implement	Not reported

ABOUT THE MATRICES

The following matrices (Table 2) compare the components of preconception care and corresponding topics (specific risk factors and health conditions), as outlined in "The Clinical Content of Preconception Care" by Jack, Atrash, and Coonrod et al., 2008 to the components and topics found in the environmental scan. Each black dot within the matrices indicates that the tool addressed at least one or more topics within the larger specified component of preconception care. The tools for which specific topics could be identified include a list of additional information to the side of each dot. The author of each tool aligns with the author name and year as it appears within the environmental scan database, emphasizing the entry that corresponds to each tool.

Table 2: Preconception/Interconception Screening Tools and Interventions Matrix

Potential Components and Topics of Preconception Care[1]	Preconception Health Appraisal (Moos-Cefalo 1989, 1996)	Preconception Risk Survey (Jack 1995, 1998)	Preconception Health Screening/Counseling Checklist (Bernstein 2000)	Preconception Health Assessment (de Weerd 2002)
Health Promotion – *family planning and reproductive life plan, physical activity, weight status, nutrient intake, folate, immunizations, substance use, STIs*	• weight status, nutrient intake, immunizations, substance use, STIs	• family planning, nutrient intake, immunizations, substance use, STIs	• family planning, physical activity, substance use	•physical activity, weight status, nutrient intake, STIs
Immunizations – *HPV, hepatitis B, varicella, MMR, influenza, TdaP vaccinations*	• rubella	• hepatitis B, rubella	•HPV, hepatitis B, varicella, rubella	•HPV, rubella
Infectious Disease – *HIV, hepatitis C, TB, toxoplasmosis, CMV, listerosis, parvovirus, malaria, gonorrhea, chlamydia, syphilis, herpes, asymptomatic bacteruria, periodontal disease, bacterial vaginosis, group B streptococcus*	• HIV, toxoplasmosis, herpes, gonorrhea, chlamydia, syphilis	• HIV, hepatitis, gonorrhea, chlamydia, syphilis, herpes	•HIV, toxoplasmosis	• HIV, hepatitis, toxoplasmosis, gonorrhea, chlamydia, herpes
Medical Conditions – *diabetes mellitus, thyroid disease, PKU, seizure disorders, hypertension, rheumatoid arthritis, lupus, renal disease, cardiovascular disease, thrombophilia, asthma*	• diabetes, PKU, epilepsy, hypertension, renal disease, heart disease	• diabetes, thyroid disease, PKU, epilepsy, hypertension, lupus, renal disease, heart disease, asthma	•diabetes, thyroid disease, hypertension, renal disease, cardiovascular disease, asthma	•diabetes, thyroid disease, epilepsy, hypertension, lupus, renal disease, heart disease, asthma
Psychiatric Conditions – *depression, anxiety, bipolar disease, schizophrenia*	—	•depression, anxiety	—	•suicide, admission to psychiatric ward or mental institution
Parental Exposures – *alcohol, tobacco, illicit substances*	• All	•All	•All	•All
Family & Genetic History – *ethnicity based, family history, previous pregnancies, known genetic conditions*	• ethnicity based, family history, known genetic conditions	• ethnicity based, family history, known genetic conditions	•ethnicity based, family history, known genetic conditions	•previous pregnancies
Nutrition – *dietary supplements, vitamin A, folic acid, multivitamins, vitamin D, calcium, iron, essential fatty acids, iodine, overweight, underweight, eating disorders*	•multivitamins, overweight, underweight	•folic acid, multivitamins	• folic acid, vitamin D, calcium, eating disorder	• multivitamins, eating disorders
Environmental Exposures – *mercury, lead, soil and water hazards, workplace and household exposures*	•lead, work and house exposures	• lead, work and house exposures	•lead, work exposures	•work and house exposures
Psychosocial Risk – *inadequate financial resources, access to care, physical/sexual abuse*	• physical abuse	•inadequate financial resources, access to care, physical/ sexual abuse	—	—
Medication – *prescription, over-the-counter, dietary supplements*	• prescription, OTC	• prescription	•prescription, OTC	•prescription, OTC
Reproductive History – *prior preterm birth, prior cesarean delivery, prior miscarriage, prior stillbirth, uterine anomalies*	• miscarriage, stillbirth uterine anomalies,	• preterm birth, C-section miscarriage, stillbirth, uterine anomalies,	• preterm birth, stillbirth, uterine anomalies	• preterm birth, miscarriage, uterine anomalies
Special Populations – women with disabilities, immigrant and refugee populations, cancer, men	—	•cancer	—	•cancer

Table 2: Preconception/Interconception Screening Tools and Interventions Matrix (continued)

Potential Components and Topics of Preconception Care[1]	Georgia Preconception Care Toolkit (Dunlop 2010, 2012)	Preconception Health Assessment Online (Zwangerzijzer.nl) (Landkroon 2010)	Preconception Risk Assessment (Gabby Intervention) (Jack 2012)	Colorado Guidelines for Preconception Interconception Care (Health Team Works 2012)
Health Promotion – *family planning and reproductive life plan, physical activity, weight status, nutrient intake, folate, immunizations, substance use, STIs*	●reproductive life plan, STIs	●STIs	●All	●Immunizations
Immunizations – *HPV, hepatitis B, varicella, MMR, influenza, TdaP vaccinations*	●vaccination status	●rubella	●All	● HPV, hepatitis B, MMR, varicella, TdaP
Infectious Disease – *HIV, hepatitis C, TB, toxoplasmosis, CMV, listerosis, parvovirus, malaria, gonorrhea, chlamydia, syphilis, herpes, asymptomatic bacteruria, periodontal disease, bacterial vaginosis, group B streptococcus*	● HIV, toxoplasmosis	●toxoplasmosis	●HIV, hepatitis C, TB, gonorrhea, chlamydia, syphilis, herpes	● HIV, TB, gonorrhea, chlamydia, syphilis
Medical Conditions – *diabetes mellitus, thyroid disease, PKU, seizure disorders, hypertension, rheumatoid arthritis, lupus, renal disease, cardiovascular disease, thrombophilia, asthma*	●diabetes, thyroid disease, epilepsy, hypertension, lupus	● diabetes, thyroid disease, epilepsy, hypertension, arthritis, renal disease, heart disease, thrombosis, asthma	●All	●diabetes, thyroid, PKU, epilepsy, hypertension, arthritis, lupus, renal disease, heart disease, asthma
Psychiatric Conditions – *depression, anxiety, bipolar disease, schizophrenia*	●depression	—	●All	●depression, bipolar disorder, schizophrenia
Parental Exposures – *alcohol, tobacco, illicit substances*	●All	●All	●All	●All
Family & Genetic History – *ethnicity based, family history, previous pregnancies, known genetic conditions*	●ethnicity based, family history, known genetic conditions	●family history, previous pregnancy, genetic conditions,	● ethnicity based, family history, known genetic conditions	● ethnicity based, known genetic conditions
Nutrition – *dietary supplements, vitamin A, folic acid, multivitamins, vitamin D, calcium, iron, essential fatty acids, iodine, overweight, underweight, eating disorders*	● dietary supplements, folic acid	● vitamin A, folic acid, eating disorders	●All	●folic acid, overweight, underweight
Environmental Exposures – *mercury, lead, soil and water hazards, workplace and household exposures*	●work exposures	●work and house exposures	●All	●soil and water hazards, work and house exposures
Psychosocial Risk – *inadequate financial resources, access to care, physical/sexual abuse*	●physical/sexual abuse	—	●All	●physical/sexual abuse
Medication – *prescription, over-the-counter, dietary supplements*	●All	●prescription, OTC	●All	●prescription, dietary supplements
Reproductive History – *prior preterm birth, prior cesarean delivery, prior miscarriage, prior stillbirth, uterine anomalies*	●preterm birth, miscarriage	●All	●All	●preterm birth, prior C-section, stillbirth, uterine anomaly
Special Populations – women with disabilities, immigrant and refugee populations, cancer, men	—	●cancer	●All	—

Table 2: Preconception/Interconception Screening Tools and Interventions Matrix (continued)

Potential Components and Topics of Preconception Care[1]	Interconception Care Project of California (LA County Public Health 2012)	Becoming A Parent Checklist (WI Assoc. for Perinatal Care 2012)	Strong Healthy Women Intervention (Hillemeier 2008; Weisman 2011)	Preconception WHEELS (County of San Diego HHS Agency 2012)
Health Promotion – *family planning and reproductive life plan, physical activity, weight status, nutrient intake, folate, immunizations, substance use, STIs*	•immunizations, substance use	•family planning, weight status, nutrient intake	• family planning, physical activity, weight status, nutrient intake, immunizations	• family planning, physical activity, weight status , immunizations, STIs
Immunizations – *HPV, hepatitis B, varicella, MMR, influenza, TdaP vaccinations*	•All	• hepatitis B, varicella, mumps , rubella,	•hepatitis B, varicella, rubella	—
Infectious Disease – *HIV, hepatitis C, TB, toxoplasmosis, CMV, listerosis, parvovirus, malaria, gonorrhea, chlamydia, syphilis, herpes, asymptomatic bacteruria, periodontal disease, bacterial vaginosis, group B streptococcus*	• HIV, hepatitis C, gonorrhea, chlamydia, syphilis	• HIV, TB, toxoplasmosis, gonorrhea, chlamydia, syphilis, herpes	• HIV, gonorrhea, chlamydia, syphilis, herpes, bacterial vaginosis	—
Medical Conditions – *diabetes mellitus, thyroid disease, PKU, seizure disorders, hypertension, rheumatoid arthritis, lupus, renal disease, cardiovascular disease, thrombophilia, asthma*	• diabetes, thyroid disorder, epilepsy, hypertension	• diabetes, thyroid disease, epilepsy, hypertension, lupus, renal disease, heart disease, asthma	• diabetes, hypertension, heart disease	•diabetes, hypertension
Psychiatric Conditions – *depression, anxiety, bipolar disease, schizophrenia*	•depression	•depression, anxiety, bipolar disorder	—	—
Parental Exposures – *alcohol, tobacco, illicit substances*	•All	•All	•alcohol, tobacco	•All
Family & Genetic History – *ethnicity based, family history, previous pregnancies, known genetic conditions*	—	•family history, known genetic conditions	—	—
Nutrition – *dietary supplements, vitamin A, folic acid, multivitamins, vitamin D, calcium, iron, essential fatty acids, iodine, overweight, underweight, eating disorders*	•overweight	•folic acid, eating disorders	• folic acid, overweight, underweight	• folic acid, multivitamins, overweight, underweight,
Environmental Exposures – *mercury, lead, soil and water hazards, workplace and household exposures*	—	•lead, water hazards, work and house exposures,	—	•work and house exposures
Psychosocial Risk – *inadequate financial resources, access to care, physical/sexual abuse*	•physical/sexual abuse	•physical/sexual abuse	• access to care, physical/sexual abuse	—
Medication – *prescription, over-the-counter, dietary supplements*	—	•All	—	•All
Reproductive History – *prior preterm birth, prior cesarean delivery, prior miscarriage, prior stillbirth, uterine anomalies*	•preterm birth, prior C-section	• preterm birth, miscarriage, stillborn,	—	—
Special Populations – women with disabilities, immigrant and refugee populations, cancer, men	—	•cancer	—	—

Table 2: Preconception/Interconception Screening Tools and Interventions Matrix (continued)

Potential Components and Topics of Preconception Care[1]	Grady Interpregnancy Program (Dunlop 2008)	Los Angeles Mommy & Baby (L.A.M.B.) Project (LA County Public Health 2007)	Women's Health Questionnaire (Boston Public Health Commission 2012)	Total
Health Promotion – *family planning and reproductive life plan, physical activity, weight status, nutrient intake, folate, immunizations, substance use, STIs*	• family planning, reproductive life plan, nutrient intake, substance use, STIs	• physical activity, nutrient intake, STIs	•family planning	**15**
Immunizations – *HPV, hepatitis B, varicella, MMR, influenza, TdaP vaccinations*	• hepatitis B, rubella	—	—	**12**
Infectious Disease – *HIV, hepatitis C, TB, toxoplasmosis, CMV, listerosis, parvovirus, malaria, gonorrhea, chlamydia, syphilis, herpes, asymptomatic bacteruria, periodontal disease, bacterial vaginosis, group B streptococcus*	• HIV, chlamydia, bacterial vaginosis	•bacterial vaginosis	•hepatitis C	**14**
Medical Conditions – *diabetes mellitus, thyroid disease, PKU, seizure disorders, hypertension, rheumatoid arthritis, lupus, renal disease, cardiovascular disease, thrombophilia, asthma*	• diabetes, hypertension	• diabetes, hypertension, asthma	• thyroid disorder, epilepsy, hypertension, heart disease	**15**
Psychiatric Conditions – *depression, anxiety, bipolar disease, schizophrenia*	•depression, anxiety	•depression	•depression, anxiety	**11**
Parental Exposures – *alcohol, tobacco, illicit substances*	•All	•All	•All	**15**
Family & Genetic History – *ethnicity based, family history, previous pregnancies, known genetic conditions*	—	—	•family history	**10**
Nutrition – *dietary supplements, vitamin A, folic acid, multivitamins, vitamin D, calcium, iron, essential fatty acids, iodine, overweight, underweight, eating disorders*	•folic acid, multivitamins, calcium	•multivitamins, overweight	•eating disorders	**15**
Environmental Exposures – *mercury, lead, soil and water hazards, workplace and household exposures*	—	—	—	**10**
Psychosocial Risk – *inadequate financial resources, access to care, physical/sexual abuse*	• All	•inadequate financial resources, access to care, physical/sexual abuse	•physical/sexual abuse	**11**
Medication – *prescription, over-the-counter, dietary supplements*	•prescription	—	•All	**12**
Reproductive History – *prior preterm birth, prior cesarean delivery, prior miscarriage, prior stillbirth, uterine anomalies*	• preterm birth, stillbirth	•preterm birth, miscarriage, stillbirth	•preterm birth, miscarriage	**13**
Special Populations – women with disabilities, immigrant and refugee populations, cancer, men	—	—	—	**5**

Source: [1]Jack BW, Atrash H, Coonrod DV, Moos M-K, O'Donnell J, Johnson K. The clinical content of preconception care: an overview and preparation of this supplement. American Journal of Obstetrics and Gynecology 2008; 199: S266-S79.

Additional Preconception Screening Tools and Interventions

The following list represents additional screening tools and interventions that were found during the environmental scan, but did not meet our inclusion criteria. Most of these tools are available online or by request from the author.

- Preconception Screening and Counseling Checklist (March of Dimes and Upper Hudson Prenatal Services Network)[5]
- Preconception Care, Version 3.0 (Mater Mothers' Hospital, Brisbane South East Alliance of General Practice)[6]
- Preconception/Prenatal Family Health History Questionnaire (March of Dimes Foundation)[7]
- Thinking About Tomorrow: Preparing for your own health and the health of any future children (Merry-K Moos)[8]
- Healthy Births for Healthy Communities : Interconceptional Questionnaire Version 3.2[9]
- Comprehensive Perinatal Services Program: Initial Combined Assessment (CDPH 4455) (California Department of Public Health)[10]
- Preconception Screening and Counseling Checklist (Illinois Department of Healthcare and Family Services)[11]

[5] March of Dimes, Upper Hudson Prenatal Services. Preconception Screening and Counseling Checklist. Available at http://health.utah.gov/mihp/pdf/preconceptool.pdf

[6] Mater Mothers' Hospital, Brisbane South East Alliance of General Practice. Preconception Care. (June 2010). Available at http://www.brisbanesouth.com.au/content/Document/Resources/Prac%20Support/Pre%20Conception%20Care%20Booklet.pdf

[7] March of Dimes Foundation. Preconception/Prenatal Family Health History Questionnaire. (2008). Available at http://www.marchofdimes.com/Your_family_health_historypreconceptionprenatal.pdf

[8] Moos, MK. Thinking about tomorrow: preparing for your own health and the health of any future children. (2010). Available by request from the author

[9] Healthy Births for Healthy Communities. (2009). Available at http://healthybirths.files.wordpress.com/2011/01/iccp_survey_v3-2-_03-04-09.pdf

[10] California Department of Public Health. Comprehensive perinatal services program: initial combined assessment (CDPH 4455). (2005). Available at http://cchealth.org/services/perinatal/pdf/cpsp_provider_handbook.pdf

[11] Illinois Department of Health care and Family Services. Preconception Screening and Counseling Checklist. (2007). Available at http://www.chtc.org/dl/handouts/20080617/Handout%202.pdf