



Quad Council

of Public Health Nursing Organizations



American Nurses Association
Congress on Nursing Practice & Economics

The Public Health Nursing Shortage: A Threat to the Public's Health

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Public Health Nursing is in the midst of a critical shortage, one that threatens the health of the nation. While nursing shortages have existed before, the magnitude of the current shortage is far worse than any the U.S. has ever experienced. In this time of increasing demands on public health to respond to issues such as emergency preparedness, new emerging infections, and significant increases in chronic illnesses, the public health nursing shortage must be addressed. While others have written about the shortage, the Quad Council of Public Health Nursing Organizations has examined the shortage through the prism of the potential impact on the public's health and offered recommendations for dealing with the shortage.



Association of Community Health
Nursing Educators

Public health nurses focus on the health of populations, working with communities, and the individuals and families who live in them. With an emphasis on prevention, their practice is multifaceted, and has resulted in positive health outcomes including enhanced surveillance; higher rates of breastfeeding; reductions in pre-term births and low birth weight rates; and improved behavior, education, and employment.



Association of State and Territorial
Directors of Nursing

The current shortage is complex, the result of multiple and varied factors. Contributing factors include an overall shortage of registered nurses as well as factors specific to public health: an aging population of nurses; a poorly funded public health system on the national, state, and local levels that results in inadequate salaries; reduced and/or eliminated public health nursing positions; bureaucratic hiring practices; inadequate numbers of baccalaureate nursing graduates; limited public health advocacy; a growing shortage of nursing faculty, adequately prepared to teach public health nursing; and invisibility of public health nursing in media and marketing campaigns.

While the issues are many, change is possible, if we have the political will to do so. The following are recommendations to address the public health nursing shortage.

Recommendations

- Increase core financial support for public health agencies, to enable an increase in salaries for nurses.
- Enhance leadership development programs for the public health workforce, including public health nurses.
- Increase funding to the Health Resources and Services Administration (HRSA), Division of Nursing for projects that support public health nursing.
- Provide scholarship funding and loan forgiveness programs to support nurses who seek advanced public health nursing education.
- Increase funding to the Centers for Disease Control & Prevention to enhance support of public health workforce through partnerships with nursing and fellowship opportunities.
- Develop effective marketing campaigns intended to attract new nurses entering the profession, as well as veteran nurses interested in a career change into public health.
- Conduct research to determine what attracts nurses to public health and use this information to develop recruitment and marketing strategies.
- Provide support and assistance to practicing public health nurses to continue their education, both undergraduate and graduate.
- Encourage schools of nursing, public health training centers, and schools of public health to collaborate with state and local health agencies to provide educational opportunities for nurses.
- Collaborate with HRSA to assure the questions and reports of the NSSRN accurately capture information about public health nurses, including the settings where public health nurses practice.
- Create representation for the field of public health nursing on the National Advisory Council (to the Secretary of Health and Human Services) on Nurse Education and Practice, chaired by HRSA's Division of Nursing.
- Fund research identifying the differences in nursing workforce issues between the public and private sectors.
- Fund research related to identifying effective strategies for expanding and strengthening the public health nursing workforce.
- Create joint practice arrangements for public health nursing faculty and joint teaching arrangements for master's and doctorally prepared public health nurses in practice.
- Encourage and reward experienced nurses for serving as mentors or preceptors to students.
- Provide incentives such as tax credits to retain public health nursing faculty, and support state or federal initiatives to retain this faculty.
- Form new public health/educational partnerships in order to support the development of qualified preceptors and clinical sites.
- Develop and share innovative strategies to teach public health nursing.

The Public Health Nursing Shortage: A Threat to the Public's Health

Introduction

The United States is in the midst of a critical shortage of registered nurses. While nursing shortages have existed before, the magnitude of the current shortage is far worse than any the U.S. has ever experienced. The growing elderly population and the reduced numbers of those entering the nursing profession make this shortage more significant and long lasting.

There have been many commentaries written about the nursing shortage; however, few have addressed the impact of the shortage in relation to public health. This paper, written by representatives of the Quad Council of Public Health Nursing Organizations, focuses on the shortage of public health nurses in official governmental agencies, identifies the effects of the shortage on the public's health, and recommends strategies for addressing the problem. The Quad Council is an alliance of the four national nursing organizations that address public health nursing issues: the Association of Community Health Nurse Educators (ACHNE), the American Nurses Association's Congress on Nursing Practice and Economics (ANA), the American Public Health Association-Public Health Nursing Section (APHA), and the Association of State and Territorial Directors of Nursing (ASTDN).

What is Public Health Nursing?

Public health nursing is defined as the practice of promoting and protecting the health of populations using knowledge from nursing, social, and public health sciences (American Public Health Association, Public Health Nursing Section 1996). The title "public health nurse" (PHN) designates a registered nurse with educational preparation in both public health and nursing. The primary focus of public health nursing is to promote health and prevent disease for entire population groups. This is done by working with individuals, families, communities, and/or systems.

Public health nurses work with communities, the individuals and families that compose the communities, and the systems that affect the communities (Minnesota Department of Health, 2001). They work in schools, homes, clinics, jails, and out of mobile vans and dog sleds. PHNs partner with policymakers, faith-based organizations, firefighters, law enforcement agencies, hospitals, free clinics, and numerous social service organizations.

The work of public health nurses is multifaceted and includes activities such as:

- Partnering with supportive housing advocates to ensure adequate, accessible, and affordable housing;
- Working with family day care providers to implement national standards for safe care;

- Identifying neighborhoods with low immunization rates and partnering to develop culturally and linguistically appropriate interventions to increase those rates;
- Interviewing an individual diagnosed with hepatitis to determine the possible source of the disease;
- Helping young mothers access services and care for themselves and their babies;
- Collaborating with a community organization to design a program to promote the use of bicycle helmets;
- Providing care in an emergency shelter following a severe storm and power outage;
- Teaching a group of business owners about the threat of pandemic influenza and what they need to do to prepare for it.

The Impact of Public Health Nurses

The practice of public health nursing has demonstrated a significant impact on improving the health of the public through both population-based health strategies and interventions with families and individuals. Recent published articles demonstrate the critical role PHNs play in the development of evidence-based nursing practice and its impact on population health. A synopsis of recent research follows and is outlined in the accompanying table, “Associated Outcomes of Selected Public Health Nursing Interventions.”

Interventions with Populations

Research regarding effective population-based interventions is still new and a great deal more needs to be understood. However, recent studies indicate PHNs have been essential in improving population-level health. In the area of emergency preparedness, for example, PHNs were effective in forming informal partnerships that are essential for disease surveillance, and using informal communication channels to obtain critical surveillance information (Atkins et al., 2005). PHNs were also integral to the development of community partnerships and coalitions, both at the state and local levels (Padget et al., 2004; Corrarino et al., 2000). Similarly, Monsen and Keller (2001) described a population-based project where PHNs developed, disseminated, and encouraged the use of evidence-based treatment guidelines.

Interventions with Individuals and Families

Public health nursing interventions have improved the health of individuals and families in areas such as: injury prevention, perinatal outcomes, child abuse and neglect prevention, asthma control, and family functioning. Corrarino et al., reported the number of scald burn prevention measures implemented by parents was significantly improved after PHNs provided teaching (Corrarino, Walsh and Nadel, 2001). Health education and case management by PHNs, with a specific focus on the needs of the target population, produced improvements in vaccination rates for infants born to women who tested positive for the hepatitis B virus, and reduced hospital costs for asthmatics (Corrarino, 2000; Corrarino & Little, 2006). In 2000, Eckenrode et al. reported significantly fewer child maltreatment reports involving the mother as perpetrator or the study child as subject after PHN home visitation.

The work of PHNs also demonstrated improvement in health during pregnancy. Fetrick et al., (2003) reported a PHN intervention demonstrated a higher than average hemoglobin among pregnant women, and a higher rate of breastfeeding. In 2000, Corrarino et al., reported about a project that included a public health nurse-led interdisciplinary team and home visits by a public health nurse to pregnant women who were substance abusers and not in treatment for their abuse. Based on the usual practice among this particular population, researchers expected only 10 percent of the mothers would enter treatment. However, 90 percent of the women in Corrarino's study entered treatment, and all had full-term newborns. In addition, marked improvement in alcohol and drug use, as well as reduction in psychiatric problems, was demonstrated. Moore and colleagues (1998) demonstrated a significant reduction in preterm birth rates of low-income African American teenagers with PHN interventions. Further research determined high-risk pregnant women with Medicaid who received case management, monitoring, and health education from a PHN had a low birth weight rate of 3.5 percent. This was less than the low birth rate for non-Medicaid women of the same health insurer (Milbank Memorial Fund, 1998).

The impact of public health nursing interventions on families has been clearly demonstrated. Several prospective randomized clinical trials reported long term improvement, continuing years after the program terminated, in the lives of women and children who were visited by PHNs. Areas of improvement for the children included: lower incidence of behavior problems, higher scores on achievement tests, less aggression, and higher intellectual functioning (Izzo et al., 2005; Olds et al., 2004[a]; Olds et al., 2004[b]). Mothers who received PHN services had fewer negative outcomes (e.g., less substance abuse, better parenting practices, etc.) after experiencing uncontrolled stressful life events (e.g., death of loved one, etc.). Additional trials reported significant PHN-produced effects on a wide range of maternal and child outcomes, including: superior child mental development, less language delays, fewer subsequent pregnancies, longer intervals between pregnancies, better maternal-infant interaction, and more productive employment patterns (Olds et al., 2002; Kearney et al., 2000). In 2004, studies by Olds reported families receiving PHN care had improved outcomes when compared to those receiving interventions from paraprofessionals.

The Magnitude of the Nursing Shortage

The shortage of registered nurses is not a new phenomenon. Such shortages are cyclical in nature and the United States has dealt with previous shortages in the health professions. There is evidence, however, that the current shortage is, and will continue to be, worse than ever before.

Federal law mandates the routine collection of information regarding the supply, distribution, and current and future requirements for nursing personnel for each state. The National Sample Survey of Registered Nurses (NSSRN) conducted by the Health Resources and Services Administration (HRSA) is the source of statistics on all those with current licenses to practice in the United States, whether or not they are currently employed in nursing. The survey is based on a complex sample survey method of approximately 1.2 percent of licensure listings from each of the fifty states and the District of Columbia, and has been systematically collected every four years since 1980.

The data from the NSSRN reveal the following:

- In 2004, the total number of licensed RNs in the United States was calculated to be 2,909,467, an increase of 7.9 percent from 2000. Although this is better than the 5.2 percent increase for 1996-2000, it is considerably lower than the 14.2 percent increase for 1992-1996.
- The nursing population is aging. The average age of employed RNs in 2000 was 43.3 years and 46 percent were at least 45 years old. In 1980, 52.9 percent of RNs were younger than age 40 and 26 percent were under 30. In 2000, 31.7 percent were younger than 40 and less than 10 percent were under age 30 (HRSA 2000).
- With the overall population aging and health care needs expected to increase, in 2000 HRSA compared the supply and demand for RNs. The estimated shortfall was 6 percent, or 110,000 full-time equivalent RNs. If these trends continue, the shortfall is projected to grow to 12 percent in 2019, and to 29 percent by 2020. The HRSA 2000 study estimated that the demand for RNs was greater than the supply in 30 states and by 2020, this greater demand will extend to 44 states.
- In 2004, a 3.4 percent decrease was reported in RNs working in the community and public health settings, from 18.3 percent to 14.9 percent. Data for 2004 are not available for the official governmental work sites. In 2000, 26,277 (1.2 percent) of the RNs employed in nursing worked in official state health departments, and 40,321 (1.8 percent) worked in official city or county health departments.

The current nursing shortage will significantly affect public health nursing. Public health nurses are the largest component of the public health workforce (IOM, 2003a) and make up the “largest identified professional group” (Gebbie et al., 2001). A report from The Association of State & Territorial Health Officials (ASTHO) stated 30 out of 37 states reported public health nursing as the field that will be most affected by workforce shortages in the future (ASTHO, 2005). The number of public health nurses decreased from 39 percent of the public health workforce in 1980 to 17.6 percent in 2000 (ASTHO, 2005). The aging and retirement trends of RNs will have a drastic effect on the public’s health. The average age of the public health workforce is 46.6 years and retirement rates are estimated to be as high as 45 percent over the next five years (ASTHO, 2004).

The serious impact of the nursing shortage on the public health system and the health of the public has been documented by various organizations:

- The American Nurses Association (ANA) action report, Supporting Public Health Nurses and their role in Strengthening the Public Health Infrastructure (<http://nursingworld.org/member/inside/Hod03/public.pdf>) addressed the need for ongoing advocacy in the support of the critical role of public health nurses in providing health services to individuals, families, and communities (ANA, 2003).
- The Frontier Education Center report, Addressing the Nursing Shortage: Impacts and Innovations in Frontier America. (<http://www.frontierus.org/index.htm?p=2&pid=6007&spid=6083>) looked at the effect of the nursing shortage on rural and frontier communities and made

recommendations to address the shortage. This document stated that frontier and rural communities were more likely to suffer from the nursing shortage and that these communities depend on non-hospital care settings to a greater degree than urban areas (Frontier Education Center, 2004).

- The Association of State & Territorial Health Officials (ASTHO) 2004 report, State Public Health Employee Worker Shortage Report: A Civil Service Recruitment and Retention Crisis (<http://www.astho.org/pubs/Workforce-Survey-Report-2.pdf>).
- The ASTHO issue brief, Public Health Workforce Shortage: Public Health Nurses (<http://www.astho.org/pubs/PHNursesIssueBrief121405.pdf>) described workforce trends and identified options for addressing the nursing shortage (ASTHO, 2005).
- The National Association of County and City Health Officials (NACCHO, 2005) recognized the critical impact of a public health nursing shortage and passed a resolution, To Support Education and Recruitment of Public Health Nurses. (<http://archive.naccho.org/documents/resolutions/05-08.pdf>).
- The 2005 HRSA, Public Health Workforce Study (<http://bhpr.hrsa.gov/healthworkforce/reports/publichealth/default.htm>) reported difficulty recruiting public health nurses, especially in rural areas. The recruitment difficulties were attributed to shortages of workers, non-competitive salaries, and lengthy processing time for new hires.
- The American Public Health Association issue brief, The Public Health Workforce Shortage: Left Unchecked, Will We Be Protected? (<http://www.apha.org/workforcebrief.pdf>), includes information about public health nurses (APHA, 2006).

Issues Contributing to the Shortage

Inadequate Funding and Salaries

In 2005, the HRSA Public Health Workforce Study identified four primary factors that contributed to the public health nursing shortage: budget constraints, non-competitive salaries, the length of time required to process new hires, and lack of qualified candidates (HRSA, 2005). Of these factors, budget constraints was identified as the most important barrier to adequate workforce staffing. As a result of federal and state budget cuts, a large number of vacancies from retirement or turnover have been frozen or not filled (APHA, 2006). This creates an extreme burden on the existing workforce and is a barrier for hiring staff that could bring workplace relief.

The nursing shortage in other specialty areas has generated financial incentives in the private sector. Strategies such as sign-on bonuses, high base salaries, lucrative benefit packages, and flexible hours challenge public health's ability to compete economically (HRSA, 2005). It is common for public health agencies to hire nurses at salaries far below health care industry standards with no career ladder incentives. In addition, many states have had serious budget shortfalls in recent years, resulting in no cost of living raises for employees. Since public health nursing positions are frequently part of a

governmental employee system, salaries for nurses cannot be increased unless all other employees also get raises. Therefore, the salaries of public health nurses have fallen far behind nurses working in comparable positions in the private sector.

Complicated Hiring Processes

The economic barriers for public health nursing are further complicated by the fact that potential public health agencies often have lengthy, bureaucratic hiring processes. It is common for it to take more than three months to process a civil service application and hire a nurse in a public health agency. This barrier has caused qualified professional nurses, who were recruited for positions, to accept other jobs that allow them to confirm their plans and begin working much sooner.

Lack of Qualified Applicants

The Institute of Medicine report, "Who Will Keep the Public Healthy?", describes a looming crisis related to a shortage of well-trained public health workers (IOM, 2003b). Although baccalaureate education has been identified as the minimum standard for public health nurses (Quad Council, 1999), New York, Minnesota, and California are the only states requiring a baccalaureate degree to practice public health nursing (HRSA, 2005). In addition, less than one-half of all nurses have a baccalaureate, master's or doctorate degree. It is estimated at least 390,000 of the one million projected RN vacancies in the year 2010 will be for RNs with a baccalaureate or master's degrees (AACN, 2005). This demand for nurses with greater education increases the challenge for public health agencies to hire nurses with the appropriate education (HRSA, 2004).

Ineffective Recruitment and Retention

Successful recruitment and retention is challenging for all health care institutions; however, governmental public health has even greater challenges than the private sector. Current vacancy rates of up to 20 percent exist in some states and public health employment turnover rates of 14 percent are present in some parts of the country (ASTHO, 2005). Budget constraints in public health have resulted in staff leaving jobs for positions in the private sector for higher salaries, better benefits, and less responsibility (APHA, 2006). This turnover of staff is costly; the state of Georgia calculated the financial impact of public health nursing turnover was at least nine million dollars in FY 2005 (Georgia Division of Public Health, 2006).

Public health agencies do not typically have budgets to support the aggressive marketing and recruitment campaigns. In addition, since public health nursing is not highlighted in the media nor always visible in the community, the specialty of public health nursing is not well understood and often not perceived to be exciting or challenging. These factors, combined with complicated and lengthy hiring processes and non-competitive salaries, make it difficult to recruit new staff.

Loss of Nursing Positions Due to System Changes

Over the past two decades, key policy documents have emphasized the need for public health to focus on the core functions of assessment, assurance and policy development, and population-based services (Allender & Spradley; 2001; Institute of Medicine, 1988;

Lundy & James, 2001; Stanhope & Lancaster, 2006). As state and local health departments moved away from direct care of individuals, nursing positions that were frequently narrowly viewed as clinical positions were eliminated. This has resulted in a decrease in the number of public health nursing positions and has further limited public health capacity (APHA, 2006).

Inadequate Political Support and Advocacy

On the local and state level, the support and financing for public health is heavily affected by several crucial and interlocking factors: decision making within internal public health infrastructures and organizations, elected politicians, both in the executive and legislative branches, advocacy groups, and the media. The organization and advocacy needed to influence these factors is often lacking. It has been documented that the involvement of both public health departments and community groups in shaping public policy is not only possible, but also critical to protecting and improving the health of communities (Acosta, 2003). For example, local politicians could be educated about the PHN shortage, the level of skill, education, and expertise required by the job, and the disparity in salaries between nurses working in the public and private sector. These elected officials possess the power and authority to effect many improvements and remedies in these areas. Public health nurses could effectively influence this critical aspect of public health policy and their own destiny by actively working to educate these officials.

Educational Challenges

The nursing shortage has affected the supply of adequately prepared nursing faculty available to teach public health. A recent report revealed a 7.9 percent faculty vacancy rate in baccalaureate and higher degree programs; this is an increase of 32 percent since 2002 (National League of Nursing, 2006). In 2005, nursing schools denied more than 32,000 qualified applicants, due primarily to a shortage of nurse educators (AACN, 2005). The situation is further complicated by the estimate that between 200-300 doctoral prepared faculty will be eligible to retire annually during the years 2004-2012. This estimate is conservative, assuming faculty work until age 62 and there are no other reasons to leave teaching (AACN, 2005).

Education to prepare public health nurses occurs in baccalaureate and graduate nursing programs. In baccalaureate programs, content is integrated throughout the curriculum and/or covered in a separate Public/Community Health Nursing course and includes public health theory, population-focused practice, and public health nursing roles (ACHNE, 2000). Teaching undergraduate public health nursing has special challenges. Public health agencies, where students and faculty typically seek practical experiences, are often small, widely dispersed, and distant from schools of nursing. The loss of nursing positions caused by budget cuts, and the increased focus on population-based services, often make it difficult to find placement sites and nurses to be preceptors to students. In addition, integrated curricula have led some nursing programs to hire public health nursing faculty with no experience in public health and population-based care.

Students often select the area of nursing they want to specialize in based on their student experience. Students are reluctant to pursue a career in public health when the students are taught by faculty without the appropriate experience, observe a decrease of

public health nursing positions in governmental health agencies, and learn salaries are significantly below the market average for hospital workers.

Conclusion

As the largest component of the public health workforce, public health nurses are a critical resource in the effort to improve the public's health. While the U.S. has experienced nursing shortages in the past, none has been as severe as the current shortage that clearly threatens the health of the nation. The public health nursing shortage is complex and caused by numerous and varied factors such as inadequate salaries, aging of the current workforce, reduction of positions due to budget constraints, bureaucratic personnel and hiring systems, ineffective recruitment and retention strategies, inadequate political support and advocacy, and a critical shortage of adequately prepared faculty. Clearly, no single approach to address the current shortage will be sufficient to meet the challenge. Governmental agencies, educational institutions, and the private sector must work together to develop, fund, and promote creative solutions to address the problem.

Recommendations

- Increase core financial support for public health agencies, to enable an increase in salaries for nurses.
- Enhance leadership development programs for the public health workforce, including public health nurses.
- Increase funding to the Health Resources and Services Administration (HRSA), Division of Nursing for projects that support public health nursing.
- Provide scholarship funding and loan forgiveness programs to support nurses who seek advanced public health nursing education.
- Increase funding to the Centers for Disease Control & Prevention to enhance support of public health workforce through partnerships with nursing and fellowship opportunities.
- Develop effective marketing campaigns intended to attract new nurses entering the profession, as well as veteran nurses interested in a career change into public health.
- Conduct research to determine what attracts nurses to public health and use this information to develop recruitment and marketing strategies.
- Provide support and assistance to practicing public health nurses to continue their education, both undergraduate and graduate.

- Encourage schools of nursing, public health training centers, and schools of public health to collaborate with state and local health agencies to provide educational opportunities for nurses.
- Collaborate with HRSA to assure the questions and reports of the NSSRN accurately capture information about public health nurses, including the settings where public health nurses practice.
- Create representation for the field of public health nursing on the National Advisory Council (to the Secretary of Health and Human Services) on Nurse Education and Practice, chaired by HRSA's Division of Nursing.
- Fund research identifying the differences in nursing workforce issues between the public and private sectors.
- Fund research related to identifying effective strategies for expanding and strengthening the public health nursing workforce.
- Create joint practice arrangements for public health nursing faculty and joint teaching arrangements for master's and doctorally prepared public health nurses in practice.
- Encourage and reward experienced nurses for serving as mentors or preceptors to students.
- Provide incentives such as tax credits to retain public health nursing faculty, and support state or federal initiatives to retain this faculty.
- Form new public health/educational partnerships in order to support the development of qualified preceptors and clinical sites.
- Develop and share innovative strategies to teach public health nursing.

Associated Outcomes of Selected Public Health Nursing Interventions

Interventions with Populations and Communities	
Associated Outcomes	Authors
PHN obtained critical surveillance information for emergency preparedness.	Atkins R.B., Williams J.R., Silenas R., Edwards J.C., 2005.
PHN developed state-wide and local community partnerships and coalitions for influencing policy development and organizational redesign.	Padget S.M., Bekemeier B., Berkowitz B., 2004
PHN demonstrated need and developed, disseminated and encouraged use of head lice treatment guidelines among health care providers.	Monsen K. & Keller L.O., 2001
Interventions with Families and/or Individuals	
Associated Outcomes	Authors
PHN teaching resulted in statistically significant increases in prevention of prevent scald burns.	Corrarino J.E., Walsh P.J., Nadel E., 2001
PHN teaching resulted in improved vaccination rates for infants born to women chronically infected with hepatitis B virus.	Corrarino J.E., 2000.
Case management and teaching by PHN to parents of children with asthma resulted in statistically significant cost reduction for hospitalizations and emergency room visits.	Corrarino J.E. & Little A., 2006
Home visits by PHN to mothers identified as a perpetrator of child maltreatment resulted in reduced child maltreatment reports.	Eckenrode J., Ganze.I.B et al., 2000
Home visits by a PHN-led interdisciplinary team to pregnant women with substance abuse and not in treatment resulted in 90% rate of entry into treatment and 100% full term births.	Corrarino J. E., Williams C., et al., 2000
PHN home visits resulted in higher than average prenatal hemoglobin levels and higher rates of breast feeding.	Fetrick A., Christensen M., & Mitchell C., 2003
PHN telephone intervention resulted in reduced pre-term birth rates for low income African American teens	Moore M.L., Meis P.J., et al., 1998
PHN case management, monitoring and teaching to women covered by Medicaid, who were at risk for delivering a low birth weight infant, resulted in a low weight birth rate that was less than commercial enrollees of the same insurer.	Milbank Memorial Fund, 1998

Associated Outcomes	Authors
Standardized PHN home visiting program resulted in long-term, sustained improvement in lives of women and children; decreased behavior problems; higher achievement scores, less aggression and higher intellectual functioning.	Izzo C.V., Eckenrode J.J., et al., 2005 Olds D.L., Kitzman H., et al., 2004a Olds D.L., Robinson J., et al., 2004
Standardized home visiting program for building trusting relationships and coaching maternal-infant interaction resulted in improved maternal and child health. Improvement in social outcomes of superior child's mental development, fewer subsequent pregnancies, longer intervals between pregnancies, more productive employment patterns, and improved maternal-infant interaction were also reported.	Kearney M.H., York R., & Deatrick J.A. 2000 Olds D.L., Robinson J., et al., 2002,
Nurses produced significant positive effects on a wide range of maternal and child health outcomes compared to paraprofessionals	Norr K.F., Crittenden K.S., et al., 2003
PHN home visits targeting at risk families showed significant reductions in postnatal depression screening scores as well as improvement in parental role.	Armstrong K.L., Fraser J.A., et al., 1999
PHN home visits to indigent mothers revealed significant increased in utilization of primary care providers as regular source of sick care and better recall of health education information.	Margolis P.A., Lannon C.M., et al., 1996
Children visited by a nurse had significantly fewer health care encounters related to injuries or ingestions and the mothers held fewer child abuse/neglect associated beliefs about childrearing.	Kitzman H., Olds D., et al., 1997
Mothers at both high and low risk of child abuse had significant improvement in child abuse potential after PHN intervention.	Cerney J.E., Inouye J., 2001

Appendix A Work Group Members

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