

Action Plan for the National Initiative on Preconception Health and Health Care (PCHHC)

A Report of the PCHHC Steering Committee

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The Preconception Health and Health Care (PCHHC) Initiative is made up of a dedicated group of individuals from public and private organizations and agencies with interest in improving the health of women and infants. The Initiative promotes improving the health of women and infants through widespread delivery of preconception and interconception care. The Initiative is guided by the PCHHC Steering Committee and the five workgroups that are listed below and described within this document.

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INTRODUCTION

Preconception Health and Health Care Initiative

Background

Too many babies in the United States are born preterm, of low birth weight, or with birth defects. In 2008, the U.S. infant mortality rate was 6.61 per 1,000 live births (1). In the 2005 international rankings, the United States ranked 30th in infant mortality, behind other developed countries including Canada, Australia, New Zealand, Hong Kong, Singapore, Japan, and most European countries (2). Improving the health of women of childbearing age, before they conceive, is essential to changing these trends, yet millions of women do not receive evidence-based prevention services, primary care, and treatment due to a lack of health coverage or limited access to quality care (3,4). Many women do not currently benefit from clinical and community preventive services that could improve their health for a lifetime and help them have healthy babies when, and if, they choose to do so. Unfortunately, many women also continue to face multiple barriers such as violence and poverty and might live in neighborhoods that impede their ability to reach their full potential for health and well-being.

The objectives of this action plan are to advance the knowledge of women and their partners, increase the availability of evidence-based services, and improve the health of communities in our nation.

Growing Evidence and Action to Support a Changing Paradigm

Starting in the late –1980s, experts in maternal and infant health identified opportunities to improve women’s health and pregnancy outcomes through preconception health promotion and health care (5). Recommendations by the Institute of Medicine (IOM) (6), the U.S. Public Health Service (USPHS) Expert Panel on the Content of Prenatal Care (7), and a national Committee on Perinatal Health convened by American Academy of Pediatrics, American College of Obstetrics and Gynecology, and March of Dimes (8) made successively stronger calls for improving preconception health. Early studies, including randomized trials, pointed to promising practices, as well as challenges in implementing preconception care in primary care practice (9–15). In 2002, the fifth edition of *Guidelines for Perinatal Care* (16) included an expanded section on preconception care advising that “all health encounters during a woman’s reproductive years, particularly those that are part of preconception care, should include counseling on appropriate medical care and behavior to optimize pregnancy outcomes”. Based on expert opinion, these professional organizations recommended four categories of interventions: 1) physical assessments, 2) risk screening, 3) vaccinations, and 4) counseling for positive behavior change including exercising, preventing human immunodeficiency virus (HIV) infection, and consuming folic acid. Also in 2002, a systematic review of 21 research trials was published that strengthened the evidence base for several elements of preconception care. The review concluded that to improve pregnancy outcomes, maternal and child health (MCH) professionals needed to promote the concept of readiness for pregnancy and ensure that women are as healthy as possible before conception (17).

In 2003, an internal Workgroup at the Centers for Disease Control and Prevention (CDC) began a review of published studies related to preconception health. This internal Workgroup then met with representatives of 16 external organizations and engaged in strategic planning to determine goals and

strategies for improving preconception health and health care. In 2005, the first National Summit on Preconception Care was convened to gather information about promising practices in the field. Concurrently, CDC convened the Select Panel on Preconception Care that resulted in the 2006 *Morbidity and Mortality Weekly Report (MMWR)* publication titled, “Recommendations to Improve Preconception Health and Health Care –United States: A Report of the CDC/ATSDR Preconception Care Workgroup and the Select Panel on Preconception Care” (18). Ten core recommendations with key action steps, based on four broad goals, were issued in that publication. This select panel defined preconception care as “a set of interventions that aim to identify and modify biomedical, behavioral, and social risks to a woman’s health or pregnancy outcome through prevention and management.” The concept included interconception care for women with identified risks and prior adverse pregnancy outcomes, which was defined as preventive and primary care services for women between pregnancies. The recommendations included an array of approaches to changing preconception health and health care. The aim was to change both the paradigm for women’s primary health care in a patient–centered, health care home (19,20) and women’s health over the lifespan (21,22).

The CDC engaged leaders and practitioners in various fields to ensure implementation of the recommendations and, in 2006, convened five workgroups in the areas of clinical, public health, consumer, policy and finance, and surveillance and research (23). A new public–private partnership known as the Preconception Health and Health Care (PCHHC) Initiative, comprising federal agencies and key private sector organizations, was formed to guide implementation of the goals, recommendations, and action steps outlined by the select panel. A public–private strategic plan was developed and has largely been completed over the past 5 years.

One initial focus of the PCHHC Initiative was on improving the clinical content of preconception care (24–27). Over two years, the Clinical Workgroup engaged 59 experts in an in-depth review of more than 80 topics to: 1) define the clinical components of preconception care, 2) summarize the existing evidence for inclusion of each component in clinical activities, and 3) define the health promotion package to be delivered as part of preconception care. Using a standardized approach, based on the format of the U.S. Preventive Services Task Force (USPSTF), the review looked at burden of the conditions, accuracy of screening, effectiveness of treatment, and effects of detection and treatment of the condition prior to pregnancy. This work led to a report entitled, *Preconception Health and Health Care: The Clinical Content of Preconception Care* (28), published as a special supplement in the *American Journal of Obstetrics and Gynecology (AJOG)* that documented the evidence base for preconception care and made recommendations across 14 areas of clinical services. This extensive review helped to lay the groundwork for inclusion of preconception care as part of the IOM’s recommendations for women’s clinical preventive services (29).

The Policy and Finance Workgroup sought out means currently available to increase opportunities for more women to receive preconception care including implementation of Medicaid waivers and providing technical assistance to state and local entities in integrating preconception care components into existing programs. This group agreed on three major reforms in the design of health coverage to create a comprehensive women’s health benefit for women of reproductive age. These reforms are: 1) an improved package for “well–woman” health visits, 2) an array of covered benefits categories providing

comprehensive treatment for conditions diagnosed that are known to adversely affect maternal health and birth outcomes among women of childbearing age that are, and 3) coverage of intensive interconception treatment for any woman for whom a prior pregnancy ended in an adverse outcome (e.g., fetal death, very low birth weight, preterm birth, or infant mortality) (30). Implementation of the Patient Protection and Affordable Care Act (ACA) can make affordable coverage available, with most insurance plans being required to cover preventive services and treatments (29,31), including components of preconception care as part of well–woman visits.

The Consumer Workgroup conducted formative research among women and couples in order to understand their knowledge of, attitudes and behaviors towards, and barriers to engaging in preconception health activities. These efforts laid the groundwork for the development of a consumer–focused preconception health brand and national social marketing campaign. In addition, other information from a literature review by the Consumer Workgroup has helped build an understanding of the barriers faced by women of color and other special populations who are at high risk for adverse pregnancy outcomes and other special populations. This workgroup also has compiled studies and papers from experts across the country for a special supplemental issue of the *American Journal of Health Promotion* focusing on preconception health, which will be released in early 2013.

The Public Health Workgroup in collaboration with state and local health departments across the country developed a core set of 45 preconception health indicators across several domains to maximize data from national and state surveillance systems (32–34). More than a dozen states have preconception health initiatives under way, most sustained by a public-private partnership or coalition. The Surveillance and Research Workgroup partnered with the National Institute of Child Health and Human Development (NICHD) in the development of a research agenda for preconception care. Resources for the research agenda were not forthcoming and the workgroup was halted temporarily; it then was reconstituted at a strategic planning meeting in December 2011.

Cutting across PCHHC Initiative workgroups, the Division of Healthy Start and Perinatal Services in the Health Resources and Services Administration’s (HRSA) Maternal and Child Health Bureau (MCHB) of the U.S. Department of Health and Human Services (HHS), supported a 3–year Healthy Start Interconception Care Learning Community that engaged 104 grantee teams constituting more than 750 individuals in 15 quality improvement learning collaboratives. The collaboratives were developed to improve the quality of interconception care and health for women with low incomes who are at risk for adverse pregnancy outcomes in communities with high infant mortality (35). Additional accomplishments of the workgroups can be found in Appendix A.

Why Are Preconception Health and Health Care Important?

Women of childbearing age can experience various health conditions and risk factors that can affect their well–being and should they become pregnant, the well–being of their infant. Millions of women do not receive needed prevention and intervention services, often due to the lack of health coverage (4,36,37). Yet even among women with health coverage and other resources, chronic conditions, risky health behaviors, toxic exposures, and social and economic factors, such as poverty and racism, can affect a woman’s long-term health and the outcome of any pregnancy she might have (6,38,39).

Table 1: Prevalence of Selected Risk Indicators, Medicaid and All Women, PRAMS, U.S., 26 reporting areas*, 2004 (40)

		Percent of women with Medicaid coverage	Percent of women with private insurance	Percent of all women reporting in PRAMS
Preconception (Prepregnancy) Risk and Protective Factors	Tobacco use	36.0	17.3	23.2
	Alcohol use	37.7	37.1	50.1
	Multi-vitamin use	21.4	45.9	35.1
	Stress	33.8	11.1	18.5
	Overweight	14.4	12.9	13.1
	Obesity	32.7	23.3	21.9
	Diabetes	2.9	1.4	1.8
	Non-use of contraceptives	54.9	52.2	53.1
History of Adverse Outcome	Prior LBW	15.6	8.8	11.6
	Prior preterm	13.7	11.1	11.9
Interconception/ Postpartum (PP) Risk and Protective Factors	Use of contraceptives	85.1	85.5	85.1
	Tobacco use	26.8	10.9	17.9
	PP Depression**	22.5	10.2	15.7

*Reporting areas: Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Louisiana, Maine, Maryland, Michigan, Mississippi, Nebraska, New Jersey, New Mexico, New York City, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia.

** Only 16 areas reported on postpartum depression.

As shown in Table 1, data from the Pregnancy Risk Assessment Monitoring System (PRAMS) document the prevalence of a number of risk factors and health conditions experienced by women during the preconception and interconception periods that are associated with adverse pregnancy outcomes (40). Data from the National Birth Defects Prevention Study (NBDPS) also point to the magnitude of some health behavior risks. An analysis of data from NBDPS indicated that women with unintended pregnancies were more likely to use illicit drugs, smoke, be exposed to environmental smoke, and not take folic acid, compared to women with intended pregnancies (41). Another study conducted among women who had recently delivered a baby found that 80% reported some amount of alcohol use in the preconceptional period. Among those women, 50% reported alcohol use prior to pregnancy recognition and 22% reported binge drinking (42).

Diabetes, hypertension, obesity, depression, and sexually transmitted diseases (e.g., chlamydia, gonorrhea, and syphilis) are among the medical conditions that can cause adverse pregnancy outcomes among women of reproductive age (40, 43–45). Moreover, often without understanding the risks, women can use prescription medications, alcohol, tobacco, and other substances that are associated with birth defects, preterm birth, miscarriage, and other adverse pregnancy outcomes (27,38). All of these risk factors and conditions are modifiable, if identified during the preconception and interconception period by health screenings and addressed with evidence-based interventions (46). Many of these risk factors are complex and long standing issues for many communities. Success in addressing these conditions is amplified when programs and policies also address larger issues such as access to healthy food, safe neighborhoods, higher education, and healthy social support. The following examples of health conditions

and risk behaviors illustrate the potential of preconception health interventions to address a woman's health overall and the health of her baby, should she become pregnant.

Diabetes: A recent systematic review and meta-analysis were conducted to assess the effects of diabetes on maternal and fetal outcomes among women who received preconception care. The study had a total of 24 randomized and non-randomized trials and cohort and case-control studies. The final conclusions were that preconception care is effective in reducing diabetes related congenital malformation, preterm delivery, and maternal hyperglycemia in the first trimester of pregnancy (47).

Hypertension: This condition comprises a large spectrum of hypertensive disorders including chronic hypertension, preeclampsia, and gestational hypertension. These disorders are responsible for 1 in 50 stillbirths, 1 in 10 of all preterm births, and 1 in 3 cases of severe maternal morbidity (48). Based on a systematic review by the National Collaborating Centre for Women's and Children's Health, the preconception period presents an opportunity to implement aspirin prophylaxis, which reduces the occurrence of preeclampsia, preterm birth, and fetal and neonatal mortality among women at risk of a hypertensive disorder (49). The National Institute for Health and Clinical Excellence's (NICE) guidelines recommend that during the preconception period women with chronic hypertension be informed of the increased risk of congenital malformations associated with taking teratogenic medications (e.g., angiotensin converting enzyme inhibitors, angiotensin II receptor blockers, and chlorothiazide) to control their condition during pregnancy and that they discuss alternative antihypertensive treatments with a health care provider if they plan to become pregnant (49).

Tobacco Use: A 2004 Report of the Surgeon General disclosed several maternal and fetal outcomes associated with tobacco use during pregnancy (50). The report highlighted the increased risk for spontaneous abortion, ectopic pregnancy, low birthweight, sudden infant death syndrome, preterm birth, and other fetal and maternal complications due to prenatal tobacco exposure. In addition, CDC has been investigating, for some time, a possible link between smoking during pregnancy and cleft lip or cleft palate, or both. In 2007, results from a landmark study led to the conclusion that there is an association and that those women who smoke during pregnancy are more likely than women who do not smoke to have a baby with cleft lip and cleft palate (51). These and other outcomes of smoking during pregnancy can be costly, as highlighted by one study that estimated that the national smoking attributable expenses equaled about \$122 million (52). Another report highlighted the benefits of current tobacco interventions that are safe and effective, resulting in quit rates of 25%–30% among the overall population with the potential of being even higher among women (53). A Cochrane Review meta-analysis also concluded that smoking cessation programs during pregnancy appear to reduce smoking, low birth weight, and preterm birth (54), thereby indicating the potential benefit of tobacco interventions on reducing adverse pregnancy outcomes and associated health care costs.

Alcohol Misuse: Prenatal alcohol exposure is considered a leading preventable cause of birth defects and developmental disabilities in the United States. Alcohol is a known teratogen that is capable of causing major and minor malformations in a developing fetus (55). One study from CDC reported that 7.6% of non-pregnant women of reproductive age were at risk for becoming pregnant (i.e. they were fertile and sexually active, and were not using effective contraception). Among the women who were not using birth

control, more than half (52%) said they wanted to become pregnant. The prevalence rate of binge drinking among this group (five or more drinks on one occasion) was 12.4% (56). Women who reported binge drinking were at high risk for an alcohol–exposed pregnancy.

Obesity: Even prior to the recent increases in obesity, a high body mass index (BMI) has been associated with pregnancy complications including gestational diabetes mellitus, preeclampsia, and other adverse health outcomes. Studies show that an active lifestyle that includes exercise can benefit women of childbearing age by reducing their risks for a chronic illness during pregnancy. In 2008, a literature review was conducted to assess the effects of exercise before and during pregnancy on maternal and fetal outcomes. Women who engaged in exercise throughout the year before pregnancy were found to have a significantly reduced risk of both gestational diabetes mellitus and preeclampsia, compared with inactive women who did not exercise (57).

Medication Use: Without awareness or understanding of the risks, many women consume prescription medications (i.e., over–the–counter, dietary, or herbal supplements) that are associated with birth defects, preterm birth, and other adverse pregnancy outcomes. Approximately 3% of women who could get pregnant take either prescription or over–the–counter drugs that are known teratogens, often because their providers neglect to query about unprotected sexual activity and counsel about the potential harm to a fetus, should the woman become pregnant while taking these medications (58). The use of teratogens is a risk factor that has been associated with birth defects and developmental delays among infants, but preconception care can help minimize these risks. Preconception care can minimize teratogenic exposures by: 1) establishing safe and effective treatments for chronic conditions before conception occurs; 2) counseling women to avoid the use of nonessential medications including prescription and over-the-counter medications, as well as dietary and herbal supplements; and 3) limiting the use of essential medications to the smallest number and lowest dose that will treat the disease or condition effectively without compromising the health of the woman or a future child, should she become pregnant (59).

What Are the Adverse Outcomes of Preconception Risk Factors and Health Conditions?

The rates of unintended pregnancy in the United States exacerbate the risks from chronic diseases and environmental exposures (60). The Guttmacher Institute estimates that there are 62 million women in their childbearing years (15–44 years of age) in the United States, of whom 43 million are sexually active and do not want to become pregnant, but could (61). In fact, 49% of pregnancies in the United States are unintended, according to the most recent data from 2006 (62). Consequently, many women become pregnant when they are not in optimal health or while engaging in behaviors that could be harmful during pregnancy. In addition, unplanned pregnancies can contribute to both short and long intervals between pregnancies, which have been associated with adverse health outcomes such as preterm birth, low birth weight, small for gestational age, and perinatal death (63). Additional studies provide knowledge about women’s preconception health behaviors and risks, as they relate to intendedness of pregnancy. In a study of pregnancy intendedness, women who were exposed to preconception health information were more likely to describe their pregnancy as intended than those without preconception information (64). Improving the health of all women of reproductive age, regardless of their plans for pregnancy is therefore, a critical strategy for improving the health of current and future generations.

The consequences of continuing on our current course are serious and costly. Birth defects are a leading cause of morbidity and mortality, accounting for more than 20% of infant deaths (65). Of the more than 4 million infants born in the United States each year, approximately 120,000 (or about 3% of all infants born) have birth defects (66). These congenital conditions can be lifelong and irreversible for children affected with annual health care costs estimated to be \$2.6 billion nationwide (67).

Preterm birth is also a leading contributor to newborn death in the United States, accounting for 17% of all infant deaths (68). Other studies have focused on estimates of preterm-related infant deaths that combine the 17% with an additional group of infant deaths, in which death was considered a consequence of preterm birth (not the underlying cause of death but a contributor to infant death). Their estimate of preterm-related infant deaths was 36.5% of all infant deaths in the U.S. (69). A newly released report, *Born Too Soon: The Global Action Report on Preterm Birth*, from the March of Dimes; World Health Organization; Partnership for Maternal, Newborn & Child Health; and Save the Children documents many of the risk factors and health conditions that contribute to preterm birth that can be addressed through preconception care (70). In the United States, approximately 12 of every 100 babies were born preterm in 2010, an increase of 30% compared with 1981. In addition to human suffering, the economic cost in 2005 for preterm birth in this country was \$26.2 billion (70).

Tobacco use, unintended pregnancy, overweight or obesity, mental illness, sexually transmitted infections, and other health conditions affect the lives of millions of women across the country. A woman's health prior to pregnancy can affect the outcome of the pregnancy for the woman and the infant. Improving women's health has the potential to reduce birth defects, preterm birth, and infant and maternal mortality. Furthermore, women's health and well-being matters regardless of their childbearing decisions. Supporting the health of women before, between, and beyond pregnancy enhances her trajectory toward lifelong wellness. Women's roles in their families, communities, and society at large are critically important. As such, the health and wellness of the women of our nation are essential.

What Have We Learned About What Works To Improve Preconception Health?

While more research is needed, existing studies have pointed to important factors in the design of preconception health interventions. In 2009, the Cochrane Review released a report addressing preconception health promotion and pregnancy outcomes (71). The systematic review of randomized and quasi-randomized trials found four studies on the effectiveness of preconception health promotion interventions designed to identify and modify preconception risk factors. One study focused specifically on changing women's risky drinking (i.e., consuming more than seven alcoholic drinks per week or five or more drinks on any one occasion) before pregnancy using four counseling sessions on alcohol use and one contraception visit. Another study focused on providing women of reproductive age, who had a single child an intervention. The intervention was led by a midwife and involved a home visit for risk assessment and referral and information about lifestyle factors related to poor pregnancy outcomes, such as smoking. A third study focused on an intervention aimed at increasing folate supplement use among women of childbearing-age. Women received brief advice on the benefits of folic acid and a free bottle of folate supplements. The final study was delivered over six, 2-hour sessions and focused on providing women of reproductive-age an educational intervention to improve their health. Women were assessed at baseline and referred to health providers for follow-up on conditions (such as high blood pressure or high

cholesterol) found to be outside of the normal range.

In summary, the main results of the review indicated that there was some evidence that health promotion interventions were associated with positive preconception behavior change, including lower rates of binge drinking. The authors also concluded that more evidence is needed in order to make recommendations about the use of preconception health promotion for the health of mothers and babies. Additional evidence of the effects of preconception interventions on pregnancy-related outcomes is demonstrated by the *Strong Healthy Women* intervention of the Central Pennsylvania Women's Health Study (CePAWHS). Women in the intervention group were significantly more likely than women in the control group to experience higher self-efficacy and intent to eat healthy and be physically active. Similarly, at a 12-month follow-up the women were also more likely to consume a daily multivitamin and to have a lower weight. The benefits of preconception maternal health status on birth outcomes has also been described in other CePAWHS studies (72,73).

At the request of the Clinical Workgroup of the PCHHC Initiative, CDC collaborated with the workgroup to conduct an environmental scan to update the current evidence base of peer-reviewed and non-peer-reviewed preconception and interconception screening tools and interventions. The *Preconception Health and Health Care Environmental Scan: Report on Clinical Screening Tools and Interventions* (74) was completed in 2012 and provided a broad overview of promising PCHHC tools and interventions. Most of the 18 entries in the scan reflected adherence to the recommendations from the 2008 *AJOG* supplement, *Preconception Health and Health Care: The Clinical Content of Preconception Care* (28). A number of the screening tools also were based on adaptations of the Preconception Health Appraisal (5). A matrix was developed to compare the extent to which each screening tool included the recommended components of care and topics in the supplement. The 13 components of care and their corresponding topics on the screening tools included areas such as infectious disease, substance use, immunizations, nutrition, and medical conditions. Overall, results from the scan supported client acceptance of the screening tools and the utility of the tools in identifying preconception risk factors. The reported number of risk factors identified through use of the screening tools ranged from 6.8 to 8.9 among studies that included a measure for risk factors. Promising findings from interventions included increased pregnancy intendedness, increased multivitamin and folic acid intake, lower preconception weight, and lower body mass index (74). This report can be accessed at (<http://www.cdc.gov/preconception/documents/environmental-scan-report.pdf>)

For women with identified risks, a number of health services research projects have shown promising results through delivery of interconception care (75). A study of interventions for, Black or African-American women with low incomes who gave birth to a very low birth weight infant at a public hospital in Atlanta, Georgia, found that women in the control group had an average of 2.6 times as many pregnancies within 18 months and 3.5 times as many adverse pregnancy outcomes as women in the intervention group (76,77). Similar interconception care projects have positive evaluation data that is underway (78). In addition, building on the Atlanta results, Georgia and Louisiana have developed Medicaid interconception (also known as interpregnancy) care demonstration waiver projects. An interconception care clinical trial in Philadelphia is identifying barriers and strategies to promote consistent participation of vulnerable women in preventive care (79,80).

A select number of federal Healthy Start programs have evaluated the impact of preconception and interconception care activities. For example, in Northeast Florida the Magnolia Project offers clinical services, health education, and intensive case management to preconception, Black or African–American women of childbearing age who have an identified risk that could result in poor birth outcomes. Results from a 2004 assessment of the program’s outcomes and activities, highlighted that 74% of participants with repeated sexually transmitted diseases or sexually transmitted infections (STDs/STIs) had no recurrent STDs or STIs at the end of the project period (76).

OVERVIEW

Development of a New Action Plan

The overarching goal of preconception care is to improve the health of women of childbearing age and thereby improve the outcome of any pregnancy they might have (81). The 2006 *Morbidity and Mortality Weekly Report* (18) publication cited previously laid out 10 recommendations that would guide the path for programs and agencies to develop and deliver an array of evidence-based preconception health and health care services and supports for women. The vehicles for implementation of these recommendations were determined to be the following five workgroups: clinical, public health, consumer, policy and finance, and surveillance and research. Many of the recommendations and actions proposed in 2006 have been implemented. Over the past 6 years, the Preconception Health and Health Care (PCHHC) Initiative, including the workgroups, has resulted in substantial research, publications, policy changes, and community action.

After the 3rd National Summit on Preconception Health and Health Care in June 2011, the leadership of the PCHHC Initiative decided to build on the momentum of the meeting by developing a new strategic plan. Steering committee members of the PCHHC Initiative convened a strategic planning meeting to outline priorities for an up-to-date national action plan for preconception health and health care. Prior to the meeting, an environmental scan was conducted to guide strategic planning, including a survey of perceptions among PCHHC leaders. In addition, each of the workgroups completed a review of its previous priorities, activities, and accomplishments. The desired outcome of the meeting was for each workgroup to identify major priorities, goals, strategies, and action steps. This included the identification of opportunities for having an effect on the priorities using currently existing resources. Steering committee members also were provided with an example of an action plan released by the U.S. Department of Health and Human Services (HHS) entitled “Combating the Silent Epidemic of Viral Hepatitis” (82). A diverse group of leaders from around the country, members of the PCHHC Steering Committee, and the five workgroups came together in December 2011 and through facilitated discussion, as well as a host of tools and resources, were able to take significant steps forward in creating an initial action plan. Workgroups met individually to discuss priorities and action steps that were circulated and discussed in an iterative fashion over the course of 9 months until a final version was reached. This report is the product of these deliberations.

Overarching and Cross-Cutting Issues

The “Action Plan for the National Initiative on Preconception Health and Health Care (PCHHC) 2012–2014” outlines goals, objectives, strategies, and action steps that can: 1) move science into clinical practice; 2) market messages and images that will raise consumer awareness of preconception care; 3) inform policy development, implementation, and innovation; 4) guide public health and prevention programs in efforts to improve the health of women, infants, and families; and 5) monitor the processes and impact of preconception and interconception care at the local, state, tribal, territorial, and national levels. It also sets forth a renewed vision, goals, and strategies for achieving change in maternal and child health.

Figure 1. Strategic Plan Pyramid for Improving Preconception Health and Health Care (83)



A Vision for Improving Preconception Health and Pregnancy Outcomes

- All women of childbearing age and men of reproductive age have high reproductive awareness
- All women and men have a reproductive life plan
- All pregnancies are intended and planned
- All women of childbearing age have health coverage
- All women of childbearing age are screened prior to pregnancy for risks related to outcomes
- Women with a prior adverse pregnancy outcome have access to intensive interconception care to reduce their risks

Initiative Goals

1. To improve the knowledge, attitudes, and behaviors of men and women related to preconception health.
2. To create health equity and eliminate disparities in adverse maternal, fetal, and infant outcomes.
3. To ensure that all women of childbearing age in the United States receive preconception care services—screening, health promotion, and interventions—that will enable them to achieve high levels of wellness, minimize risks, and enter any pregnancy they might have in optimal health.
4. To reduce risks among women who have had a prior adverse maternal, fetal, or infant outcome through interventions during the postpartum and interconception period.

Achieving the four goals of the PCHHC Initiative and carrying out the strategies in this action plan will require action across the areas defined by the five workgroups (clinical, consumer, public health, policy and finance, and surveillance and research). Leaders of the PCHHC Initiative have identified themes and issues that cut across the workgroups in substantive and important ways. In the planning process, four to five cross-cutting issues were identified that will require collaborative efforts across several workgroups.

For example, one of the four goals is to ensure that all women of childbearing age have access to and utilize preconception care services. A critical aspect of this is ensuring implementation of coverage for women's clinical preventive services that include preconception care services as part of well-woman visits. Based on recommendations by the Institute of Medicine, HHS has ruled that a large number of private sector and publicly subsidized health plans should cover women's clinical preventive services without cost-sharing beginning in August 2012 (29,84). Achieving this will require strategies and actions by each workgroup as follows:

The Clinical Workgroup will

- Develop a preconception toolkit for clinicians who provide primary care to women of reproductive potential.
- Disseminate evidence-based preconception health screening tools to be used in the care of women of reproductive potential, particularly during routine, annual, or well-woman visits.

The Consumer Workgroup will

- Provide messages for social marketing of the preconception health concept.
- Raise women's awareness of the value of women's clinical preventive services to increase demand for and use of these services without cost-sharing.

The Public Health Workgroup will

- Emphasize the need to integrate preconception health into women's clinical preventive services in publicly subsidized clinics (Title X, Title V, Federally Qualified Health Center, and other public health clinics).
- Use the federal Healthy Start program to promote the integration of interconception health into clinical preventive services for women who are at high risk for an adverse pregnancy outcome.

The Policy and Finance Workgroup will

- Assist major national health plans in modeling effective implementation of HHS rules for women's clinical preventive services.
- Work with states to institute Medicaid coverage of women's clinical preventive services.

The Surveillance and Research Workgroup will

- Use data and surveillance to monitor the use of these aforementioned preventive services.
- Study the effects of the HHS rule on women's clinical preventive services, including preconception care as part of well-woman visits.

This strategic planning process will be used to identify shared strategies and coordinated efforts to address several key cross-cutting issues throughout implementation of the action plan. Collaborative work between the Surveillance and Research and other workgroups will be essential in identifying existing preconception and life course indicators and determining others that should be added. Bridging the new social marketing campaign into a social movement over time is another critical area.

Monitoring the progress of the strategic plan will involve tracking information reported back to the Steering Committee during monthly meetings, collecting results of strategies and action steps within the individual workgroups, and studying the manner in which cross-cutting issues are addressed collectively.

The action plan that is described on the following pages has been guided by the vision, goals, and recommendations that were described in the 2006 *MMWR* report. While many of the strategies described will require partnership across various organizations and agencies to complete, the plan is structured based on the existing successful workgroup individual plans. Within each section, the goals that will be addressed are highlighted – these are drawn from the PCHHC Initiative’s four goals mentioned previously. Next, the specific recommendations from the 2006 *MMWR* report, which will be addressed by the strategies and action steps outlined by each workgroup, are described.

To date, the PCHHC Initiative has been a broadly–focused, public–private sector collaboration to guide and stimulate change in clinical practice, public health, consumer knowledge and behaviors, public policy, and research and surveillance. Selected agencies and organizations have provided support to this effort over time including the Centers for Disease Control and Prevention, Health Resources and Services Administration’s (HRSA) Maternal and Child Health Bureau, the Office of Population Affairs at HHS, National Institute of Health’s National Institute on Child Health and Human Development, Office of Minority Health at HHS, Office on Women’s Health at HHS, Centers for Medicare and Medicaid Services (CMS), and others have been involved in the initiative at various points in time. The commitment of these agencies and organizations in supporting the Initiative has made a critical difference. Currently, many states have activities underway directly related to preconception health including California, Colorado, Florida, Louisiana, North Carolina, Oklahoma, and Wisconsin.

In July 2012, a partnership between HRSA, March of Dimes, the Association of State and Territorial Health Officials, CMS, and the National Governor’s Association, launched a Collaborative Improvement & Innovation Network to reduce infant mortality among the 13 southern states in Public Health Regions IV and VI. Five topics were selected and interconception care was one of the five. Members of the Policy and Finance Workgroup have contributed significantly to the success of this collaboration. They also contributed to the development of additional evidence–based women’s clinical preventive services that will be provided without cost–sharing under the Affordable Care Act (effective August 1, 2012), by supporting evidence gathered from the recommendations and publications of the PCHHC Initiative members. Furthermore, the Workgroup has supported the Secretary’s Advisory Committee on Infant Mortality in proposing that a strong emphasis on preconception and interconception care be included in their preliminary recommendations to Secretary Kathleen Sebelius as part of the 2012 national strategy to reduce infant mortality.

The PCHHC Initiative has been very successful in moving the field of public health forward by supporting those providers who are early adopters and organizing the evidence available to date (Appendix A). Each workgroup has identified potential partnering agencies for moving their preconception health agenda forward, including those previously mentioned, yet this does not represent organizational commitment by those agencies. This action plan, which is the third strategic plan for the Initiative, will move the initiative to the next level of impact.

SECTION 1

Clinical Workgroup

Initiative Goals

To assure that all U.S. women of childbearing age receive preconception care services – screening, health promotion, and interventions – that will enable them to achieve high levels of wellness, minimize risks, and enter any pregnancy they may have in optimal health.

To reduce risks among women who have had a prior adverse maternal, fetal, or infant outcome through interventions in the postpartum/interconception period.

Supporting Recommendations from the Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry (CDC/ATSDR) Select Panel on Preconception Care:

- **Recommendation 3:** Preventive Visits – As part of primary care visits, provide preconception health assessments relevant educational and health promotion counseling to all women of childbearing age to reduce reproductive risks and improve pregnancy outcomes.
- **Recommendation 4:** Interventions for Identified Risks – Increase the proportion of women who receive evidence-based interventions matched to positive findings in their preconception assessment.
- **Recommendation 5:** Interconception Care – Use the interconception period to provide additional intensive interventions to women who have had a previous poor pregnancy outcome.

Objective 1: Arm providers with tools that encourage inclusion of preconception health promotion into the routine care of all women of reproductive age and potential.

Strategy 1.1 Develop a preconception health promotion toolkit for clinicians caring for women of reproductive potential.

The toolkit, based on proven and emerging best practices, will include guidance and examples on how to: efficiently and effectively assess health status; promote, assess, and address reproductive life plans; address positive screening findings; provide patient education materials that incorporate age and culturally appropriate approaches; seek reimbursement; align with Affordable Care Act (ACA) women's clinical preventive services; and meet performance metrics.

Actions steps to be initiated in 2012 (Target completion date – 2013):

1. Complete an environmental scan of preconception assessment tools that have appeared in peer reviewed literature, as well tools that are being used in practice but have not yet appeared in peer reviewed literature.

2. Complete an environmental scan of reproductive life planning tools and recommendations that have appeared in peer reviewed literature as well as those in use but that have not yet appeared in the literature.
3. Compile the information from the environmental scans into a compendium of promising, emerging and best practices and disseminate to clinicians, professional organizations, insurers, government agencies, and others through publications and www.beforeandbeyond.org.
4. Identify two or three preconception health assessment approaches that balance comprehensiveness and efficiency and ideally use differing approaches for collecting information (e.g. clinician administered, self-administered, online, and part of electronic medical records, etc.) to recommend through the toolkit. Sufficient uptake might provide a foundation for multisite evaluation of implementation processes and health effects
5. (Cross-cutting) Identify patient and consumer educational pieces appropriate for inclusion in the toolkit.

Strategy 1.2 Disseminate the preconception toolkit and its contents.

Actions steps to be initiated in 2012–2013:

1. Disseminate the toolkit and its contents (using multiple strategies, including Internet posting, professional meetings, webinars, mail, and etc.) to providers of women’s health.
2. Collaborate with partners in the development of a dissemination plan for penetration of target populations.
3. Track dissemination of the toolkit and its contents.

Objective 2: Measure impact of incorporating preconception care into routine well-woman preventive care visits.

Strategy 2.1 Design studies and methods for measuring impact on health services and on health outcomes.

Actions steps to be initiated in 2012 (Target completion date – 2013):

1. Design studies to assess the impact of incorporating preconception care into routine well–woman preventive care visits on women, clinicians, care delivery systems, professional education, and health outcomes.

2. Collaborate with partners to conduct health services research, including multisite impact studies.

Strategy 2.2 Continue and advance development and implementation of quality measures.

Actions steps to be initiated in 2012 (Target completion date –2013):

1. Review updates and reports on CDC projects related to preconception clinical quality measures and preconception health.
2. Continue public–private collaboration to advance use of existing clinical quality measures for adults and to develop additional quality metrics, as needed.

Strategy 2.3 Assess the effects of the preconception toolkit on women, clinicians, and practices.

Actions steps to be initiated in 2012–2013:

1. Identify funding sources, explore interest, and submit applications for funding of evaluation and assessment of impact.
2. Develop performance metrics that track implementation of elements of tool kit.

Objective 3: Provide clinicians with the knowledge, skills and content needed to advance evidence-based postpartum visits and interconception care.

Strategy 3.1 Review and update, as needed, clinical guidelines and tools for the postpartum and interconception care of all women, with a priority emphasis on women who have experienced pregnancies complicated by maternal morbidity and/or fetal/infant morbidity or mortality.

Action steps to be initiated and completed in 2012–2013:

1. Based on the Interconception Care Project of California algorithms and related evidence develop a uniform clinical tool to guide postpartum visits.
2. Review and update clinical guidelines for postpartum visits.

Action steps to be initiated in 2013 (Target completion date – 2014):

1. Develop continuing education modules for beforeandbeyond.org on postpartum visits and interconception care.
2. Convene a meeting to develop strategies for disseminating information to clinicians.

SECTION 2

Consumer Workgroup

Initiative Goal

To improve the knowledge, attitudes, and behaviors of men and women related to preconception health.

Supporting Recommendations from the Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry (CDC/ATSDR) Select Panel on Preconception Care:

- **Recommendation 1:** Individual responsibility across the lifespan – Encourage each woman and every couple to have a reproductive life plan.
- **Recommendation 2:** Consumer Awareness – Increase public awareness of the importance of preconception health behaviors and increase individuals’ use of preconception care services using information and tools appropriate across varying age, literacy, health literacy, and cultural and linguistic contexts.
- **Recommendation 3:** Preventive Visits – As a part of primary care visits, provide risk assessment and counseling (education and health promotion) to all women of childbearing age to reduce risks related to the outcomes of pregnancy.
- **Recommendation 5:** Interconception Care – Use the interconception period to provide intensive interventions to women who have had a prior pregnancy ending in an adverse outcome (e.g., infant death, low birthweight or preterm birth).

Objective 1: Increase preconception knowledge, awareness, and behavior among women of childbearing age.

Strategy 1.1 Develop a social marketing campaign plan.

A marketing plan will provide a roadmap for taking action in terms of campaign development (e.g., brand identity, content, and tools), implementation (e.g., dissemination), and evaluation activities. The plan also will provide a timeline for accomplishing activities in a phased approach. Phase 1 will emphasize implementation across the Internet and Consumer Workgroup members. Phase 2 will include a targeted national mass media campaign as well as specialty advertising tactics.

Action steps to be initiated in 2012–2013:

1. Convene Consumer Workgroup to complete the final draft of social marketing campaign plan.

2. Convene a face-to-face meeting of the Consumer Workgroup and other partners to vet the social marketing campaign plan.
3. Finalize the social marketing campaign plan based on input from partners, by refining goals and objectives, revising timelines as needed, completing the development of campaign products and identifying process evaluation measures.
4. Partners develop organization-specific implementation action plans (i.e. goals, objectives, strategies, and an evaluation plan).
5. Develop data collection methods for process evaluation of Phase 1 of the social marketing campaign.

Strategy 1.2 Implement and evaluate Phase 1 of the social marketing plan.

Action steps to be initiated in 2012–2013:

1. Organize an implementation collaborative designed to support implementation leaders from both the Consumer Workgroup and pre-identified non-Consumer Workgroup partners.
2. Implement campaign across Consumer Workgroup members and other implementation collaborative partners.
3. Begin evaluation, gather data, analyze evaluation data, prepare evaluation report, and distribute a report and findings on Phase 1 of the social marketing campaign.

Strategy 1.3 Develop and implement Phase 2 of the social marketing plan.

Action steps to be initiated in 2013–2014:

1. Complete assessment of feasibility of Phase 2 of the social marketing campaign.
2. Refine Phase 2 of the social marketing campaign plan (i.e. establish or revise goals, objectives, and timeline, and develop new product).

Strategy 1.4 Increase professional knowledge among health providers regarding preconception health social marketing and health promotion.

Action steps to be initiated in 2012–2013:

1. Develop a special supplement on preconception health and health care in the *American Journal of Health Promotion*.

2. Publish the special supplement of the *American Journal of Health Promotion*.
3. Develop a dissemination strategy and disseminate the special supplement of the *American Journal of Health Promotion* to increase access to information among those most likely to use it.

SECTION 3

Public Health Workgroup

Initiative Goals

To create health equity and eliminate disparities in adverse maternal, fetal, and infant outcomes

To assure that all U.S. women of childbearing age receive preconception care services – screening, health promotion, and intervention that will enable them to achieve high levels of wellness, minimize risks, and enter any pregnancy they may have in optimal health.

Supporting Recommendations from the Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry (CDC/ATSDR) Select Panel on Preconception Care:

- **Recommendation 3:** Preventive Visits – As part of primary care visits, provide preconception health assessments, relevant educational and health promotion counseling to all women of childbearing age to reduce reproductive risks and improve pregnancy outcomes.
- **Recommendation 4:** Interventions for Identified Risks – Increase the proportion of women who receive evidence-based interventions matched to positive findings in their preconception assessment.
- **Recommendation 5:** Interconception Care – Use the interconception period to provide additional intensive interventions to women who have had a previous poor pregnancy outcome.
- **Recommendation 8:** Public Health Programs and Strategies – Infuse and integrate components of preconception health into existing local public health and related programs, including emphasis on those with prior adverse outcomes.

Objective 1: Reduce chronic disease and improve preconception health among women of childbearing age.

Strategy 1.1 Identify priority conditions and strategies to be addressed through collaboration between maternal and child health (MCH) and chronic disease prevention agencies at the federal, state, and local levels.

Actions steps to be initiated in 2012 (Target completion date–2013):

1. Develop, publish, and disseminate a supporting case statement (2 to 4 pages) to define the need for collaboration between MCH and chronic disease agencies in order to improve women's health.
2. Advise MCH and chronic disease divisions within state health departments regarding available

joint funding opportunities. Communicate monthly regarding funding opportunities (potentially to be included in the preconception health and health care e-newsletter).

3. Include in monthly Preconception Health and Health Care (PCHHC) Steering Committee meetings relevant discussions of opportunities to increase collaboration between MCH and chronic disease agencies, including public and private funding opportunities.
4. Identify states where MCH and chronic disease divisions within state public agencies are interested in collaboration and provide technical assistance on opportunities for action.

Strategy 1.2 Use communications to advance collaborative efforts between MCH and chronic disease prevention agencies aimed at improving preconception health and reducing chronic disease among women of childbearing age.

Action steps to be initiated in 2012–2013:

1. Organize and conduct quarterly webinars featuring state or local health departments or private MCH agencies to showcase their work to jointly address chronic disease and MCH.
2. Disseminate results of projects and research through journal publications, PCHHC Resource Center, monthly PCHHC e-news, organizational newsletters, media, and other communication outlets.
3. Make presentations at conferences on national public health, MCH, and chronic disease to promote evidence-based approaches for improving pre- and interconception health.
4. Organize a roundtable of national public health leaders from HRSA/MCHB, CDC, HHS/OWH and Administration for Children and Families to discuss development of conceptual models for increasing collaboration between MCH and chronic disease departments across the nation.
5. Inform states regarding federal funding opportunities such as the second round of CDC's Community Transformation Grant, Medicaid interconception care waiver projects, and HRSA/MCHB funding for preconception or interconception care.
6. Support HRSA/MCHB efforts to improve the quality and effectiveness of Healthy Start and related interconception care projects.
7. Collaborate with other Workgroups to provide support and technical assistance to states interested in applying for Medicaid waivers to test preconception and interconception health promotion strategies, including chronic disease management and reproductive life planning.

Objective 2: Support the development of the PCHHC Resource Center and enhance the quality and relevancy of public health program information available at the resource center.

Strategy 2.1 Engage in the process for the development and enhancement of the resource center.

Action Steps to be initiated in 2012–2013:

1. Develop mechanisms to identify, on an ongoing basis, new public health tools, resources, program abstracts, publications, and/or strategies that relate to preconception health and fall under the inclusion criteria for the resource center.
2. Participate in resource center committee meetings, serve as reviewers for submitted materials, and participate in the evaluation of the resource center.
3. Gather and submit at least two new public health tools, resources, program abstracts, publications, and/or strategies per month to the resource center via phhresourcecenter@gmail.com.
4. Promote the PCHHC Resource Center through additional communication channels and speak on behalf of the Resource Center, when necessary.
5. Provide feedback and guidance on a sustainability plan for the resource center.

Objective 3: Describe the application of the Life Course Approach to Preconception Health.

Strategy 3.1 Develop a white paper or position statement to describe the links and synergy between preconception health and the life course approach to improving MCH and reducing disparities in perinatal outcomes.

Action steps to be initiated in 2012–2013:

1. Convene a think tank group of experts in the life course approach, preconception health and public health.
2. Facilitate a series of discussions to reach an agreement on this issue.
3. Develop a draft document and have it reviewed by experts. Document might include specific examples.

4. Include a resource section in the white paper to lead readers to additional resources on life course and preconception health

Strategy 3.2: Increase knowledge among public health leaders, non–health sector leaders and the community about how to apply the life course framework to preconception health.

Action steps to be initiated in 2012–2013:

1. Develop and implement a dissemination plan to make the white paper accessible to public health leaders and existing partnerships.
2. Collaborate with the Surveillance and Research Workgroup to ensure that indicators being developed to monitor trends in preconception health include measures of the social determinants of health.
3. Invite at least two representatives from the non–health sector to join the Public Health Workgroup.

SECTION 4

Policy and Finance Workgroup

Initiative Goals

To create health equity and eliminate disparities in adverse maternal, fetal, and infant outcomes.

To assure that all U.S. women of childbearing age receive preconception care services – screening, health promotion, and intervention that will enable them to achieve high levels of wellness, minimize risks, and enter any pregnancy they may have in optimal health.

Supporting Recommendations from the Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry (CDC/ATSDR) Select Panel on Preconception Care:

- **Recommendation 3:** Preventive visits – As a part of primary care visits, provide risk assessment and counseling (education and health promotion) to all women of childbearing age to reduce risks related to the outcomes of pregnancy.
- **Recommendation 5:** Interconception Care – Use the interconception period to provide intensive interventions to women who have had a prior pregnancy ending in adverse outcome (e.g., infant death, low birth weight or preterm birth).
- **Recommendation 7:** Health Insurance Coverage for women with Low Incomes – Increase Medicaid coverage among low-income women to improve access to preventive women’s health, preconception, and interconception care.
- **Recommendation 8:** Public Health Programs and Strategies – Infuse and integrate components of preconception health into existing local public health and related programs, including emphasis on those with prior adverse outcomes.

Objective 1: Support and advance implementation of coverage for women’s clinical preventive benefits, including preconception care during well–woman visits.

Strategy 1.1 Promote awareness of coverage for preconception care during well–woman visits, without cost sharing (effective August 2012).

Actions steps to be initiated in 2012 –2013:

1. Prepare and disseminate an issue brief to inform providers, local public health, and consumer advocates regarding coverage and benefits for women’s clinical preventive services.
2. (Cross–cutting) Develop a communications strategy and plan to increase awareness of coverage and benefits for women’s clinical preventive services.

Strategy 1.2 Identify leading insurance plans and health maintenance organizations (HMOs) that are interested in developing model strategies for implementation of preconception care as part of well –woman visits.

1. Conduct key stakeholder interviews with leading insurance plans and HMOs to assess their interest.
2. (Cross–cutting) Use and build upon the toolkit and recommended screening tools from the Clinical Workgroup and patient education materials recommended by the Consumer Workgroup to support development of model strategies by health plans/HMOs.

Objective 2: Improve and expand implementation of interconception care policies, programs, and services.

Strategy 2.1 Support Medicaid policy development to increase coverage for and access to interconception care.

Action steps to be initiated in 2012–2013:

1. Disseminate results of the “Preconception Health Peer–to–Peer Learning Project” supported by The Commonwealth Fund, and CDC, and the National Center on Birth Defects and Developmental Disabilities (NCBDDD).
2. Provide technical assistance and education upon request regarding use of Interpregnancy (Interconception) Care Medicaid demonstration projects among states.
3. Develop and disseminate model guidance for design of Interpregnancy Care Medicaid demonstration waivers, including covered services, service providers, payment rates and budgets, performance measures, and evaluation strategies.
4. Support efforts by state agencies and private sector partners in applying for and securing innovation grants related to pre– and interconception health.

Strategy 2.2 Advance primary care capacity to deliver well woman visits with preconception and interconception care, beginning with Federally Qualified Health Centers (FQHC).

Actions to be initiated in 2012–2013:

1. Educate key stakeholders about the importance of FQHC expansion for ensuring access to care, including preconception health care for women of childbearing age.

2. Identify opportunities for collaboration between Healthy Start grantees and FQHCs at the local level to increase access to primary care services for women of childbearing age, including interconception care.

Objective 3: Support continued investment in preconception health and health care.

Strategy 3.1 Continue investments in preconception health and health care through key public health and safety net programs.

Action steps to be initiated in 2012–2013:

1. Study and report on the alignment of the preconception health action plan with the National Prevention Strategy, National Plan for Elimination of Disparities, chronic disease prevention plans, ASTHO President’s Infant Mortality Challenge, recommendations of SACIM, and other relevant documents.
2. Educate key stakeholders regarding the importance of continued and increased investments and coordination related to preconception health and health care through existing public health programs (e.g., CDC, Title V, Title X, Healthy Start, Public Health, and Prevention Fund).
3. Develop a Federal Interagency Coordinating Committee to support implementation of this action plan.

SECTION 5

Surveillance and Research Workgroup

Goal

Overarching work and across all four goals, this group will focus on assessing and monitoring the population health status, providers' knowledge, access and quality of services.

Supporting Recommendations from the Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry (CDC/ATSDR) Select Panel on Preconception Care:

- **Recommendation 9:** Research – Augment research knowledge related to preconception health.
- **Recommendation 10:** Monitoring improvements – Maximize public health surveillance and related research mechanisms to monitor preconception health.

Objective 1: By June 2012, develop the vision, framework, goals, and objectives for this workgroup.

Strategy 1.1 Identify individuals interested in devoting time and energy to the workgroup.

Convene the group to develop the purpose statement and role in bringing forth a comprehensive approach to collecting and analyzing outcome measures that are meaningful in assessing the contributions and benefits of integrating preconception and interconception care into public health. Establish an infrastructure to support goals and objectives of the workgroup.

Action steps to be initiated in 2012–2014:

1. Seek input from the steering committee and identify experts for this workgroup.
2. Establish key priorities and develop a communication schedule for meetings on these topics and provide agendas for the meetings.

Objective 2: (Cross-cutting) Develop a research and evaluation agenda that focuses on preconception health and includes perspectives of life course, social determinants of health, and health equity.

Strategy 2.1 Engage members from each Preconception Health and Health Care (PCHHC) Workgroup in the development of an updated, overarching research, and evaluation agenda.

Action steps to be initiated in 2012–2014:

1. Gather information from other workgroups, including prior presentations, papers, proposals, and on-going research to identify data needs that are not met by current data sets and core indicators.
2. Develop a research agenda on existing knowledge and gaps for specific topics, such as behaviors, chronic disease (i.e., cardiovascular disease and diabetes), mental health, or overarching topics such as science to practice.
3. Reach out to other appropriate agencies and partners to engage them in the activities and priorities of the workgroup to solicit buy in.

Strategy 2.2 Prepare an updated review of the literature.

Action steps to be initiated in 2012–2014:

1. Develop a work plan, including assignments, topics, and timelines for completion of literature review and synthesis of information.
2. Prepare a list of existing research to be conducted as a baseline for beginning the research process.
3. Conduct a review of the literature and prepare a report of the results and recommendations.

Objective 3: Enhance and expand the use of existing surveys and surveillance systems such as the core preconception indicator set, Pregnancy Risk Assessment Monitoring System (PRAMS), Behavioral Risk Factor Surveillance System (BRFSS), Vital Statistics, and Title V Information System. (Ongoing)

Strategy 3.1 Promote awareness and use of core preconception indicator set.

Action steps to be initiated in 2012–2014:

1. Develop and implement strategies to promote use of core preconception indicator set (e.g., materials packets, case studies, sample reports, webinar, and Internet access).
2. Develop and/or expand technical assistance and support to state public health agencies in the use of the core preconception indicator set.
3. Develop and disseminate multi-state *Morbidity and Mortality Weekly Report* surveillance summary describing the indicators at the state level.

Strategy 3.2 Encourage and support the regular reports in order to track on trends at the state and local levels in the PCHHC core indicators.

Action steps to be initiated in 2012–2014:

1. Collect and make available through the PCHHC Resource Center reports by state and local areas.
2. Add the PCHHC indicators measured by PRAMS and BRFSS to the PRAMS and BRFSS online query systems (e.g., CDC’s PRAMS Online Data for Epidemiologic Research and SMART).
3. Develop user– friendly training materials to help state and local epidemiologists understand and use the indicators.
4. Identify barriers and challenges to using the indicators, and approaches to address them.
5. Implementation of a demonstration project using the PCHHC indicators to improve adolescent preconception health (i.e., the Community Approach for Adolescent Preconception Health Investments project).
6. Create a learning community to encourage others to use the data to inform practice or policy.

Strategy 3.3 Develop the case in support of improvements in key preconception and perinatal data and surveillance systems.

Action steps to be initiated in 2012–2014:

1. Develop a 2–4 page brief that articulates the case to be made regarding the need for and value of improvements in key preconception and perinatal data and surveillance systems.
2. Disseminate the case statement to partners and other key stakeholders at the state and federal levels.

CONCLUSIONS

An ongoing challenge for the Preconception Health and Health Care (PCHHC) Initiative is the demonstration of a package of high-priority preconception risk factors and conditions that through evidence-based screenings and interventions can change the outcome of pregnancy when delivered before the pregnancy occurs. There are a number of models for delivering preconception and interconception care that are being tested in the field. These models will make important contributions to the science base for preconception and interconception care implementation.

This action plan for the PCHHC Initiative outlines goals, objectives, strategies, and action steps that can move science into practice, market messages, and images that will raise consumer awareness of preconception and interconception care; inform policy development and management that support sustained change; and monitor the processes and effects of preconception and interconception care at the local, state, tribal, territorial, and national levels. Efforts to continue to reach out to new partners through the workgroups and cross-cutting issues will be essential to success.

APPENDIX A

PCHHC Initiative Accomplishments

Timeline

2003

- Held the first meeting of the CDC Internal Workgroup on preconception health and health care.

2005

- Organized the 1st National Summit on Preconception Care (Atlanta, Georgia).
- Held the first meeting of the CDC Select Panel on Preconception Care.
- Release of the American Congress of Obstetricians and Gynecologists Committee Opinion on preconception care.

2006

- Published recommendations for preconception health and health care in the Morbidity and Mortality Weekly Report (MMWR).
- Published a supplement in the Maternal and Child Health Journal Supplement (9/2006):
- Initiated the launch of the Preconception Health and Health Care (PCHHC) Initiative's Workgroups to guide implementation of the MMWR recommendations.
 - Clinical, Public Health, and Consumer Workgroups launched

2007

- Launched the Policy and Finance Workgroup.
- Organized the 2nd National Summit on Preconception Care (Oakland, California).

2008

- Hosted a research agenda meeting with the National Institute of Child Health and Human Development.
- Supported the launch of the Before and Beyond website, home of a health professional curriculum.
- Published the American Journal of Obstetrics and Gynecology Supplement — “Preconception Health and Health Care: The Clinical Content of Preconception Care”.
- Published a policy supplement in Women's Health Issues.

2009

- Supported the development of the Health Resources and Services Administration, Maternal and Child Health Bureau's Healthy Start Interconception Care Learning Community (2009-2011).

2010

- Supported the development of a state indicator set based on national survey data and vital statistics.
- Facilitated collaborative learning of Medicaid policy among seven states through the Medicaid Preconception Health Peer-2-Peer Learning project (2010-2011).

2011

- Organized the 3rd National Summit on Preconception Care (Tampa, Florida)
- Initiated the development of an updated strategic action plan for the PCHHC Initiative

APPENDIX B

Strategic Planning Meeting

Attendee List – December 2011 New Orleans, Louisiana

- Abresch, Chad
- Atrash, Hani
- Barfield, Wanda
- Biermann, Janis
- Boyle, Coleen
- Brady, Carol
- Coonrod, Dean
- Drummonds, Mario
- Dunlop, Anne
- Estrada-Portales, Isabel
- Ewig, Brent
- Floyd, Louise
- Fraser, Michael
- Gee, Rebekah
- Grigorescu, Violanda
- Handler, Arden
- Hayes, Maxine
- Humphrey, Jasmine
- Johnson, Sharon
- Johnson, Kay
- Johnson, Alison
- Kent, Helen
- Klein Walker, Deborah
- Kotelchuck, Milton
- Malin, Kiko
- Mitchell, Betsy
- Moore, Cynthia
- Moos, Merry-K
- Moskosky, Susan
- O'Leary, Leslie
- Peck, Magda
- Pies, Cheri
- Posner, Sam
- Roberts, Alma
- Ruhl, Catherine
- Simpson, Patrick
- Snebold, Laura
- Sniezek, Joe
- Verbiest, Sarah
- Wood, Susan
- Zapata, Lauren

References

1. Matthews MS, MacDorman MF. Infant mortality statistics from the 2008 period linked birth/infant death data set. *National Vital Statistics Reports* [Internet]. Hyattsville: National Center for Health Statistics (US). 2012; 60(5). Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_05.pdf
2. MacDorman MF, Matthews TJ. Behind international rankings of infant mortality: how the United States compares with Europe. *NCHS Data Brief* [Internet]. Hyattsville: National Center for Health Statistics (US). 2009; (23). Available from: <http://www.cdc.gov/nchs/data/databriefs/db23.pdf>
3. Seshamani M. Why the current health care system does not work for women. Washington: Office of Health Reform, Department of Health and Human Services (US). Available from: <http://www.healthreform.gov/reports/women/women.pdf>
4. Ranji U, Salganicoff A. Women's health care chartbook: key findings from the Kaiser Women's Health Survey. Washington: Kaiser Family Foundation; 2011. Available from: <http://www.kff.org/womenshealth/upload/8164.pdf>
5. Moos MK, Cefalo RC. Preconceptional health promotion: a focus for obstetric care. *Am J Perinatol*. 1987; 4:63-67.
6. Institute of Medicine. Preventing low birthweight. Washington: The National Academies Press; 1985. Available from: http://www.nap.edu/openbook.php?record_id=511&page=1
7. Department of Health and Human Services (US). Caring for our future: report of the Public Health Service Expert Panel on the content of prenatal care. Washington: Department of Health and Human Services, Public Health Service (US); 1989.
8. March of Dimes. Toward improving the outcome of pregnancy: the 90s and beyond. White Plains: March of Dimes Birth Defects Foundation; 1993. Available from: http://www.marchofdimes.com/TIOPIII_finalmanuscript.pdf
9. Jack BW, Culpepper L. Preconception care: risk reduction and health promotion in preparation for pregnancy. *JAMA*. 1990; 264:1147-1149.
10. Jack BW, Culpepper L. Preconception care. *J Fam Pract*. 1991; 32:306-315.
11. Moos MK, Cefalo RD. Preconceptional health care: a practical guide. 2nd ed. St. Louis: Mosby; 1995.
12. Moos MK, Bangdiwala SI, Meibohm AR, Cefalo RC. The impact of a preconceptional health promotion program on intendedness of pregnancy. *Am J Perinatol*. 1996; 13:103 -108.
13. Klerman LV, Reynolds DW. Interconception care: a new role for the pediatrician. *Pediatrics*. 1994; 93:327-329.
14. Cheng D. Preconception health care for the primary care practitioner. *Md Med J*. 1996; 45:297-304.
15. Adams MM, Bruce FC, Shulman HB, Kendrick JS, Brogan DJ. Pregnancy planning and pre-conception counseling: The PRAMS Working Group. *Obstet Gynecol*. 1993; 82(6):955-999.
16. American Academy of Pediatrics; American College of Obstetricians and Gynecologists. Guidelines for perinatal care, 5th ed. Elk Grove Village; 2002.
17. Korenbrot CC, Steinert A, Bender C, Newberry S. Preconception care: a systematic review. *Matern Child Hlth J* [Internet]. 2002; 6(2):75-88. Available from: http://americas.evipnet.wikibvs.org/img_auth.php/c/cd/Article_matern_child_health_j_2002.pdf
18. Johnson K, Posner SF, Biermann J, Cordero J, Atrash HK, Parker CS, et al. Recommendations to improve preconception health and health care – United States. A report of the CDC/ATSDR Preconception Care Workgroup and the Select Panel on Preconception Care. *MMWR Recomm Rep* [Internet]. 2006; 55(RR-6):1-23. Available from: <http://www.cdc.gov/MMWR/preview/mmwrhtml/rr5506a1.htm>
19. Jack BW, Atrash H, Bickmore T, Johnson K. The future of preconception care: a clinical perspective. *Women Health Iss* [Internet]. 2008b; 18(6 Suppl):S19-25. Available from: <http://www.sciencedirect.com/science/article/pii/S1049386708001382> . Subscription required to view.
20. Moos MK, Dunlop AL, Jack BW, Nelson L, Coonrod DV, Long R, et al. Healthier women, healthier reproductive outcomes: recommendations for the routine care of all women of reproductive age. *Am J Obstet Gynecol* [Internet]. 2008; 199(6 Suppl 2):S280-289. Available from:

<http://www.sciencedirect.com/science/article/pii/S0002937808010296>

21. Lu MC, Kotelchuck M, Hogan V, Jones L, Wright K, Halfon N. Closing the black-white gap in birth outcomes: a life-course approach. *Ethnic Dis.* 2010; 20(1 Suppl 2):S62-S76.
22. Chavkin W, Rosenbaum S, Jones J, Rosenfield A. Women's health and health care reform: the key role of comprehensive reproductive health care [report on the Internet]. New York: Columbia University, Mailman School of Public Health; 2009. Available from: <http://documents.scribd.com.s3.amazonaws.com/docs/3wq7y0t7y8mjpmw.pdf?t=1280842565>
23. Kent H, Johnson K, Curtis M, Hood JR, Atrash H. Proceedings of the preconception health and health care clinical, public health, and consumer workgroup meetings – June 27-28, 2006 – Atlanta, GA. Atlanta: National Center on Birth Defects and Developmental Disabilities; 2006. Available from: <http://www.cdc.gov/preconception/documents/WorkgroupProceedingsJune06.pdf>
24. American College of Obstetrics and Gynecology Committee on Gynecologic Practice. Committee opinion: the importance of preconception care in the continuum of women's health care. *Am J Obstet Gynecol* [Internet]. 2005; 106(3):665-6. Available from: http://www.acog.org/Resources_And_Publications/Committee_Opinions/Committee_on_Gynecologic_Practice/The_Importance_of_Preconception_Care_in_the_Continuum_of_Womens_Health_Care
25. Curtis M, Abelman S, Schulkin J, Williams JL, Fassett EM. Do we practice what we preach? a review of actual clinical practice with regards to preconception care guidelines. *Matern Child Hlth J* [Internet]. 2006; 10(5 Suppl):S53-S58. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1592243/>
26. Atrash HK, Johnson K, Adams M, Cordero JF, Howse J. Preconception care for improving outcomes: the time to act. *Matern Child Hlth J* [Internet]. 2006; 10:S3-S11. Available from: <http://link.springer.com/article/10.1007%2Fs10995-006-0100-4>
27. Atrash H, Jack BW, Johnson K, Coonrod DV, Moos MK, Stubblefield PG, et al. Where is the "W"oman in MCH? *Am J Obstet Gynecol* [Internet]. 2008; 199(6 Suppl 2):S259-S265. Available from: [http://www.ajog.org/article/S0002-9378\(08\)01028-4/fulltext](http://www.ajog.org/article/S0002-9378(08)01028-4/fulltext)
28. Preconception health and health care: the clinical content of preconception care. Jack B, Atrash HK, editors. *Am J Obstet Gynecol* [Internet]. 2008; 199(6 Suppl 2):S257 – S395. Available from: [http://www.ajog.org/issues?issue_key=S0002-9378\(08\)X0011-0](http://www.ajog.org/issues?issue_key=S0002-9378(08)X0011-0)
29. Institute of Medicine. *Clinical preventive services for women: closing the gaps.* Washington: National Academies Press; 2011.
30. Rosenbaum S. Women and health insurance: implications for financing preconception health. *Women Health Iss* [Internet]. 2008; 18(6 Suppl):S26-35. Available from: <http://www.sciencedirect.com/science/article/pii/S1049386708001084> Subscription required to view.
31. Johnson K. Women's health and health reform: implications of the Patient Protection and Affordable Care Act. *Curr Opin Obstet Gyn* [Internet]. 2010; 22(6):492-497. Available from: <http://europepmc.org/abstract/MED/20966751/reload=0;jsessionid=fYDXEgQLqpaCTKT81WBL.12> Subscription required to view.
32. Levi J, Cimon M, Johnson K. Healthy women, healthy babies: how health reform can improve the health of women and babies in America [issue brief]. Washington: Trust for America's Health; June 2011. Available from: <http://healthyamericans.org/assets/files/TFAH%202011HealthyBabiesBrief.pdf>
33. Colorado Department of Public Health and Environment. Preconception health nationwide initiatives: state by state summary. Available from: <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadname1=Content-Disposition&blobheadname2=Content-Type&blobheadvalue1=inline%3B+filename%3D%22Nationwide+Initiatives+-+Individual+States+Summary.pdf%22&blobheadvalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251836110711&ssbinary=true>
34. Broussard DL, Sappenfield WB, Fussman C, Kroelinger CD, Grigorescu V. Core state preconception health indicators: a voluntary, multi-state selection process. *Matern Child Hlth J* [Internet]. 2011; 15(2):158-168.

Available from: <http://link.springer.com/article/10.1007%2Fs10995-010-0575-x#>

35. Badura M, Johnson K, Hench K, Reyes M. Healthy start lessons learned on interconception care. *Women Health Iss* [Internet]. 2008; 18(6 Suppl):S61-S66. Available from: <http://www.sciencedirect.com/science/article/pii/S1049386708001059> . Subscription required to view.
36. U.S. Department of Health and Human Services. *Women's health and mortality chartbook: 2011 edition*. Washington: Office on Women's Health; 2011. Available from: http://www.healthstatus2020.com/owh/chartbook/images/Chartbook_2011Edition.pdf
37. Robertson R, Collins SR. Realizing health reform's potential: women at risk: why increasing numbers of women are failing to get the health care they need and how the Affordable Care Act will help. findings from the commonwealth fund biennial health insurance survey of 2010 [issue brief on the Internet]. New York: The Commonwealth Fund; May 2011. Available from: http://www.commonwealthfund.org/~media/Files/Publications/Issue%20Brief/2011/May/1502_Robertson_women_at_risk_reform_brief_v3.pdf
38. Goldenberg RL, Culhane JF. Prepregnancy health status and the risk of preterm delivery. *Arch Pediatr Adolesc Med*. 2005; 159:89–90.
39. Institute of Medicine. *Preterm birth: causes, consequences, and prevention*. Behrman RE, Butler AS, editors. Washington: National Academies Press; 2007. Available from: <http://www.iom.edu/Reports/2006/Preterm-Birth-Causes-Consequences-and-Prevention.aspx>
40. D'Angelo D, Williams L, Morrow B, Cox S, Harris N, Harrison L, et al. Preconception and interconception health status of women who recently gave birth to a live-born infant—Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 reporting areas, 2004. *MMWR Surveill Summ*. 2007; 56(10):1-35. Available from: <http://www.cdc.gov/MMWR/preview/mmwrhtml/ss5610a1.htm>
41. Dott M, Rasmussen SA, Hogue CJ, Reefhuis J. Association between pregnancy intention and reproductive-health related behaviors before and after pregnancy recognition, National Birth Defects Prevention Study, 1997-2002. *Matern Child Hlth J* [Internet]. 2010; 14:373-381. Available from: <http://link.springer.com/article/10.1007/s10995-009-0458-1/fulltext.html>
42. Tough S, Tofflemire K, Clarke M, Newburn-Cook C. Do women change their drinking behaviors while trying to conceive? an opportunity for preconception counseling. *Clin Med Res* [Internet]. 2006; 2:97-105. Available from: <http://www.clinmedres.org/content/4/2/97.long>
43. Centers for Disease Control and Prevention. Preventing and managing chronic disease to improve the health of women and infants [fact sheet on the Internet]. Available from: http://www.cdc.gov/reproductivehealth/WomensRH/PDF/ChronicDisease_FactSheet.pdf
44. Centers for Disease Control and Prevention. Sexually transmitted disease morbidity for selected STDs by age, race/ethnicity and gender 1996-2009. CDC WONDER On-line Database; June 2011. (cited 9 May 2012) Available from: <http://wonder.cdc.gov/std-std-race-age.html>
45. Chatterjee S, Kotelchuck M, Sambamoorthi U. Prevalence of chronic illness in pregnancy, access to care, and health care costs: implications for interconception care. *Women Health Iss* [Internet]. 2008; 18(6 Suppl):S107-16. Available from: <http://www.sciencedirect.com/science/article/pii/S1049386708000923> . Subscription required to view.
46. Jack BW, Atrash H, Coonrod DV, Moos, MK, O'Donnell J, Johnson K. The clinical content of preconception care: an overview and preparation of this supplement. *Am J Obstet Gynecol*. 2008; 199(6):S266-S289. Available from: [http://www.ajog.org/article/S0002-9378\(08\)00887-9/fulltext](http://www.ajog.org/article/S0002-9378(08)00887-9/fulltext)
47. Wahabi HA, Alzeidan RA, Bawazeer GA, Alansari LA, Esmaeil SA. Preconception care for diabetic women for improving maternal and fetal outcomes: a systematic review and meta-analysis. *BMC Pregnancy Childbirth* [Internet]. 2010; 10(63):1-14. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2972233/>
48. Visintin C, Muggleston MA, Almerie MQ, Nherera LM, James D, Walkinshaw S. Management of hypertensive disorders during pregnancy: summary of NICE guidance. *BMJ* [Internet]. 2010; 341:499-504. Available from: <http://www.bmj.com/content/341/bmj.c2207?view=long&pmid=20739360> . Subscription required to view.

49. National Collaborating Centre for Women's and Children's Health (UK). Hypertension in pregnancy: the management of hypertensive disorders during pregnancy. Regent's Park (UK): Royal College of Obstetricians and Gynaecologists; 2011. Available from: <http://www.nice.org.uk/nicemedia/live/13098/50475/50475.pdf>
50. Department of Health and Human Services (US). The health consequences of smoking: a report of the Surgeon General. Atlanta: Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. 2004. Available from: <http://www.surgeongeneral.gov/library>
51. Honein MA, Rasmussen SA, Reefhuis J, Romitti P, Lammer EJ, Sun L, et al. Maternal smoking, environmental tobacco smoke, and the risk of oral clefts. *Epidemiology* [Internet]. 2007; 18(2):226-33. Available from: <http://www.cdc.gov/ncbddd/birthdefects/CleftLip.html>
52. Adams EK, Melvin CL, Raskind-Hood C, Joski PJ, Galactionova E. Infant delivery costs related to maternal smoking: an update. *Nicotine Tob Res* [Internet]. 2011 Aug; 13(8):627-37. Available from: <http://ntr.oxfordjournals.org/content/13/8/627.long> Subscription required to view.
53. Rosenthal AC, Melvin CL, Barker DC. Treatment of tobacco use in preconception care. *Matern Child Hlth J* [Internet]. 2006; 10:S147-S148. Available from: <http://link.springer.com/content/pdf/10.1007%2Fs10995-006-0117-8>
54. Lumley J, Chamberlain C, Dowswell T, Oliver S, Oakley L, Watson L. Interventions for promoting smoking cessation during pregnancy. *Cochrane Db Syst Rev* [Internet]. 2009 July; Issue 3. Art. No.: CD001055. DOI: 10.1002/14651858.CD001055.pub3. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001055.pub3/full> . Subscription required to view.
55. Mattson SN, Schoenfeld AM, Riley EP. Teratogenic effects of alcohol on brain and behavior. *Alcohol Res Health* [Internet]. 2001; 25(3):185-191. Available from: <http://pubs.niaaa.nih.gov/publications/arh25-3/185-191.pdf>
56. Centers for Disease Control and Prevention. Alcohol consumption among women who are pregnant or might become pregnant – United States, 2002. *MMWR* [Internet]. 2004; 53(50):1178-1181. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5350a4.htm>
57. Gavard JA, Artal R. Effect of exercise on pregnancy outcome. *Clin Obstet Gynecol* [Internet]. 2008 June; 51(2):467-480. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18463475> . Subscription required to review.
58. Atrash H, Jack BW, Johnson K. Preconception care: A 2008 update. *Curr Opin Obstet Gynecol* [Internet]. 2008 Dec; 20(6):581-589. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18989135> . Subscription required to review.
59. Cragan JD, Friedman JM, Holmes LB, Uhl K, Green NS, Riley L. Ensuring the safe and effective use of medications during pregnancy: planning and prevention through preconception care. *Matern Child Hlth J* [Internet]. 2006; 10:S129-S135. Available from: <http://link.springer.com/article/10.1007%2Fs10995-006-0102-2> . Subscription required to view.
60. Chor J, Rankin K, Harwood B, Handler A. Unintended pregnancy and postpartum contraceptive use in women with and without chronic medical disease who experienced a live birth. *Contraception* [Internet]. 2011; 84(1):57-63. Available from: <http://www.sciencedirect.com/science/article/pii/S0010782410006906> . Subscription required to view.
61. Guttmacher Institute. Contraceptive use in the United States [fact sheet on the Internet]. 2012 July. Available from: http://www.guttmacher.org/pubs/fb_contr_use.html
62. Finer LB, Zolna MR. Unintended pregnancy in the United States: incidence and disparities, 2006. *Contraception* [Internet]. 2011; 84(5):478-485. Available from: <http://www.sciencedirect.com/science/article/pii/S0010782411004720>
63. Conde-Agudelo A, Rosas-Bermudez A, Kafury-Goeta AC. Birth spacing and risk of adverse perinatal outcomes. *JAMA* [Internet]. 2006; 295(15) 1809-1823. Available from: <http://jama.jamanetwork.com/article.aspx?articleid=202711>
64. Moos MK, Bangdivala SI, Meibohm AR, Cefalo RC. The impact of a preconceptional health promotion program on intendedness of pregnancy. *Am J Perinat*. 1996; 13(2):103-108.

65. Heron MP, Hoyert DL, Xu JQ, Kochanek KD, Tejada-Vera B. Deaths: final data for 2006. *National Vital Statistics Reports* [Internet]. Hyattsville: National Center for Health Statistics (US). 2009; 57(14): 80pp. Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr57/nvsr57_14.pdf
66. Centers for Disease Control and Prevention. Update on overall prevalence of major birth defects – Atlanta, Georgia, 1978-2005. *MMWR* [Internet]. 2008 January; 57 (01):1-5. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5701a2.htm>
67. Russo CA, Elixhauser A. Hospitalizations for birth defects, 2004. *Healthcare Cost and Utilization Statistical Brief #24*. January 2007. Rockville: Agency for Healthcare Research and Quality (US). Available from: <http://www.ncbi.nlm.nih.gov/books/NBK63495/pdf/sb24.pdf>
68. Mathews TJ, MacDorman MF. Infant mortality statistics from the 2007 period linked birth/infant data set. *National Vital Statistics Reports* [Internet]. Hyattsville: National Center for Health Statistics (US). 2011; 59(6): 31pp. Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59_06.pdf
69. MacDorman MF, Callaghan WM, Mathews TJ, Hoyert DL, Kochanek KD. Trends in preterm-related infant mortality by race and ethnicity, United States, 1999-2004. *Int J Health Serv* [Internet]. 2007; 37(4):635-641. Available from: <http://www.metapress.com/content/15g3t7011563087p/fulltext.pdf>
70. March of Dimes; The Partnership to Maternal, Newborn, & Child Health; Save the Children; World Health Organization. *Born too soon: the global action report on preterm birth*. CP Howson, MV Kinney, JE Lawn [editors]. Geneva: World Health Organization. 2012. Available from: http://www.who.int/pmnch/media/news/2012/201204_borntoosoon-report.pdf
71. Whitworth M, Dowswell T. Routine pre-pregnancy health promotion for improving pregnancy outcomes (review). *Cochrane Db Syst Rev* [Internet]. 2009; Issue 4. Art. No.: CD007536. Available from: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD007536.pub2/pdf>
72. Hillemeier MM, Downs DS, Feinberg ME, Weisman CS, Chuang CH, Parrott R, 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 Health Iss* [Internet]. 2008; 18 (6 Suppl): S87- 96. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2744213/>
73. Weisman CS, Misra DP, Hillemeier MM, Downs DS, Chuang CH, Camacho FT, et al. Preconception predictors of birth outcomes: prospective findings from the Central Pennsylvania Women's Health Study. *Matern Child Hlth J* [Internet]. 2011; 15(7): 829-35. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2939188/>
74. Humphrey JR, Floyd RL. Preconception health and health care environmental scan: report on clinical screening tools and interventions [report on the Internet]. 2012. Available from: <http://www.cdc.gov/preconception/documents/environmental-scan-report.pdf>
75. Lu MC, Kotelchuck M, Culhane JF, Hobel CJ, Klerman LV, Thorp JM. The content of prenatal care: an approach to preconception care between pregnancies. *Matern Child Hlth J* [Internet]. 2006; 10(5 Suppl):S107-S122. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1592148/>
76. Biermann J, Dunlop AL, Brady C, Dubin C, Brann A Jr. Promising practices in preconception care for women at risk for poor health and pregnancy outcomes. *Matern Child Hlth J* [Internet]. 2006; 10(5 Suppl):S21-S28. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1592161/>
77. Dunlop AL, Dubin C, Raynor BD, Bugg GW Jr, Schmotzer B, Brann AW Jr. Interpregnancy primary care and social support for african-american women at risk for recurrent very-low-birthweight delivery: a pilot evaluation. *Matern Child Hlth J* [Internet]. 2008; 12(4):461-468. Available from: <http://link.springer.com/content/pdf/10.1007%2Fs10995-007-0279-z>
78. Johnson, Kay (Department of Pediatrics, Dartmouth Medical School, Hanover, NH) Conversation with: Arden Handler (University of Illinois at Chicago School of Public Health, Chicago, IL), Dean Coonrod (Department of Obstetrics and Gynecology, Maricopa Integrated Health System, Phoenix, AZ).
79. Webb DA, Coyne JC, Goldenberg RL, Hogan VK, Elo IT, Bloch JR, et al. Recruitment and retention of women in a large randomized control trial to reduce repeat preterm births: The Philadelphia Collaborative Preterm Prevention Project. *BMC Med Res Methodol* [Internet]. 2010; 10:88. Available from:

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2957387/>

80. Hogan VK, Amamoo MA, Anderson AD, Webb D, Mathews L, Rowley D, et al. Barriers to women's participation in inter-conceptional care: a cross-sectional analysis. *BMC Public Health* [Internet]. 2012 Feb 1; 12:93. Available from: <http://www.biomedcentral.com/1471-2458/12/93>
81. Moos MK. From concept to practice: reflections on the preconception health agenda. *J Womens Health* [Internet]. 2010; 19(3):561-567. Available from: <http://online.liebertpub.com/doi/pdfplus/10.1089/jwh.2009.1411>
82. Department of Health and Human Services (US). Combating a silent epidemic of viral hepatitis: action plan for the prevention, care, and treatment of viral hepatitis [report on the Internet]. Available from: http://www.hhs.gov/ash/initiatives/hepatitis/actionplan_viralhepatitis2011.pdf
83. Posner S, Johnson K, Parker C, Atrash H, Biermann J. The national summit on preconception care: a summary of concepts and recommendations. *Matern Child Hlth J* [Internet]. 2006; 10(Suppl1): S197- S205. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1592248/>
84. Department of Health and Human Services (US). Affordable Care Act ensures women receive preventive services at no additional cost [press release]. Washington: 2011. Available from: <http://www.hhs.gov/news/press/2011pres/08/20110801b.html>

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