

TOPIC: **IN SUPPORT OF INCREASING AWARENESS ABOUT THE LACK OF HUMANPAPILLOMAVIRUS VACCINATION IN ADOLESCENT MALES**

SUBMITTED BY: **Maurine Church Coburn School of Nursing
Monterey, CA**

AUTHORS: **Lali Baratashvili**

WHEREAS, 79 Million Americans, from late teens and early 20s, are infected with HPV (Centers for Disease Control and Preventions, 2019); and

WHEREAS, of the approximate 19.7 million sexually transmitted infections annually in the United States, HPV accounts for 14.1 million of these infections, with most people infected being between ages 15-24. (Wofford & Voss, 2016, p. 390); and

WHEREAS, a majority of the adolescent population (ages 13-17) that have received the complete dose schedule of the HPV vaccine are adolescent females at 30%, while only 10% of adolescent males have done so. (Wofford & Voss, 2016, p. 390); and

WHEREAS, the most common reason for not vaccinating is lack of physician recommendation for the HPV vaccine. Over 50% of parents reported that the clinicians did not advise them about the vaccine (Fuller & Hinyard, 2017, p. 1128); and

WHEREAS, a survey of 400 males found that participants were unaware of the association between anogenital cancer and HPV transmission; while a study found that only 55.2% of college aged males knew that they could get HPV (Fuller & Hinyard, 2017, p. 1128); and

WHEREAS, initial concerns over mandating HPV vaccinations involve the safety and efficacy of the vaccine. However, these critiques are invalid as nearly 90 million doses have been distributed since 2006, and 92% of side effects were classified as “non- serious.” (Bayefsky, 2018, p. 502); and

WHEREAS, epidemiological data have shown that in the four years after the vaccine was released (2006), HPV infections in teen girls in the US decreased by 56%. (Bayefsky, 2018, p. 502); and

WHEREAS, it is important for adolescent males to receive the HPV vaccine as a study showed that men between ages 18-59 showed a prevalence of 25.1% of having cancer causing HPV. (Beltran et al. 2017, p.813); therefore be it

RESOLVED, that the California Nursing Students’ Association (CNSA) collaborate with healthcare professionals and health institutions to increase awareness of the low HPV vaccination rates in adolescent males and address the factors contributing to low uptake in HPV vaccinations; and be it further

RESOLVED, that the CNSA invite a guest speaker to the state convention at a future date to speak about and raise awareness of the low HPV vaccination rates among adolescent males; and be it further

RESOLVED, that the CNSA creates social media accounts (Twitter, Instagram, Facebook, and/or Snapchat) that address the low HPV vaccination rates in adolescent males; and be it further

RESOLVED, that the CNSA send a copy of this resolution to the National Foundation for Infectious Diseases, American Cancer Society, National Nurses Association, National League for Nursing, Oncology Nursing Society, California Association for Nurse Practitioners, and all others deemed appropriate by the CNSA Board of Directors.

TOPIC: IN SUPPORT OF INCREASING AWARENESS ABOUT
THE LACK OF HUMANPAPILLOMAVIRUS
VACCINATION IN ADOLESCENT MALES

SUBMITTED BY: Maurine Church Coburn School of Nursing
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ABSTRACT: HPV is the most common sexually transmitted infection across all genders especially in individuals in adolescence. The majority of marketing and public health initiatives have been directed toward females due to their increased risk of cervical cancer. As a result, the male gender has been overlooked in regard to their risk of cancers associated with the Human Papillomavirus. This resolution's purpose is to increase awareness about the lack of HPV vaccination rates in adolescent males.

Estimated Cost of Implementation - 2021 CNSA Resolution

**TOPIC: IN SUPPORT OF INCREASING AWARENESS ABOUT THE LACK OF HUMANPAPILLOMAVIRUS
VACCINATION IN ADOLESCENT MALES**

| | |
|---|---------------------------------|
| Convention or MidYear Conference Speaker (transportation, housing, meals) | \$2,500 |
| Article in <i>Range of Motion</i> | No additional cost |
| Social Media Manager: Facebook page, Instagram, Snapchat, Twitter | No additional cost (staff role) |
| Email messages to organizations and agencies | No additional cost (staff role) |
| <hr/> | |
| Total cost | \$2,500 |

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doi: 10.1111/wvn.12172

Genital HPV Infection – Fact Sheet



Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States. Some health effects caused by HPV can be prevented by the HPV vaccines.

The content here can be [syndicated](#) (added to your web site).

[Print Version](#) 

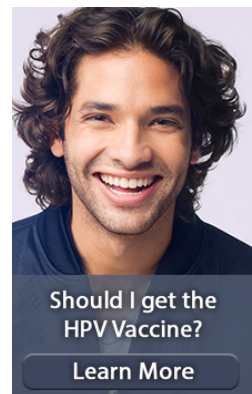
What is HPV?

HPV is the most common sexually transmitted infection (STI). HPV is a different virus than [HIV](#) and [HSV](#) (herpes). **79 million Americans, most in their late teens and early 20s, are infected with HPV.** There are many different types of HPV. Some types can cause health problems including genital warts and cancers. But there are vaccines that can stop these health problems from happening.

How is HPV spread?

You can get HPV by having vaginal, anal, or oral sex with someone who has the virus. It is most commonly spread during vaginal or anal sex. HPV can be passed even when an infected person has no signs or symptoms.

Anyone who is sexually active can get HPV, even if you have had sex with only one person. You also can develop symptoms years after you have sex with someone who is infected. This makes it hard to know when you first became infected.



Does HPV cause health problems?

In most cases, HPV goes away on its own and does not cause any health problems. But when HPV does not go away, it can cause health problems like genital warts and cancer.

Genital warts usually appear as a small bump or group of bumps in the genital area. They can be small or large, raised or flat, or shaped like a cauliflower. A healthcare provider can usually diagnose warts by looking at the genital area.

Does HPV cause cancer?

HPV can cause cervical and other **cancers** including cancer of the vulva, vagina, penis, or anus. It can also cause cancer in the back of the throat, including the base of the tongue and tonsils (called **oropharyngeal cancer**).

Cancer often takes years, even decades, to develop after a person gets HPV. The types of HPV that can cause genital warts are not the same as the types of HPV that can cause cancers.

There is no way to know which people who have HPV will develop cancer or other health problems. People with weak immune systems (including those with HIV/AIDS) may be less able to fight off HPV. They may also be more likely to develop health problems from HPV.

How can I avoid HPV and the health problems it can cause?

You can do several things to lower your chances of getting HPV.

Get vaccinated. The HPV vaccine is safe and effective. It can protect against diseases (including cancers) caused by HPV when given in the recommended age groups. (See “Who should get vaccinated?” below) CDC recommends HPV vaccination at age 11 or 12 years (or can start at age 9 years) and for everyone through age 26 years, if not vaccinated already. For more information on the recommendations, please see: <https://www.cdc.gov/vaccines/vpd/hpv/public/index.html>

Get screened for cervical cancer. Routine screening for women aged 21 to 65 years old can prevent cervical cancer.

If you are sexually active

- Use latex condoms **the right way** every time you have sex. This can lower your chances of getting HPV. But HPV can infect areas not covered by a condom – so condoms may not fully protect against getting HPV;
- Be in a mutually monogamous relationship – or have sex only with someone who only has sex with you.

Who should get vaccinated?

HPV vaccination is recommended at age 11 or 12 years (or can start at age 9 years) and for everyone through age 26 years, if not vaccinated already.

Vaccination is not recommended for everyone older than age 26 years. However, some adults age 27 through 45 years who are not already vaccinated may decide to get the HPV vaccine after speaking with their healthcare provider about their risk for new HPV infections and the possible benefits of vaccination. HPV vaccination in this age range provides less benefit. Most sexually active adults have already been exposed to HPV, although not necessarily all of the HPV types targeted by vaccination.

At any age, having a new sex partner is a risk factor for getting a new HPV infection. People who are already in a long-term, mutually monogamous relationship are not likely to get a new HPV infection.

How do I know if I have HPV?

There is no test to find out a person’s “HPV status.” Also, there is no approved HPV test to find HPV in the mouth or throat.

There are HPV tests that can be used to screen for cervical cancer. These tests are only recommended for screening in women aged 30 years and older. HPV tests are not recommended to screen men, adolescents, or women under the age of 30 years.

Most people with HPV do not know they are infected and never develop symptoms or health problems from it. Some people find out they have HPV when they get genital warts. Women may find out they have HPV when they get an abnormal Pap test result (during cervical cancer screening). Others may only find out once they’ve developed more serious problems from HPV, such as cancers.

How common is HPV and the health problems caused by HPV?

HPV (the virus): About 79 million Americans are currently infected with HPV. About 14 million people become newly infected each year. HPV is so common that almost every person who is sexually-active will get HPV at some time in their life if they don't get the HPV vaccine.

Health problems related to HPV include genital warts and cervical cancer.

Genital warts: Before HPV vaccines were introduced, roughly 340,000 to 360,000 women and men were affected by genital warts caused by HPV every year.* Also, about one in 100 sexually active adults in the U.S. has genital warts at any given time.

Cervical cancer: Every year, nearly 12,000 women living in the U.S. will be diagnosed with cervical cancer, and more than 4,000 women die from cervical cancer—even with screening and treatment.

There are other conditions and cancers caused by HPV that occur in people living in the United States. Every year, approximately 19,400 women and 12,100 men are affected by cancers caused by HPV.

*These figures only look at the number of people who sought care for genital warts. This could be an underestimate of the actual number of people who get genital warts.

I'm pregnant. Will having HPV affect my pregnancy?

If you are pregnant and have HPV, you can get genital warts or develop abnormal cell changes on your cervix. Abnormal cell changes can be found with routine cervical cancer screening. You should get routine cervical cancer screening even when you are pregnant.

Can I be treated for HPV or health problems caused by HPV?

There is no treatment for the virus itself. However, there are treatments for the health problems that HPV can cause:

1. **Genital warts** can be treated by your healthcare provider or with prescription medication. If left untreated, genital warts may go away, stay the same, or grow in size or number.
2. **Cervical precancer** can be treated. Women who get routine Pap tests and follow up as needed can identify problems *before* cancer develops. Prevention is always better than treatment. For more information visit www.cancer.org .
3. **Other HPV-related cancers** are also more treatable when diagnosed and treated early. For more information visit www.cancer.org .

Where can I get more information?

[STD information](#)

[HPV Information](#)

[HPV Vaccination](#)

[Cancer Information](#)

[Cervical Cancer Screening](#)

[CDC's National Breast and Cervical Cancer Early Detection Program](#)

STD information and referrals to STD Clinics

CDC-INFO

1-800-CDC-INFO (800-232-4636)

TTY: 1-888-232-6348

[In English, en Español](#)

[CDC National Prevention Information Network \(NPIN\)](#)

P.O. Box 6003

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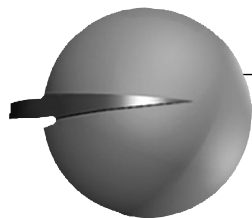


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Evidence Review

Human Papillomavirus Vaccine Uptake in Adolescent Boys: An Evidence Review

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Keywords

HPV,
adolescents,
boys,
parents,
HPV vaccine,
vaccine uptake,
vaccine barriers,
theory,
political implications

ABSTRACT

Background: Despite evidence-based guidelines recommending routine vaccination against human papillomavirus (HPV) for adolescent boys, ages 11–12 years, vaccine uptake among this population remains low.

Aims: To examine reasons for low HPV quadrivalent vaccine uptake and methods available to increase vaccine uptake among adolescent males, ages 11–12 years.

Methods and Results: Of 341 identified studies, 30 were included from three databases. The 30 studies were grouped into six categories: population-specific, problem-specific, educational interventions, theory-specific, political implications, and foundational guidelines and Websites.

Discussion: Among eight studies, low vaccine uptake was attributed to lack of parental, adolescent, and physician knowledge of HPV4 vaccine availability and recommendations. HPV4 vaccine educational interventions for parents and adolescents were the most effective for promoting vaccine uptake. Theory applications and gain-framed messages were shown to be effective for assessing HPV vaccine attitudes and perceptions. Political implication studies reveal the need for political and financial measures to encourage HPV vaccine acceptability among the population.

Implications for Clinicians: To promote HPV vaccine uptake among adolescent males, providers must remain current with HPV vaccine recommendations and offer parental and adolescent HPV education focusing on benefits of vaccine acceptance and risks of vaccine refusal.

Linking Evidence to Action: The results of this review inform our understanding of effective educational strategies to positively impact HPV vaccine uptake in adolescent males. Based on this review, clinicians can employ several evidence-based educational strategies to facilitate HPV vaccine uptake.

BACKGROUND

Human Papillomavirus (HPV) is the most common sexually transmitted infection among men and women in the United States, causing a significant amount of preventable diseases and cancers (Centers for Disease Control and Prevention [CDC], 2014). Each year there are approximately 19.7 million new sexually transmitted infections in the United States and HPV accounts for 14.1 million of these new infections (Markowitz et al., 2014). The majority of people infected with HPV are young people ages 15–24 (CDC, 2014).

The priority goal for Healthy People 2020, regarding HPV, is to reduce the proportion of males and females with the HPV infection in the United States (U.S. Department of Health and Human Services [HHS], 2014). National population-based data reveals the overall prevalence of high-risk HPV, types 16 and 18, and low-risk HPV, types 6 and 11, to be around 42.5% among females aged 14–59 years (Stokley et al., 2014). Both low-risk and high-risk types of HPV are preventable with proper vaccination.

The Advisory Committee on Immunization Practices (ACIP) recommends the licensed quadrivalent HPV vaccine

(HPV4) for routine vaccination in males, ages 11–12 years, before they become sexually active, in order to decrease HPV infection and other diseases among the population (Markowitz et al., 2014). The quadrivalent HPV4 vaccine prevents the most prevalent types of low risk and high risk HPV, 6, 11, 16, and 18, which can lead to nononcogenic and oncogenic conditions (CDC, 2014). Genital HPV is the most common clinical presentation of both low- and high-risk HPV and is linked as the cause of: 90% of genital warts, 90% of cervical cancers, 50% of vulvar cancers, 65% of vaginal cancers, 35% of penile cancers, and 95% of anal cancers (CDC, 2014; Markowitz et al., 2014). These conditions can be prevented with recommended HPV vaccination. Approximately 30% of adolescent females, ages 13–17, have received the complete dose schedule of HPV vaccinations; whereas less than 10% of adolescent males, ages 13–17 have received the three doses of vaccination (Markowitz et al., 2014). Despite quadrivalent HPV preventive vaccination availability and recommendation as routine vaccination for males ages 11–12 years, the overall uptake of vaccination and prevention of HPV remains low compared to female vaccination in the same age groups (CDC, 2013).

Factors Associated with HPV Vaccination in Young Males

Kelli M. Fuller¹ · Leslie Hinyard²

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Abstract Human papilloma virus (HPV) affects both men and women; however, recommendations for HPV vaccination among men were not issued in the United States until 2011. The purpose of this study was to describe and compare characteristics of men who did and did not report receiving at least one dose of the HPV vaccine. Data from the ten states that completed the HPV vaccination module in the 2013 Behavioral Risk Factor Surveillance System (BRFSS) were included in the study. Young men ages 18–26 were included (N=1624). Categorical variables were compared between those who did and did not receive the HPV vaccine using Chi square. Logistic regression was used to examine the odds of HPV vaccination by the above factors. Only 16.5% of men reported at least one dose of HPV vaccine. Having health insurance, having a primary doctor, and receiving an HIV test were predictive of HPV vaccination. Men in Texas were more likely to report HPV vaccination than all other states. Overall, HPV vaccination is low in men. Targeted interventions for improving HPV vaccination rates in men are warranted, especially for those without health insurance or a routine source of care.

Keywords HPV vaccines · Males · BRFSS

Background

Human papilloma virus (HPV) is the most common sexually transmitted infection (STI) in the United States (U.S.) [5]. According to Markowitz et al. [19] there are approximately 14 million Americans who receive a diagnosis of HPV infection each year. Half of those diagnoses are in those between the ages of 15–24 years. Infection affects both men and women equally. Currently, there is not routine testing for the HPV for males and, therefore, many men are unaware they are infected with the virus until symptoms of disease occur. The human papilloma virus (HPV) is particularly concerning since it can cause significant sequela, including genital warts (which can reoccur) and cancers of the head, neck and anogenital tract [3]. Every year in the U.S., 15,793 men are diagnosed with HPV related cancers [6]. HPV infection and cancer morbidity not only increase emotional and physical stress for patients, but utilization of healthcare expenditures [21].

There are more than 150 strains of the HPV virus, with over 40 types infecting the genital tract of both men and women [16, 19]. HPV strains are divided into low and high risk types. Low risk types (6 and 11) are primarily responsible for the development of genital warts and high risk types (16 and 18) can cause high grade cervical abnormalities and cancers [19]. As HPV incidence peaks, just after the onset of sexual activity [23], it is recommended to start the HPV vaccine series at an early age before individuals become sexually active, significantly decreasing the incidence genital warts and cancer [7].

Currently, there are three types of HPV vaccines, a Bivalent (HPV2), a quadravalent (HPV4) and Human Papilloma 9-valent (HPV9) available in the U.S. The quadravalent vaccine (Gardasil®) provides protection against four types of HPV; 16 and 18 (which cause 70% of cervical cancers)

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and 6 and 11 which are responsible for >90% of the cases of condyloma (genital warts) [17]. The Bivalent vaccine (Cervarix[®]) only provides protection against the high risk oncogenic (16 and 18) types [17]. The Human Papilloma 9-valent (HPV9) (Gardasil 9[®]) vaccine includes five more subtypes of HPV than the quadravalent vaccine [20].

Routine use of the HPV vaccine in males was not recommended in the U.S. until 2011 when the Advisory Committee on Immunization Practices (ACIP) recommended routine use of the HPV vaccine for males aged 11–12 years [19]. The Gardasil[®] vaccine was approved for use in males between the ages of 9 and 26 years and provides protection against four strains of the HPV virus (6, 11, 16 and 18). In 2015, ACIP recommended an additional HPV vaccine for use in males [9-valent human papilloma virus vaccine (9v)]. Clinical trials suggest that the vaccine lasts at least 8–10 years; and currently none of the vaccine series require a booster dose [10]. In a randomized control trial with the quadrivalent HPV 4 vaccine, Stanley [24] reported robust antibody responses and high efficacy against genital warts and pre-cancers in men [24].

Currently, the HPV vaccines are the only available vaccines approved for use in the U.S. to prevent cancer. The HPV vaccines are administered in a three-dose schedule. The second dose is administered at least 1–2 months after the first dose and the third dose at least 6 months after the first dose.

Fiduciary burden may prohibit individuals from receiving the vaccine since the vaccine alone costs between \$140 and \$190 per injection [8]. This does not include the cost of administration of the vaccine, or in some cases the cost to see a healthcare provider. Whether an individual has access to health insurance may predict uptake due to the significant cost of the vaccine. According to the American Cancer Society [2], if the vaccine is administered according to national guidelines, most commercial insurance plans cover the cost of the vaccine.

In 2013, it was estimated only 35% of males in the U.S. had received at least one dose of the HPV vaccine [11]. This is a concerning finding since the vaccine has been available in the U.S. since 2006, and recommended since 2011. Due to the potential to reduce oncogenic activity in multiple sites throughout the body, it is key that healthcare providers understand the importance of vaccine administration. Since the vaccine has only been approved for males since 2010, ongoing patient and provider education is critical.

There are several documented explanations as to why males have lower HPV immunization rates than females, most common being the patient lack of knowledge of the HPV and its sequela. Ratanasiripong [21] conducted a web based survey of over 400 college aged men found that both men who had and had not received the HPV vaccine had

some knowledge about HPV/HPV vaccine; however, the participants were unaware about the association between anogenital cancer and HPV transmission. Katz et al. [15] conducted a study of college aged males and found that 55.2% of college aged males knew men could get HPV. In this same study, 74.6% of men only thought they needed to get the HPV vaccine if they had high number of sex partners and if they had multiple partner 65.5%.

Another cited reason for lack of males receiving the HPV vaccine is lack of healthcare provider recommendation. Donahue et al. [12, p. 3884] reported that 60.9% of participants reported the most common reason for not vaccinating was “my doctor or healthcare provider has not recommended it.” According the Centers for Disease Control (CDC), over 50% of boys’ parents reported that clinicians did not advise them about the HPV vaccine [25]. Both studies indicate that provider education is a barrier to HPV immunization rates in young adolescent males.

The literature assessing specific characteristic variables of males who received the vaccine is scant. This review found no articles focusing on this. The reportable rates of vaccine uptake in males are significantly lower in males likely due to vaccine availability several years prior for females than males. A 2010 internet survey reported that only 2% of the respondents’ adolescent’s sons had initiated the HPV vaccination series [22]. As of 2012, Gerend et al. [13] reported only 2.3% of men between the ages of 19 and 26 had received at least one dose of the HPV vaccine.

The purpose of this study was to determine the percentage of young males (18–26 years) in the Behavioral Risk Factor Surveillance System (BRFSS) database who self-reported receiving the HPV vaccination and what factors were predictive of immunization (Table 1).

Methods

A cross-sectional analysis was performed using the Behavioral Risk Factor Surveillance System (BRFSS) for the year 2013. Men ages 18–26 were included in the sample. The BRFSS is a telephone survey that was developed in 1984 that collects data in all 50 states involving health related risk behaviors, chronic health conditions, and the use of preventive services [4]. The HPV module was a given in a subset of surveyed states—Alabama, Colorado, Delaware, Georgia, Indiana, Massachusetts, Minnesota, Rhode Island, Texas, and Wyoming—therefore, only data from surveyed states was included in this analysis.

The primary dependent variable was HPV vaccination (at least one of the three injections). Independent variables of interest included ever being tested for HIV, education, race/ethnicity, insurance coverage, having a primary care physician, income, and state of residence. Categorical

The Ethical Case for Mandating HPV Vaccination

Michelle J. Bayefsky

When the Human Papillomavirus (HPV) vaccine was approved by the FDA in 2006, public health officials and state legislators were eager to encourage adoption. Twenty-six states introduced bills proposing to mandate HPV vaccination,¹ but to date, only three have succeeded in requiring the vaccine for school entry. There are many reasons the bills failed, ranging from anger at the manufacturer, Merck, for pressuring state legislators to mandate vaccination, to the reluctance of parents to vaccinate their pre-teen children against a sexually transmitted disease. Bioethics and legal scholars were also predominantly resistant to mandating HPV vaccination,² citing concerns about insufficient evidence regarding the vaccine's safety, cost to the public, and the unfairness of mandating vaccines for girls only. A few scholars were tentatively supportive of vaccination, if certain conditions were met regarding the projected efficacy of the vaccine,³ or the ability of parents to opt-out relatively easily.⁴ Since that time, many of the misgivings expressed immediately after the vaccine's approval are no longer applicable, while others remain pertinent and continue to present an obstacle to mandating vaccination. This essay responds to earlier critiques of mandatory vaccination and offers a set of arguments in support of an HPV vaccine mandate. The first section will describe the risks of HPV and discuss concerns that arose in the aftermath of the vaccine's release that are no longer relevant. The second section will make the moral case for mandating HPV vaccination, based

on the best interests of children, solidarity, and health equity. The final section will address concerns about implementing a vaccine mandate, including the validity of linking vaccination to school entry, the option to opt-out of vaccination, and the importance of maintaining the public's trust. We have a moral imperative to protect children from the leading cause of cervical cancer, and mandating HPV vaccination is the best way to ensure that children of all cultural, religious and socioeconomic backgrounds receive the vaccine before they have been exposed to the virus.

Vaccine Benefits and Initial Concerns with Mandating Vaccination

Cervical cancer afflicts over 250,000 women in the United States and within five years, approximately one third of women with cervical cancer will die.⁵ According to an estimate by the National Cancer Institute, in 2018, there will have been about 13,240 new cases of cervical cancer.⁶ Virtually all cases of cervical cancer are caused by HPV, and HPV is also the primary cause of anal cancer, oropharyngeal cancers and vaginal cancers.⁷ While cancer caused by HPV affects a relatively small proportion of Americans, many more are at risk. Approximately 79 million Americans are currently infected with genital HPV, and 14 million become newly infected each year — mostly teens and young adults.⁸ Furthermore, there is currently no treatment available for HPV. Once it is acquired, screening for pre-cancer is the only approach available for preventing cancer.⁹ While screening with Pap smears has been an effective method of reducing cervical cancer rates since the 1950s,¹⁰ the ideal way to prevent HPV-associated cancer is to prevent HPV from establishing itself in its human host.

Michelle J. Bayefsky, B.A., is a medical student at Harvard Medical School. Previously she was a post-baccalaureate fellow in the Department of Bioethics of the National Institutes of Health, where her work focused on topics related to reproduction, genomics policy, and public health.

In 2006, the world's first HPV vaccine became available. The original iteration of the vaccine protected against two particular strains of HPV (16 and 18) that are responsible for about 66% of cervical cancers. Since that time, two more vaccines have been developed that cover four and nine strains of HPV, and as of the end of 2016, only the nine-valent HPV vaccine is available in the US.¹¹ The CDC estimates that of the 38,793 HPV-associated cancers diagnosed annually, 28,500 are attributable to HPV types that are preventable with the nine-valent HPV vaccine.¹² At present, recommendations from the CDC's Advisory Committee on Immunization Practices (ACIP) are that the HPV vaccine be administered to male and female ado-

lescents at age 11 or 12 years old. Vaccination is also recommended for females through age 26 and males through age 21 who were not adequately vaccinated at a younger age. (The nine-valent vaccine requires two doses separated by 6-12 months.)¹³

Early fears that mandating HPV vaccination would require a female-only population to be vaccinated with an unproven vaccine can thankfully be laid to rest.

lescents at age 11 or 12 years old. Vaccination is also recommended for females through age 26 and males through age 21 who were not adequately vaccinated at a younger age. (The nine-valent vaccine requires two doses separated by 6-12 months.)¹³

When HPV vaccine mandates were first proposed, some argued that the safety and efficacy of the vaccine were not sufficiently established, and the lack of long-term data regarding the vaccine's efficacy were particularly troubling.¹⁴ Over the ten years since the introduction of the vaccine, data on the safety and efficacy of the HPV vaccine have been very reassuring. Nearly 90 million doses have been distributed since 2006, and 92% of side effects were classified as "non-serious," including pain, redness and swelling where the shot is administered, and fainting during administration.¹⁵ Side effects that were considered to be "serious" included headache, nausea, vomiting, and fever and the rare anaphylactic reaction.¹⁶ With regards to efficacy, clinical trials have demonstrated that the rates of seroconversion following vaccination with the nine-valent vaccine are greater than 99%, and prevention of high-grade pre-cancerous changes in cervical cells is 96.7%.¹⁷ Epidemiological data have shown that in the four years after the vaccine was released, HPV infections in teen girls in the US decreased by 56%.¹⁸

The long-term effectiveness of the vaccine continues to be monitored, but current studies that have followed vaccinated individuals for ten years show no evidence of weakened protection over time.¹⁹ While

it is impossible to know for certain that there are no negative long-term effects, the same is true of any new vaccine, and other vaccines have been mandated within the first decade since their introduction. For example, the pneumococcal conjugate vaccine (PCV) became available in 2000 and was mandatory in nearly every state by 2008 or earlier. Over ten years after the HPV vaccine's release, we can be sufficiently confident in the vaccine that prior hesitations regarding safety and efficacy should not stand in the way of mandating vaccination.

Another early objection to mandating the HPV vaccine was that it was initially recommended only for females and not males. While the American Academy of Pediatrics (AAP) was generally supportive of the new vaccine, they opposed a mandate, and the AAP president-elect at the time, Dr. Renee Jenkins, was quoted as saying: "There are people who are concerned about gender discrimination because it's a policy that would keep girls out of school and not boys, because it's a vaccine for girls."²⁰ The vaccine was recommended first for girls because studies in males lagged behind studies in females, and it was not clear whether the cost/benefit ratio was sufficient to warrant vaccination of boys.²¹ After additional studies were completed, and "estimates of disease and cancer resulting from HPV, cost-effectiveness, and programmatic considerations" were analyzed, ACIP extended its recommendation to boys in 2011.²² Since HPV vaccination is now recommended for both boys and girls, the concern that a vaccine mandate would unfairly target girls is no longer applicable.

Early fears that mandating HPV vaccination would require a female-only population to be vaccinated with an unproven vaccine can thankfully be laid to rest. The remaining sections of this paper will address other, deeper critiques of mandatory HPV vaccination that pose ongoing obstacles to mandating the vaccine.

The Moral Case for Mandating HPV Vaccination

Despite the ACIP recommendations, the efforts of public health officials promoting the vaccine, and the support of pediatricians,²³ HPV vaccination rates in the US remain low. In 2015, only 41.9% of females aged 13-17 had completed the dose regimen for the HPV vaccine, with 62.8% having received the first dose. Among males in the same age group, 28.1% had completed the regimen and 49.8% had received the first dose. By contrast, 81.3% of adolescents aged 13-17 have received the MenACWY vaccine for meningitis, 86.4% have received the Tdap vaccine for tetanus, diphtheria

JAMA Oncology | Original Investigation

Prevalence of Genital Human Papillomavirus Infection and Human Papillomavirus Vaccination Rates Among US Adult Men National Health and Nutrition Examination Survey (NHANES) 2013-2014

Jasmine J. Han, MD; Thomas H. Beltran, BS; John W. Song, MD; John Klaric, PhD; Y. Sammy Choi, MD

 Supplemental content

IMPORTANCE Human papillomavirus (HPV) is a common sexually transmitted infection that is a major cause of noncervical anogenital and oropharyngeal cancers. Prophylactic HPV vaccine is available for primary prevention. However, the population prevalence data for male genital HPV infection is not well known, while the HPV vaccination coverage is low in the United States.

OBJECTIVES To estimate the prevalence of genital HPV infection and the HPV vaccination rate in the United States among adult men and to examine potential risk factors for HPV infection.

DESIGN, SETTING, AND PARTICIPANTS The National Health and Nutrition Examination Survey (NHANES) samples a representative cross-section of the US population. Men aged 18 to 59 years were examined in mobile examination centers during the NHANES 2013-2014. DNA was extracted from self-collected penile swab specimens, and HPV genotyping was performed by polymerase chain reaction amplification. Demographic and vaccination information was gathered via self-report during home-based standardized interviews. Binary multivariable logistic regression was used to estimate the odds of HPV infection.

MAIN OUTCOMES AND MEASURES The prevalence of genital HPV infection and the HPV vaccination coverage rate among adult men.

RESULTS During the NHANES 2013-2014, a total of 1868 men aged 18 to 59 years were examined. The overall genital HPV infection prevalence was 45.2% (95% CI, 41.3%-49.3%). The infection prevalence with at least 1 high-risk HPV subtype defined by DNA testing was 25.1% (95% CI, 23.0%-27.3%). In vaccine-eligible men, the prevalence of infection with at least 1 HPV strain targeted by the HPV 4-valent vaccine and HPV 9-valent vaccine was 7.1% (95% CI, 5.1%-9.5%) and 15.4% (95% CI, 11.7%-19.6%), respectively. Among vaccine-eligible men, the HPV vaccination coverage was 10.7% (95% CI, 7.8%-14.6%).

CONCLUSIONS AND RELEVANCE Among men aged 18 to 59 years in the United States, the overall prevalence of genital HPV infection was 45.2% (95% CI, 41.3%-49.3%). The overall genital HPV infection prevalence appears to be widespread among all age groups of men, and the HPV vaccination coverage is low.

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5 HPV subtypes 31, 33, 45, 52, and 58 found in the 9-valent vaccine was 1.3% (95% CI, 0.8%-1.9%), 1.3% (95% CI, 0.7%-2.4%), 2.1% (95% CI, 1.5%-3.0%), 2.7% (95% CI, 2.0%-3.7%), and 1.3% (95% CI, 0.7%-2.4%), respectively.

The HPV prevalence with at least 1 of the 4-valent HPV types among adults aged 18 to 59 years was 8.5% (95% CI, 7.1%-10.0%), representing more than 6.5 million men in the United States. The overall prevalence of infection with at least 1 of the 9-valent HPV subtypes was 15.1% (95% CI, 13.7%-16.6%) (eTable 2 in the Supplement). Among those aged 18 to 32 years who are or would have been eligible for the vaccine, the prevalence of infection with at least one 4-valent HPV type or 9-valent HPV subtype was 7.1% (95% CI, 5.1%-9.5%) and 15.4% (95% CI, 11.7%-19.6%), respectively. The prevalence of 9-valent HPV was similarly elevated among the vaccine-ineligible group at 14.6% (95% CI, 12.5%-16.9%). Bivariate analysis indicated no difference in prevalence based on vaccine age eligibility among 4-valent HPV types ($P = .17$ for comparison) and 9-valent HPV subtypes ($P = .73$ for comparison).

We found that the overall HPV-16 prevalence was 4.3% (95% CI, 3.2%-5.6%), which represents 3.3 million men in the United States. The HPV-18 prevalence was 1.7% (95% CI, 1.1%-2.5%), which reflects 1.3 million men. The infection prevalence solely among those aged 18 to 32 years was 3.3% (95% CI, 2.2%-5.0%) for HPV-16 and 1.3% (95% CI, 0.6%-2.6%) for HPV-18. There was no difference between vaccine-eligible and vaccine-ineligible groups ($P = .27$ for comparison for HPV-16 and $P = .25$ for comparison for HPV-18).

The distribution and prevalence of genital high-risk HPV infection were similar between vaccine-eligible and vaccine-ineligible groups at 29.5% (95% CI, 25.0%-34.3%) and 29.1% (95% CI, 26.4%-33.0%), respectively (eTable 2 in the Supplement). The overall prevalence of HPV infection was lowest among men aged 18 to 22 years at 28.9% (95% CI, 22.2%-36.8%). Most men infected with only low-risk HPV (79.1%; 95% CI, 73.0%-84.2%) showed single-strain infection compared with the high-risk group, who showed single-strain infection at 36.4% (95% CI, 31.1%-42.1%) (Table 1).

Factors Associated With HPV Infection

Demographic characteristics associated with genital HPV infection in univariate analysis included age ($P < .001$), race/ethnicity ($P < .001$), marital status ($P < .001$), educational level ($P < .002$), and age at first sexual intercourse ($P < .001$) (P value for trend). Annual household income ($P = .05$) and smoking status ($P = .05$) were marginally associated with genital HPV infection. Circumcision was also marginally associated with such infection ($P = .03$). The results were similar in the high-risk HPV DNA testing group except for circumcision ($P = .01$) and smoking status ($P = .35$). The genital HPV infection prevalence was highest among non-Hispanic black men (65.0%; 95% CI, 59.7%-70.0%) and lowest among non-Hispanic Asian men (24.4%; 95% CI, 18.4%-31.5%).

In multivariable analyses, men in older age groups were approximately twice as likely to have genital HPV infection compared with those aged 18 to 22 years. This increased risk was apparent in those aged 23 to 32 years only when the analysis was limited to the 14 high-risk HPV subtypes (Table 2). Com-

Table 1. HPV Infections by Classified Risk

| No. of HPV Strains Detected | HPV Infection, % (95% CI) | |
|-----------------------------|---------------------------|------------------|
| | Low Risk | High Risk |
| 1 | 79.1 (73.0-84.2) | 36.4 (31.1-42.1) |
| 2 | 16.3 (11.1-23.2) | 26.3 (22.6-30.3) |
| 3 | 3.0 (1.2-7.4) | 16.9 (13.0-21.7) |
| 4 | 1.6 (0.5-5.1) | 9.7 (6.7-13.9) |
| ≥5 | 0.0 (0.0-0.0) | 10.7 (7.7-14.5) |

Abbreviation: HPV, human papillomavirus.

pared with those with less than a high school education, those with a high school diploma or general equivalency diploma were approximately 40% more likely to have these infections (OR, 1.4; 95% CI, 1.0-2.1) in the high-risk group. Compared with married men, men who reported never having been married, living with a partner, or being widowed, divorced, or separated from a spouse were twice as likely to have genital HPV infections. In the high-risk group, this prevalence increased to 2.8 times (OR, 2.8; 95% CI, 1.7-4.7) if widowed, divorced, or separated from a spouse.

Vaccination

The overall rate of HPV vaccination among men who are or were vaccine eligible was 10.7% (95% CI, 7.8%-14.6%) among an unweighted sample of 729 participants. This sample represents 3 million men aged 18 to 32 years in the noninstitutionalized US population. Among men aged 18 to 22 years, 22.0% (95% CI, 15.5%-30.3%) reported having received an HPV vaccination, and 48.1% (95% CI, 26.0%-71.0%) completed the series, with a mean age at HPV vaccination of 17 years (95% CI, 16.4-17.8 years).

Discussion

In this nationally representative sample of men aged 18 to 59 years, the prevalence of overall genital HPV infection in the United States was 45.2% (95% CI, 41.3%-49.3%), representing 34.8 million men, with the high-risk HPV prevalence at 25.1% (95% CI, 23.0%-27.3%). The lowest prevalence was 28.9% (95% CI, 22.2%-36.8%) among men aged 18 to 22 years, which increased to 46.5% (95% CI, 38.4%-54.7%) in the next age group (23-27 years) and then remained high and constant in older age groups ($P < .001$ for trend). This finding may reflect the current practice of providing HPV vaccination to younger male age groups. This result is in contrast to the female HPV prevalence, which was higher among the age group younger than 20 years and then decreased in later years.²¹

The prevalence of genital HPV infection followed a bimodal pattern, with a peak in prevalence among men aged 28 to 32 years and a second higher peak among men aged 58 to 59 years. This pattern of infection is similar to the prevalence of oral HPV infection from the NHANES 2009-2010 previously reported.¹⁵ The overall HPV prevalence is similar to recent research from Denmark, which reported a 41.8% overall HPV prevalence, with the same high-risk HPV subtype 51 as the most prevalent.²² In female individuals, the

TOPIC: **INCREASING STUDENT AWARENESS OF NURSE RESIDENCY PROGRAMS' EFFECTS ON NEW-GRADUATE CONFIDENCE AND RETENTION RATES**

SUBMITTED BY: **San Diego State University Student Nurses Association
San Diego, CA**

AUTHORS: **Cameron Harris, Jizelle Picones, Karly Lorenzen**

WHEREAS, The growing nursing shortage has become a crisis leading to increased burnout, decreased patient care quality, and higher rates of errors (Haddad, et al., 2020, p.3); and

WHEREAS, The nursing shortage continues to grow as hospitals battle with low retention rates of newly graduated nurses (Van Camp & Chappy, 2017, p.128); and

WHEREAS, Newly graduated nurses are leaving their first positions because they are feeling unprepared for clinical situations and unsupported as they transition to independent patient care (Sundin & Wealot, 2018, p.1); and

WHEREAS, The surplus of newly graduated nurses leaving their positions within the first year of employment costs hospitals significant amounts of money yearly, further pushing the seams of an already tight budget (Miller, 2017, p.2); and

WHEREAS, Hospitals are addressing these issues through the implementation of nurse residency programs for newly graduated nurses (Mullings-Carter, 2018, p.3); and

WHEREAS, With the implementation of nurse residency programs, retention rates are notably higher (Asber, 2019, p.432); and

WHEREAS, Newly graduated nurses who participate in residency programs report feeling more prepared and have increased confidence in their decision making regarding patient care (Mullings-Carter, 2018, p.35); and

WHEREAS, With increased retention rates through nurse residency programs, hospital budgets are not being stretched to the extent they once were (Eckerson, 2018, p.86); therefore be it

RESOLVED, That the NSNA promote and advocate the importance of participating in nurse residency programs on account of their positive effects on new-graduate skills, confidence, and retention rates; and be it further

RESOLVED, That the NSNA invite professional nursing organization representatives experts to speak at sessions at the NSNA Annual Convention and Midyear Conference, webinars, and membership meetings if feasible; and be it further

RESOLVED, That the NSNA publish an article in Imprint on the benefits of nurse residency programs for newly graduated nurses if feasible; and be it further

RESOLVED, That the NSNA send a copy of this resolution to American Nurses Association, National Nurses United, American Association of Colleges of Nursing, American Organization of Nursing Leadership, National League for Nursing, American Academy of Nursing, Sigma

Theta Tau, Alliance of Nurses for Healthy Environments, American Association of Critical Care Nursing, Association of Women's Health, Obstetrics and Neonatal Nurses, American Psychiatric Nurses Association, Society of Pediatric Nurses, and all others deemed appropriate by the NSNA Board of Directors.

TOPIC: **INCREASING STUDENT AWARENESS OF NURSE RESIDENCY PROGRAMS'
EFFECTS ON NEW-GRADUATE CONFIDENCE AND RETENTION RATES**

SUBMITTED BY: **San Diego State University Student Nurses Association
San Diego, CA**

AUTHORS: **Cameron Harris, Jizelle Picones, Karly Lorenzen**

ABSTRACT: The nursing shortage across the US has continued to grow year after year, and is further compounded by low retention rates of new graduate nurses. Within the first year of employment, new graduate nurses are struggling to transition due to not feeling supported nor equipped to independently conduct patient care. Low-retention rates cost hospitals significant amounts yearly, thus they have begun establishing nurse residency programs to combat these issues through multi-modal education and preceptorship.

Estimated Cost of Implementation – 2022 NSNA Resolution

**TOPIC: INCREASING STUDENT AWARENESS OF NURSE RESIDENCY PROGRAMS’
 EFFECTS ON NEW-GRADUATE CONFIDENCE AND RETENTION RATES**

| | |
|--|---------------|
| Guest speakers for NSNA Convention from professional nursing organizations | \$2000 |
| NSNA promoting the benefits of nurse residency programs at events and in Imprint | \$0.00 |
| Send a copy of the resolution to affiliated organizations | \$0.00 |
| <hr/> | |
| Total cost | \$2000 |

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Nursing Shortage

Lisa M. Haddad; Pavan Annamaraju; Tammy J. Toney-Butler.

Author Information

Last Update: December 14, 2020.

Definition/Introduction

Nurses are a critical part of healthcare and make up the largest section of the health profession. According to the World Health Statistics Report, there are approximately 29 million nurses and midwives globally, with 3.9 million of those individuals in the United States. Estimates of upwards of one million additional nurses will be needed by 2020.[1][2]

According to The American Nurses Association (ANA), more registered nurse jobs will be available through 2022 than any other profession in the United States. According to an article in the Nursing Times, The US Bureau of Labor Statistics projects that 11 million additional nurses are needed to avoid a further shortage. Employment opportunities for nurses are projected to grow at a faster rate (15%) than all other occupations from 2016 through 2026.

Issues of Concern

The nursing profession continues to face shortages due to a lack of potential educators, high turnover, and inequitable workforce distribution. The causes related to the nursing shortage are numerous and issues of concern.[3][4][5][6][7][8] Some potential reasons are explored below.

Aging Population

On the whole, the population is aging, with the baby boom generation entering the age of increased need for health services. Currently, the United States has the highest number of Americans over the age of 65 than any other time in history. In 2029, the last of the baby boomer generation will reach retirement age, resulting in a 73% increase in Americans 65 years of age and older, 41 million in 2011 compared to 71 million in 2019.

As the population ages, the need for health services increases. The reality is that older persons do not typically have one morbidity that they are dealing with, but more often have many diagnoses and comorbidities that require them to seek treatment. The population is surviving longer, as a whole, causing an increased use of health services as well. Many disease processes that were once terminal are now survivable for the long-term. Treating these long-term illnesses can strain the workforce.

Aging Work Force

Like the populations they serve, the nursing workforce is also aging. There are currently approximately one million registered nurses older than 50 years, meaning one-third of the workforce could be at retirement age in the next 10 to 15 years. This number includes nurse faculty, and that presents its own unique problem, training more nurses with fewer resources. Nursing faculty are experiencing a shortage, which leads to enrollment limitations, limiting the number of nurses that a nursing school can generate. Decreased and limited faculty can cause fewer students, and the overall quality of the program and classes can decline.

Nurse Burnout

Nursing shortages lead to errors, higher morbidity, and mortality rates. In hospitals with high patient-to-nurse ratios, nurses experience burnout, dissatisfaction, and the patients experienced higher mortality and failure-to-rescue rates than facilities with lower patient-to-nurse ratios. Some states have begun to pass legislation to limit patient-to-nurse ratios. Despite this, when staffing is short, ratios go up to meet the need.

Nursing, Allied Health, and Interprofessional Team Interventions

Technology

The introduction of the Electronic Medical Record (EMR) and other technological advances can also affect nurses staying in the profession. While some specialties such as nursing informatics are booming, that adds to the shortage problem by removing nurses from direct patient care areas. Some seasoned nurses struggle with the technology and remove themselves from the profession at an earlier rate.

Empowerment

Organizations must be creative in meeting the needs of nurses while providing the best and safest care to the patients. An environment that empowers and motivates nurses is necessary to rejuvenate and sustain the nursing workforce. Empowerment in autonomy in staffing ratio decisions considering high volume and acuity levels will lead to less burnout and a strong desire to leave the workforce. Many organizations have endorsed and sought after the Magnet Certification to provide superior nursing processes and a high level of safety, quality, and patient satisfaction.[12]

Review Questions

- [Access free multiple choice questions on this topic.](#)
- [Comment on this article.](#)

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The Effectiveness of Nurse Residency Programs on Retention: A Systematic Review



JENNIFER VAN CAMP, MSN, RN; SHARON CHAPPY, PhD, RN, CNOR

ABSTRACT

New graduates account for the highest numbers of nurses entering and exiting the profession. Turnover is costly, especially in specialty settings. Nurse residency programs are used to retain new graduates and assist with their transition to nursing practice. The purpose of this systematic review of the literature was to examine new graduate nurse residency programs, residents' perceived satisfaction, and retention rates, and to make recommendations for implementation in perioperative settings. Results indicate increased retention rates for new graduates participating in residency programs and that residency participants experienced greater satisfaction with their orientation than those not participating in residency programs. Residency participants also perceived the residency as beneficial. Because residency programs vary in curricula and length, effectively comparing outcomes is difficult. More longitudinal data are needed. Data on residency programs specific to perioperative nursing are lacking. Considering the aging perioperative nursing workforce, residency programs could address critical needs for succession planning. *AORN J* 106 (August 2017) 128-144. © AORN, Inc, 2017. <http://dx.doi.org/10.1016/j.aorn.2017.06.003>

Key words: *new graduate nurses, residency program, internship, perioperative residency, retention.*

Recognizing a preparation-practice gap and the high costs associated with new graduate nurse turnover, many health care organizations across the United States have implemented nurse residency programs (NRPs) to bridge the gap and reduce turnover costs. Additionally, many new graduate nurses actively seek out health care organizations that have NRPs for their first employment to ease the transition from student to novice nurse.¹ In a survey conducted by Pittman et al,¹ 36.9% of members of the American Organization of Nurse Executives who responded to a survey (N = 219 respondents) reported that their organizations implemented an NRP to transition new graduates into practice in the hopes of retaining graduate nurses for longer than one year. However, questions remain about the effectiveness of NRPs in retaining new graduate nurses and easing their transition into practice.

BACKGROUND

Many new graduate nurses struggle with the transition from novice to competent nurse, and an estimated 35% to 60% of nurses leave their first place of employment within one year of hire.¹⁻³ Transitioning to the RN role can leave graduate nurses feeling stressed, and many have difficulty adjusting to the reality shock of caring for multiple patients with highly complex cases. New graduate nurses may doubt their clinical knowledge and lack self-assurance in performing common nursing skills, critical thinking, organizing, prioritizing, and communicating effectively.⁴ Interestingly, nurse executives and organizational leaders hiring new graduate nurses identify the same inadequacies that graduate nurses perceive,⁵ with some executives judging that as few as 10% of new graduate hires are fully prepared to enter the nursing workforce.⁶

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repeat pregnancies, and no referrals to Child Protective Services.

Implications for Nursing Practice

The model of a perinatal educator providing education in a formal setting shows promise in

improving lives for both teenage mothers and their children. Formal research will be conducted to determine the overall impact of the program on mothers' self-esteem, infant birth weight, breastfeeding rates, and empowerment for teen participants.

Provision of Support to Graduate Nurses to Improve Retention

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Keywords

Retention
 Graduate nurse
 Support
 Internship

Professional Issues Poster Presentation

Purpose for the Program

To support new graduate nurses, with the goal of improving retention rates to increase return on investment related to the costs of training and orienting new staff. Since 2010, retention rates for first-year nurses have varied from 25% to 75%; therefore, a change was needed to support new nurse graduates and improve retention rates.

Proposed Change

With the implementation of a multifaceted, evidence-based internship program, the hospital strived to improve graduate nurse (GN) retention and to provide a comprehensive program to support nurses. Program components included a welcoming committee, monthly check-ins, simulation, additional education, mentoring, and chart reviews.

Implementation, Outcomes, and Evaluation

Through collaboration with charge nurses, preceptors, past graduate nurses, and nursing leaders, a new internship program was imple-

mented that spanned nurses' first year. Surveys were sent to the newest groups of GNs after completing their first year as well as to previous GNs who did not participate in this program. Results of the survey indicated that 45% of previous GNs who did not complete the new program did not feel that their internship prepared them for clinical situations, 50% of GNs did not feel they were able to review progress and assess learning needs, and 33% of GNs did not feel supported after the end of their internship. The retention rate for nurses increased to 100% after implementing the updated program, and survey results showed that GNs felt more confident, supported, and prepared for clinical situations.

Implications for Nursing Practice

Evidence shows that more work is needed to prepare nurses for specialty units. Providing GNs with standard education and preceptorships is not enough. It is essential to develop a program that prepares and supports GNs' growth through the first year.

Engagement of the Next Generation of Nurses Through Obstetric Research

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Keywords

Research
 Nursing students
 Baccalaureate

Professional Issues Poster Presentation

Purpose for the Program

The purpose of this program was to engage nursing students in the research process and to foster relationships between nursing students and practicing nurses. To improve patient outcomes, nurses must use research.

However, nurses in the hospital setting may have little experience with research use. In addition, the new generation of nurses may not engage in research after they start working.

Proposed Change

To pair nursing students with an obstetric staff nurse to assist with ongoing research projects. Nursing

students in baccalaureate programs take a class in research, which includes examples of research, evidence-based practice (EBP), and education on how to critique literature, but they may not conduct research.

Implementation, Outcomes, and Evaluation

Four honors baccalaureate nursing students were paired with an obstetric staff nurse and assigned the task of supporting ongoing research projects. They completed Collaborative Institutional Training Initiative training and then conducted a literature search, made recommendations for data points, gathered data, summarized the results and implications, wrote an abstract, and submitted it to a local conference for

Abstract

Losing New Graduate Bedside Nurses: A Practice Improvement Initiative

by

Beverly Miller

MS, Walden University, 2014

BS, University of South Carolina, 2011

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

August 2017

would increase NGNs' retention rates in the health care facility, hence improving quality of care offered. Section 1 presents the background, the problem, the purpose of the project, project objectives, the project-focused question, the significance of the project to the field of nursing, implications for social change, and the project's assumptions and limitations.

Background/Context

Nurse retention in the United States is a major concern to health care institutions and is attributed to the shortage of nursing workforce (El-Jardali, Merhi, Jamal, Dumit, & Mouro, 2009). Jones and Gates (2007) established that if no action is taken to remedy the low nursing retention rates, the nursing shortage will further increase. Other researchers argued that failure to retain a single nurse can cost the institution more than \$60,000 (Jones & Gates, 2007). Additionally, poor retention rates lead to a high patient-to-nurse ratio. As a result, patients are likely to receive poor quality care, which is accompanied by increased health care costs that are channeled at training NGNs. Jones (2008) argued that poor retention is accompanied by various hidden costs used for advertising for new positions and hiring of NGNs. With the forecast of 587,000 new nursing jobs to be created by the end of 2016, the nursing shortage in the United States was expected to increase (Aiken, Cheung, & Olds, 2009). (Aiken et al. (2009) estimated that the nursing shortage may increase to 1 million by 2020.

Palmetto Health Richland Hospital is located in South Carolina, and it is a 649-bed regional community teaching medical center. The center has over 225,000 patients and more than 4,200 medical and dental staff and other employees. In addition, it

THE EFFECT OF NURSE RESIDENCY PROGRAM COMPLETION ON WORK
READINESS OF NEW GRADUATE NURSES TRANSITIONING INTO PROFESSIONAL
PRACTICE

by

Suzanne Mullings-Carter

A dissertation submitted to the Graduate Faculty in Nursing in partial fulfillment of the
requirements for the Degree of Doctor of Philosophy, The City University of New York

2018

needed to perform well in the workplace. Consequently, because work readiness is indicative of potential job performance, it is a key concern for employers (Wolff, Pesut, & Regan, 2010) that presents a number of challenges (Welding, 2011), including an inability to perform basic tasks or connect classroom experiences to actual clinical practice.

Some healthcare organizations have implemented nurse residency programs (NRPs) to facilitate a higher level of readiness for practice (Anderson, G., Hair, C., & Todero, C., 2012).

The NRPs provide structured on-the-job education, training, and mentoring to increase safety, quality, and satisfaction, with the goal of increasing job retention (Welding, 2011). During NRPs, experienced nurses who are trained as preceptors assist new nurses to acquire clinical experience in specialty care units by teaching unit-specific skills, as well as, providing information about the nursing process, protocols, care providers, and a unit's culture. New nurses who work in emergency rooms, critical care, pediatrics, and labor and delivery also receive specialty orientations as NRP participants (Kramer, et al., 2013). Typically, orientations for acute or specialty nurses occur in three stages: general hospital orientation, general nursing orientation, and a 4- to 12-week clinical preceptorship (Rush, et al., 2013). By the end of the orientation period, new nurses are expected to demonstrate competence in basic unit-specific skills.

NRPs complement and supplement traditional orientation programs by providing new nurses with leadership skills, application of evidence-based practices, critical thinking skills, confidence, professional development of competence, and a sense of belonging to improve recruitment and retention. These attributes contribute to the reduction of turnover rates (Edwards, Hawker, Carrier & Rees, 2011). NRPs also are intended to ease the transition from the educational environment to professional practice (Pittman, Herrera, Bass, & Thompson,

for students, and organizational fiscal constraints. This study concluded that the issue surrounding the expectations of graduate RNs practice readiness among educators and the healthcare industry continues to be problematic and an area of concern. Likewise, Oermann et al. (2010) postulates that new graduate nurses are not prepared for the realities of clinical practice and do not possess the competencies required by current healthcare services.

Nursing competence is a standard required by the American Nurses Association and Joint Commission; a new graduate nurse cannot possess work readiness without it. A nurse with competence is ready to implement nursing knowledge, skills, and attitudes in the clinical practice setting. Beyond knowledge, new graduate nurses are increasingly expected to possess competence, colloquially referred to as “know-how” (Silva et al., 2014). In a qualitative research study of 40 NRP participants, Silva et al. found that the NRP expanded participants’ abilities to understand and apply knowledge using deductive/inductive reasoning, thereby developing their professional know-how. Competences such as decision-making, communication, and teamwork were enhanced.

Rhodes et al. (2013) studied experienced nurses’ satisfaction with the competence of newly licensed registered nurses before and after implementation of an NRP. Experienced nurses and preceptors reported an overall increase in satisfaction with new nurses’ proficiency post-NRP. Since experienced nurses work closely with new graduate nurses as they transition into their new roles, they experience benefits when new nurses are better prepared (i.e., have higher levels of work readiness) (El Haddad et al., 2013; Rhodes et al., 2013).

Summary

Although numerous scholars have examined the benefits, attributes, and outcomes of NRPs, much remains to be understood about the work readiness of new graduate nurses.



Retention Outcomes of New Graduate Nurse Residency Programs

An Integrative Review

Samantha R. Asber, MSN, RN, CCRN

OBJECTIVE: The purpose of this integrative literature review is to examine the effects that nurse residency programs (NRPs) have on the retention of new graduates.

BACKGROUND: The Institute of Medicine recommends implementing NRPs and evaluating their effectiveness. Nursing leaders need to understand if an investment in a residency program is beneficial to their organization.

METHODS: A database search was performed for research from 2010 to 2016 reporting outcomes of new graduate NRPs relating to retention.

RESULTS: In the articles reviewed, the 1-year retention was higher than the national average for new graduate nurses ranging from 74% to 100%. Higher rates were associated with national programs such as the University Hospital Consortium/American Association of Colleges of Nursing or Versant compared with organization-based programs.

CONCLUSIONS: NRPs can increase 1-year retention of new graduate nurses. More controlled and comparative studies are needed to evaluate program differences. Nurse leaders need evidence to ascertain which programs are the most effective in supporting retention and return on investment.

The “The Future of Nursing” report, released in 2010 by the Institute of Medicine, detailed 8 recommendations to guide the profession into leading change and

advancing health.¹ One of these initiatives included the recommendation to implement nurse residency programs (NRPs) to help aid the transition into practice for new nurses. This recommendation also calls for healthcare organizations who implement these NRPs to evaluate them for their effectiveness.¹

NRPs are detailed orientation curricula created for individuals who have completed a prelicensure program and are transitioning into professional practice as a newly licensed RN.² A literature review was performed by Letourneau and Fater² describing and analyzing NRPs from 2006 to 2013. Their review concluded that NRPs were beneficial to the new graduate and the hospital, but a variety of suggestions for future research were called for regarding NRPs' influence on patient outcomes, curriculum differences, and retention. Many of the articles reviewed focused solely on program development. Based on the promulgation of programs, it is vital to evaluate outcomes for organizations to continue to support and provide resources. Specifically, a closer look on how these programs influence retention rates needs to be closely evaluated as 1 indicator of success or failure.

According to the 2019 National Healthcare Retention and RN Staffing Report by NSI Nursing Solutions, Inc,³ 1st-year turnover outpaces all other tenure groups and was responsible for a national average of 27.7% of nursing turnover within US hospitals. The average for nurses leaving within their 1st 2 years of employment is 48.2% of all nursing turnover.³ The average turnover cost of a bedside nurse is \$52 100.³ With a reported turnover rate of 17.2% in 2019, the annual loss for a hospital is \$5 700 000.³ In 2019, it was reported that for each point increase in turnover percentage it cost the average hospital an additional \$328 400.³ The trend of new nurses leaving early in their employment requires organizational leaders to explore ways to improve retention for this group.

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The purpose of this integrative literature review is to examine and synthesize the research regarding NRPs and ask: What effect do NRPs have on turnover and retention outcomes?

Methods

In designing a strategy for this research, Whittemore and Knafl's⁴ integrative review methodology was used. Once the research question was formulated, a search of the databases Cumulative Index to Nursing and Allied Health Literature and Ovid was performed in January 2017 to find research related to the impact of NRPs on turnover and retention. Years searched included articles from 2010 to 2016. The search terms and Boolean operators used were "nurs* residenc*" AND "ret* OR turnover OR outcome*." Other limiters

applied include English language, research article, and peer review.

Inclusion criteria included all peer-reviewed research studies from 2010 to 2016 that reported outcomes of new graduate RN (NGRN) residency programs related specifically to turnover and retention. Exclusion criteria involved any nonnovice RN residency programs, such as nurse practitioner or LPN programs. Specific literature reviews and systematic reviews were also excluded. A total of 16 articles met the criteria and were included in this review (Figure 1).

Methods used for data extraction include the creation of a matrix (Supplemental Digital Content 1; <http://links.lww.com/JONA/A715>). Hawker and colleagues'⁵ quality appraisal tool was used to help evaluate articles and minimize bias. The tool enables the

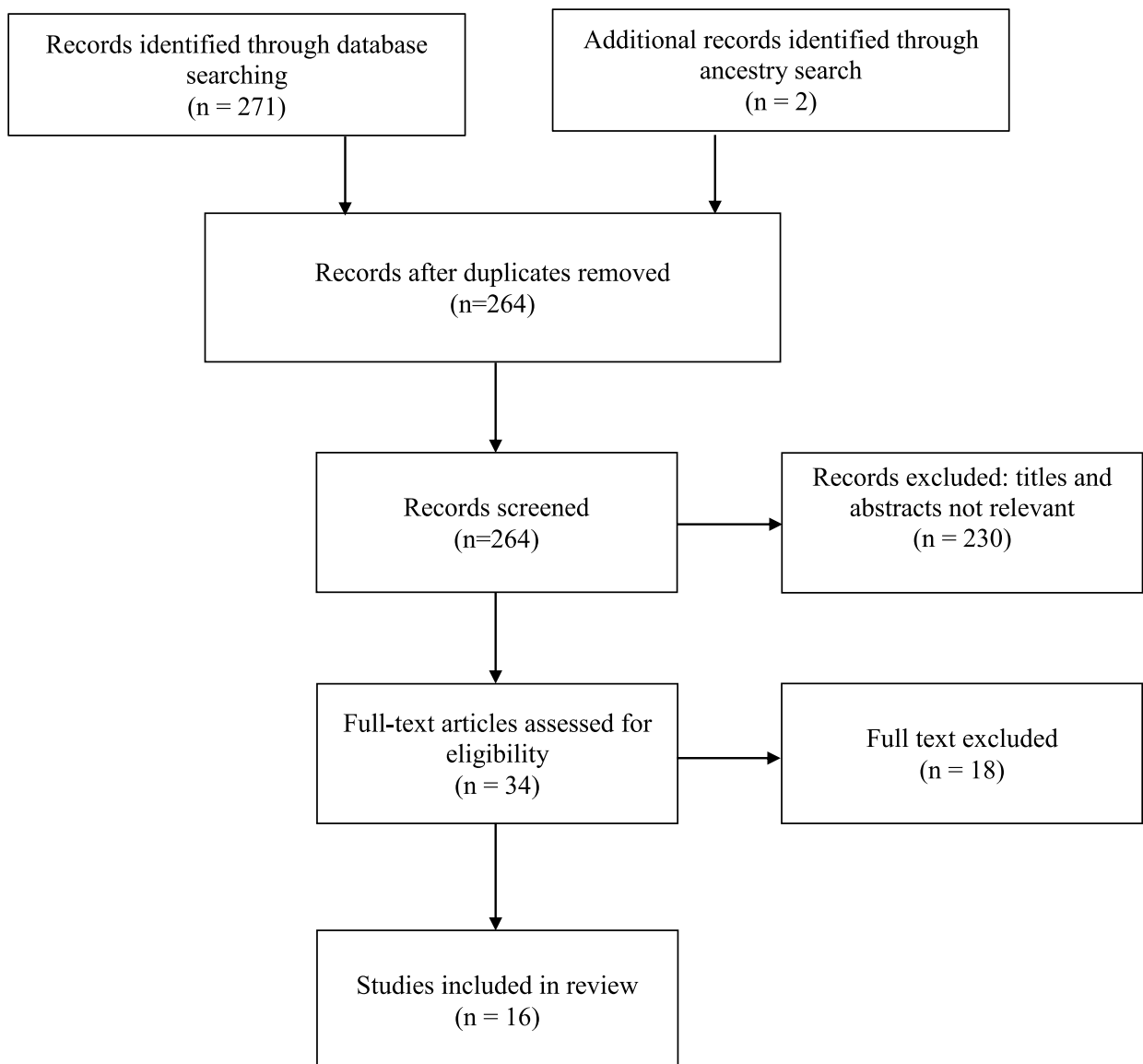


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-analyses flow diagram.

author to read each article and give a score from 9 to 36 to evaluate quality based on 9 categories. It was determined that any article with a score less than 26 would be discarded for a rating indicating that certain sections were ranked as "poor." No articles were eliminated.

Results

Retention Rates

In all 16 articles, retention rates were calculated for NGRNs after 1 year of hire who participated in an NRP. In each of these articles, the 1-year retention was higher than the national average for NGRNs ranging from 74% to 100%. Three studies compared their retention data prior to implementing an NRP with postresidency data, which showed an increase in retention after the program initiation.⁶⁻⁸

Maxwell⁶ followed new graduate nurse turnover data from 1 acute care hospital in Georgia from 2001 to 2009 in an ongoing effort to improve 1-year retention rates. Prior to having an NRP, retention rates were as low as 50%. After creating a 10-week, organization-based NRP in 2006, the hospital saw no change in retention rates. In 2007, they expanded the internal model for their NRP to 1 year, and retention rose to 60%. The hospital hired a full-time clinical nurse specialist to oversee the program in 2008, and rates climbed to 86%. In 2009, the hospital joined the University Hospital Consortium (UHC)/American Association of Colleges of Nursing (AACN) NRP and achieved a retention rate of 100%.

Olson-Sitki et al⁷ reported new graduate nurse retention rates of 86.5% at a Magnet[®]-designated medical center 2 years prior to implementing an NRP. After implementing their 1-year, organization-based NRP, rates rose to 91%. Trepanier et al⁸ conducted a study incorporating 15 hospitals within a multisite healthcare corporation who participated in identically structured NRPs. The mean retention rate across the hospitals was 63.2% prior to the NRP, which increased to 93.6% postresidency for the 15 hospitals.

In 2 of the studies, retention rates of NGRN were compared using an intervention group who completed a formal NRP⁹ and a control group who did not.¹⁰ Although Harrison and Ledbetter's⁹ data showed the highest retention rates belonging to NGRNs who completed an NRP in 1 hospital compared with nurses from 2 other hospitals who did not complete NRPs, it was not a statistically significant difference. Phillips and Hall¹⁰ collected data from a control group consisting of NGNs who participated in 1 hospital's traditional orientation program from 2007 to 2011 and compared it with an intervention group that comprised NGRNs. The average retention rate 5 years prior to

the NRP was 72%, and at 1-year postresidency implementation, it increased to 74%.

A majority of the research reviewed included retention data only up to the 1-year mark. Four of the 16 articles had information regarding retention data past 1 year from the date of hire. Friday et al¹¹ reported 2-year retention data of 91% of all new graduates who participated in an NRP. Fiedler et al¹² reported that they maintained an 86.3% cumulative retention rate of all NRP participants up from 1.5 to 3 years posthire. Researchers of longer-range studies included cumulative data of nurses who participated in NRPs ranging from 1 to 7 years posthire having retention rates of 60.2% to 65.5%.^{13,14}

Length of Program

The NRPs in the articles reviewed varied in length ranging from 12 weeks to 1 year. In 12 of the articles, the NRPs were 1 year in length. Two studies had NRPs 18 weeks in length. One of the studies had an NRP that started out as a 16-week program, but increased to 22 weeks halfway through data collection. One article included data on different programs ranging from 12 weeks to 1 year.

The retention rates from the NRPs 1 year in length ranged from 74% to 100%. Phillips and Hall¹⁰ measured retention rates of 74%. Kowalski and Cross¹⁵ reported retention of 78% at 1 year, and Bratt and Felzer¹⁶ reported 81%. The remaining 9 studies that reported retention outcomes for NRPs of 1 year had rates greater than 90%.^{6,7,9,11-13,17-19}

The researchers of the 2 studies that investigated 18-week NRPs reported retention rates of 92.9% to 93.6%.^{8,14} One study that increased the length of their NRP from 16 weeks to 22 weeks found retention rates averaged 90.8% over the 9 cohorts studied.²⁰ This single-center study had contracted a company to implement an NRP for the 1st 3 years of data collection and then continued on with their own organization-based program for the final 2 years of the study after receiving feedback and making changes. The mean retention during the 1st 3 years during the 18 week program was 84.6%, and rose to 98.8% for the 22-week program during the last 2 years.

Chappell et al²¹ designed a study involving NGRNs participating in an NRP in 23 different acute care hospitals. The objective was to determine predictors of clinical leadership skills among NGRNs and NRP characteristics. One of the NRP characteristics focused on was length of the program. They divided this category into 4 sections including NRPs less than 12 weeks, 12 to 16 weeks, 16 to 24 weeks, and more than 24 weeks. The 1-year retention rates reported were 76.8% for 12 weeks or less, 85.7% for 12 to 16 weeks, 86.7% for 16 to 24 weeks, and 98.6% for more than

24 weeks. Chappell et al²¹ found that NGRNs in programs that were more than 24 weeks were 21 times more likely to remain employed in an organization than graduates in programs that were 12 weeks or less. They also found that there was a significantly higher perception of overall quality of the program by the nurse residents the longer the NRP was.

Structure of Program

Three types of NRP programs were studied within the articles used for this integrative review. Six studies reported on UHC/AACN NRPs, 6 studies reported on organization-based NRPs, and 2 studied Versant NRPs. One study included data that were initially collected while utilizing the Versant program and then midway through data collection switched to an organization-based model.²⁰ Chappell et al²¹ researched 23 hospitals that had varying program structures that incorporated all 3 models of structures found in this integrative review, but did not report out retention data separately by program type.

The authors of studies in this review reported 90.6% to 100% retention rates for the UHC/AACN programs,^{6,7,11-13,18} 74% to 98% for the organization-based NRPs,^{7,9,10,15,16,19} and 92.9% to 93.6% for the Versant NRPs.^{8,14} Hillman and Foster²⁰ had a mean retention during the 1st 3 years with the Versant program of 84.6%, and in the last 2 years with the organization-based program, it was 98.8%.

Additional Findings Involving Predictors of Commitment

In addition to retention data, authors of 9 of the studies researched predictors of organizational commitment. Professional satisfaction scores, level of job stress, being in a hospital setting, and perceived support were found to be predictors of retention.^{9,16,18} In addition, Goode et al¹⁷ found that overall Casey-Fink Graduate Nurse Experience Survey scores, as well as the organization-prioritization and communication-leadership subscales, were statistically significant predictors of organizational commitment.

The authors of these 9 studies reviewed data of NGN at different time points throughout the programs to capture additional information. All of the NRPs were yearlong programs, and all of them included data at 6 and 12 months. Most of the studies had baseline data, and some included more time points in between and after the program had ended. Bratt and Felzer,¹⁶ Maxwell,⁶ and Lynn¹⁸ found that job stress scores of NGRNs decreased at every time point from baseline to 12 months. Kowalski and Cross¹⁵ measured NGRNs at 8 time points within 1 year in their single-center study of NRP outcomes and reported that

it took 12 months to establish a statistically significant decline in perceived threat.

Researchers using the Casey-Fink Graduate Nurse Experience Survey reported that organizing-prioritizing and communication-leadership subscales had a statistically significant increase at 6 months and then again at 12 months.^{6,10,17,18} Olson-Sitki et al⁷ found an increase in scores from 6 months to 12 months for comfort and confidence measures. Phillips and Hall¹⁰ measured that there was an increase from 6 months to 12 months in new graduates' opportunity to practice skills, feelings of excitement, and being challenged by their career. Additionally, a control and intervention group had their Casey-Fink survey scores compared at different time points over the course of a year. The control group that comprised NGRNs who did not participate in an NRP had their Casey-Fink scores declined overall from the 6-month to 12-month time point. The intervention group made up of NGRNs who had participated in an NRP had their scores increased overall from 6 to 12 months.

Researchers of 2 studies reported findings that professional satisfaction scores decreased from baseline to 6 months to 12 months.^{6,7} Lynn¹⁸ and Medas et al¹⁹ found that professional satisfaction scores decreased from the baseline to 6-month marker, but reported no further decline. However, Medas et al¹⁹ reported that the score increased from 6 months to 12 months and continued to rise back to baseline by 18 months.

Discussion

Retention Rates

The findings of this study support that NRPs have a positive effect on retention of newly licensed nurses. Thirteen of the 16 articles reviewed presented 1-year retention rates of 90% to 100%, indicating less than 10% turnover of new graduates after implementation of NRPs.^{6-9,11-14,17-21} Authors of the remaining 3 studies included retention rates ranging from 74% to 81%, which were not much improved from the 70% to 82.5% new graduate nurse retention rates that have been reported nationally. All 3 of these studies were similar in that they reported data from single centers that had organization-based NRPs with 1-year durations.^{10,15,16} The studies with the 2 lowest retention rates did, however, have some promising data in support of the effectiveness of NRPs. Phillips and Hall¹⁰ reported 74% retention, but indicated that it was an improvement from their prior rates. Kowalski and Cross¹⁵ reported 78% retention, but indicated that the 2nd cohort that had not yet finished the program had a retention rate of 96% at the time of publication. Also, both sets of data only reflected the 1st

year of the implemented organization-based NRP and discussed shortcomings of the programs and how they plan to improve upon them going forward.

Structure of Program

The fact that the 3 lowest retention rates were all from organization-based programs does indicate a trend that the structure of programs may have an impact on retention outcomes. UHC/AACN and Versant are formally defined and established NRPs and were associated with retention rates ranging from 91% to 100% in this review.^{6,8,11-14,17,18} This could be because these programs are not in their infancy and have had a large number of NGRNs across the country experience their programs and have had the opportunity to alter the curriculum based on input from participants. It could also be related to individual components to each program, including factors such as trained preceptors, mentor programs, residency development days, or simulation. This is supported by Hillman and Foster's²⁰ data of an NRP changing from a Versant to their own organization-based format and still seeing retention rates climb. More studies need to be done comparing the retention outcomes of NRPs based on the specific structural components to establish which contribute to the success of programs. This can provide guidance for institutions who wish to create their own organization-based NRP by providing them with research and evidence for a particular framework.

Length of Program

This review found little association with retention outcomes and length of NRPs, other than the 1 study by Chappell et al.²¹ Their research of 23 US hospitals found that the longer the NRP was, the better the retention rate was. Their article classified the different programs only by length and did not delve into structural differences between the varying programs across the hospitals. They reported a mix of UHC/AACN, Versant, and organization-based programs, but did not provide analysis of the differences between them in their discussion.

Additional Findings

Despite length of the NRP not being a sole determinant in higher retention rates in this review, it did have an effect on scores related to predictors of retention and organizational commitment, which is a body of evidence that could lend support to establishing longer NRPs. Although professional satisfaction scores were found to decline in the 1st 6 months of the NRP, they stabilized and had no further decline after the 6-month marker. This finding could relate to the research performed by Duchscher²² expanding upon the theory of transition shock. NGRNs report experiencing transition shock, which stems from an underestimated

adjustment from their educational preparation to the reality of the professional nurse workplace expectations. The initial dip in professional satisfaction scores may relate to this challenging adjustment period, as the scores were found to stabilize 6 months posthire, and even improve after 18 months.¹⁹

Although the professional satisfaction scores dipped, graduates of NRPs had lower job stress scores from every time period assessed up through 1 year.^{6,16,18} This review found various elements of the Casey-Fink Graduate Nurse Surveys to have statistically significant increases from 6 months to 1 year. Phillips and Hall¹⁰ was the 1 study in this review that had comparative data and found nurses in NRPs had higher overall Casey-Fink scores at the end of 1 year. Increases in prioritization, communication, and leadership after 6 months for nurses in yearlong NRPs could make an argument for longer programs to be developed. More comparative studies need to be done to examine if improvements are due to participation in an NRP or are an incidental measurement coinciding with gaining experience as a nurse over time.

Limitations

Healthcare institutions that have NRPs need to continue evaluating their outcomes and publishing retention data. The majority of the data from this review was collected from 2005 to 2012. The recession in the United States (unstable economy) was experienced in 2008 at the median point in these data and should be considered. It is unknown what amount of influence this recession may have had on NGRNs' decisions to remain in their current positions. Evaluating and reporting outcomes from programs in place since the economic recovery will strengthen the literature on the retention outcomes of NRPs. Also, retention data need to be collected beyond 1 year out. The studies in this review found 2-year retention NGN data ranging from 78.8% to 91%,¹¹⁻¹⁴ which is a significant improvement from the national average of 51.8%.³ More research is needed to support long-term benefits of NRPs.

Other limitations to be considered in this literature review are that all of data were collected from hospital settings, so it is not generalizable to all practice settings. Many of the studies in this review reported on single-center outcomes, which may present bias and not be as generalizable as multisite studies.

Conclusion

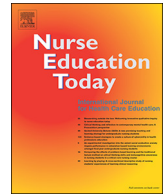
The implications of this integrative literature review are relevant to nursing leaders. Nursing administrators of hospitals should be encouraged to support development of NRPs within their institutions as they increase retention rates and organizational commitment

and decrease costs of turnover. However, they need to be aware that all NRPs are not equal and should consider the structure of the program. The data in this review support that organizationally created programs tend to not have the same initial increase in retention rates that national programs such as UHC/AACN and Versant do. If a quality NRP is implemented within an organization, it has the potential to decrease job stress

while building confidence and increasing prioritization, communication, and leadership skills. Even without considering the potential effects NRPs could have on patient care, the improvements to retention rates should strongly encourage nursing leaders to put their confidence in implementing the right NRP for their organization. It has the potential to attract and retain NGRN and save costs from a reduction in turnover.

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Review

The impact of nurse residency programs in the United States on improving retention and satisfaction of new nurse hires: An evidence-based literature review[☆]

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ABSTRACT

Entry into practice for newly graduated nurses can be a demanding and overwhelming experience. These stressful work conditions have contributed to decreased retention and satisfaction amongst new nurse hires. The aim of this literature review is to answer the following question: in newly hired BSN graduates, how would the use of a one-year nurse residency program compared to a traditional orientation affect turnover rates and reported satisfaction of the new nurse hires over a one-year period? Peer-reviewed research and systematic reviews between the years of 2012–2017 found on the Medline, Nursing & Allied health, and CINAHL were used. Inclusion criteria were peer-reviewed literature that addressed the impact of one-year NRPs on nurse retention or nurse satisfaction. Exclusion criteria were articles that addressed NRPs without discussing retention or satisfaction. The JHEBP Appraisal Tools were used to extract and appraise evidence. Use of NRPs showed increased satisfaction and retention of new nurse graduates over a one-year period, leading to the conceptualization that this is a more effective method than traditional orientations for new nurse hires.

1. The Impact of Nurse Residency Programs on Satisfaction and Retention of New Nurse Hires

Transitioning from the student nurse role to the practicing nurse role has been identified as a stressful and challenging time for new nurses as they try to adjust to caring for multiple patients with chronic, complex health conditions (Van Camp and Chappy, 2017). The challenging evolution can last as long as 12 months and has been shown to be a contributing factor for a high turn-over rate amongst new nurses during their first year of hire (Olsen-Sitki et al., 2012). Research studying the impact of hospital work environments on retention of new nurse hires found that new nurses experience less anxiety and stress in environments that foster a safe learning environment and effective communication and support (Cochran, 2017).

This is a relevant issue to nursing education because, as educators, it is vital to assess the needs of new graduates and develop effective transitional programs that will empower new nurses to practice with confidence in a safe and proficient manner, which may lead to increased satisfaction and retention during their first year of hire.

In 2010, the Institute of Medicine (IOM) offered recommendations on how to improve the nursing profession to better care for the

increasingly complex patient population. One of the recommendations was to implement nurse residency programs (Al-Dossary et al., 2013; Lin et al., 2014). This recommendation was identified in response to evidence reporting retention issues and decreased satisfaction of new nurse graduates due to stressful work environments, increased patient acuity, and lack of confidence in skill and critical judgment (Al-Dossary et al., 2013). Further studies also found that as many as 90% of hospital nurse leaders felt that new graduate nurses are ill-equipped to safely and proficiently practice as a registered nurse (Al-Dossary et al., 2013). Transitioning from the student role to the fully practicing nurse role can be stressful and overwhelming, leading to 35–60% of nurses leaving their first place of employment within one year (Van Camp and Chappy, 2017). These high turnover rates can have detrimental financial implications, costing approximately \$88,000 per nurse due to lost revenue spent on training and having to replace the nurse (Van Camp and Chappy, 2017).

A consistent finding amongst current evidence-based literature has found that nurse residency programs should be at least 10–15 months in order to successfully prepare the new nurse for independent practice (Cochran, 2017). The aim of these programs is to provide continued support to new nurses during their first year of hire in order to foster

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essential skills such as: critical thinking, prioritization, delegation, communication, leadership, and conflict resolution (Kramer et al., 2012). Common elements found in these programs consist of mentorship with a preceptor over the course of the program, and combination of didactic education, simulation, case studies, peer reflection and debriefing, and evidence-based practice projects (Cochran, 2017; Goode et al., 2013; Kramer et al., 2012).

In an effort to evaluate the impact of NRPs on new nurse hires the following question utilizing the PSCOT format (population, education, strategy, comparison, outcome, and time) was developed: In newly hired BSN graduates, how would the use of a one-year nurse residency program compared to a traditional orientation affect turnover rates and reported satisfaction of the new nurse hires over a one-year period? The aim of this review is to answer this question by analyzing current literature to determine the effects of NRPs compared to traditional orientations on retention and satisfaction of new nurses during their first year of hire.

2. Method

2.1. Search Protocol

2.1.1. Search Engines and Databases Used

Electronic search engines used to perform the search were: Medline, Nursing & Allied Health Database, and CINAHL. All databases used yielded a wealth of results and information to review regarding the topic of NRPs.

2.1.2. Search Terms

A wide variety of terms were used to search for literature for this review. The keywords used during the search were: (a) nurse residency program, (b) BSN residency program, (c) baccalaureate nurse, (d) new nurse, (e) traditional orientation, (f) transition, (g) retention, (h) turnover, and (i) satisfaction.

2.1.3. Boolean Phrases

Keywords were imputed into the advance search tabs with use of the Boolean phrase “and” or “or” to connect each keyword and narrow the results. Boolean phrases included in the literature search included: (a) nurse residency program AND satisfaction OR retention, (b) BSN residency program AND retention, (c) BSN residency program AND satisfaction and (d) new nurse AND nurse residency program.

2.1.4. Age of Literature

Articles produced within the past five years (2012–2017) were considered for the review to ensure that the most recent evidence is being used. A search for historical, relevant data was also considered for inclusion.

2.1.5. Inclusion Criteria

Articles produced from the search were assessed for inclusion. Inclusion criteria were: published in English, peer-reviewed, addressed nurse retention rates, addressed nurse satisfaction, preceptor-based with nurse residency program participation, one-year long nurse residency program.

2.1.6. Exclusion Criteria

Elements that lead to exclusion from this review were: languages other than English, non-peer reviewed articles, programs that focused on preceptor-only orientations, addressed NRP without discussion of satisfaction or staff turnover rates, articles that discussed factors of NRPs that affected job satisfaction, nurse practitioner residency programs, and research conducted in hospitals outside the United States.

2.1.7. Articles Selected for Inclusion

There were 299 articles located with 18 articles that were selected

to be appraised for use in the literature review. Of the 18 articles, 12 met the inclusion criteria to be included in the review. The John Hopkins Evidence Based (JHEBP) Appraisal Tools were utilized in performing a critical appraisal of the abstracts and articles to help identify the articles to be used.

2.2. Evidence Matrix

The 12 articles that met the inclusion criteria were analyzed for strength and quality of using the John Hopkins Evidence-Based Practice (JHEBP) Appraisal Tool. In order to organize the findings, information pertaining to the: setting, findings, observable measures, limitations, and quality rating were then recorded utilizing the JHEBP Individual Evidence Summary Tool. Please refer to the Appendix for this information.

2.3. Evidence Synthesis

Based upon the literature review it was discovered that the use of the NRP has had a generally positive impact on satisfaction and retention of new nurse hires. The evidence included a wide diversity of evidence levels and quality. Common themes present amongst the findings will be further discussed in this section.

2.3.1. Synthesis of the Population

All 12 articles included in this study evaluated nursing graduates with less than one year of experience (Cline et al., 2017; Edwards et al., 2015; Fiedler et al., 2014; Goode et al., 2013; Lin et al., 2014; Medas et al., 2015; Olsen-Sitki et al., 2012; Rosenfeld et al., 2015; Salmond et al., 2017; Smith et al., 2016; Trepanier et al., 2012; Van Camp and Chappy, 2017). It was discovered that there were limited articles that described the impact of the NRP on just baccalaureate prepared (BSN) nurses. Out of the 12 articles, three evaluated only BSN nurses (Goode et al., 2013; Fiedler et al., 2014; Rosenfeld et al., 2015). The other nine articles evaluated both BSN and associated-prepared nurses (ASN); (Cline et al., 2017; Edwards et al., 2015; Lin et al., 2014; Medas et al., 2015; Olsen-Sitki et al., 2012; Salmond et al., 2017; Smith et al., 2016; Trepanier et al., 2012; Van Camp and Chappy, 2017).

2.3.2. Synthesis of the Strategy

All articles included in this review dealt with NRPs. Six of the articles focused on NRPs initiated throughout a facility, or corporation (Fiedler et al., 2014; Goode et al., 2013; Medas et al., 2015; Olsen-Sitki et al., 2012; Rosenfeld et al., 2015; Trepanier et al., 2012). Three of the articles focused on specific specialties: one focused on pediatric NRPs, one on oncology NRPs, and one investigated NRPs in long-term care facilities (Cline et al., 2017; Salmond et al., 2017; Smith et al., 2016).

2.3.3. Synthesis of the Comparison

Most of the articles compared the results of their studies regarding retention and satisfaction to national statistics (Cline et al., 2017; Fiedler et al., 2014; Goode et al., 2013; Medas et al., 2015; Rosenfeld et al., 2015; Salmond et al., 2017; Smith et al., 2016). One article compared the study results to retention rates at the hospital prior to the initiation of the NRP (Trepanier et al., 2012). There were no articles found that met the inclusion criteria that studied nurse turnover and satisfaction for those included in a NRP compared to a control group that participated in a traditional orientation.

2.3.4. Synthesis of the Outcome and Time

Based upon the literature review it was discovered that the use of the NRP has had a generally positive impact on satisfaction and retention of new nurse hires. Satisfaction rates of the programs implemented in these studies were analyzed using various measurements. Four studies used the Casey-Fink Survey (Cline et al., 2017; Goode et al., 2013; Olsen-Sitki et al., 2012; Salmond et al., 2017). The

McCloskey/Mueller Satisfaction Scale (MMSS) was another measurement tool used in three studies (Fiedler et al., 2014; Goode et al., 2013; Medas et al., 2015). The Gerber's Control Over Nursing Practice Tool, The Nurse Job Satisfaction Scale, and The Cummings and Estabrooks' quality rating tool were used in two studies (Goode et al., 2013; Lin et al., 2014).

2.3.5. Nurse Retention

Nurse retention rates have shown a dramatic increase with the use of NRPs with most studies showing a retention rate of over 90% after the first year of hire (Goode et al., 2013; Medas et al., 2015; Trepanier et al., 2012). Two studies showed a lower retention rate (Rosenfeld et al., 2015; Salmond et al., 2017). One study had a retention rate of 85% one year post hire during the first year of the program being implemented; however, the study showed that the retention rates increased with subsequent NRPs, with a peak retention rate of 97.2% for the NRP implemented in 2010 (Rosenfeld et al., 2015). The other study of a long-term care NRP had a retention rate of 86% after the first year; however, the authors still considered this to be a considerable improvement compared to the state-wide average of 64% retention rate for new nurse hires in long-term care facilities (Salmond et al., 2017). Yet, Rosenfeld et al. (2015) found that 78.4% of participants in the NRP were still working at the same facility three years after his or her date of hire.

Financial savings were also noted in some studies as a direct correlation to increased nurse retention. Trepanier et al. (2012) reported a net gain of \$15,228,000 across the 15 hospitals studied due to increased nurse retention rates. Another study found that the increased retention saved a facility \$13,057,200 over a three-year period (Fiedler et al., 2014).

2.3.6. Nurse Satisfaction

Nine of the articles explored new nurse satisfaction as a result of the NRP (Cline et al., 2017; Edwards et al., 2015; Fiedler et al., 2014; Goode et al., 2013; Lin et al., 2014; Medas et al., 2015; Olsen-Sitki et al., 2012; Salmond et al., 2017; Van Camp and Chappy, 2017).

Two studies reported a high level of perceived job satisfaction at the start of the NRP that remained steady at six and 12 months (Fiedler et al., 2014; Olsen-Sitki et al., 2012). Perceived contributors to high level of satisfaction were peer support and positive interactions with staff and patients (Fiedler et al., 2014; Medas et al., 2015).

One study showed a gradual decrease in overall satisfaction demonstrated in a decrease in overall satisfaction from the start of the NRP (Salmond et al., 2017). The other studies showed a decline from perceived satisfaction at six months, however, the level of satisfaction was found to be back up to baseline at 12 months (Cline et al., 2017; Edwards et al., 2015; Goode et al., 2013; Lin et al., 2014; Medas et al., 2015; Van Camp and Chappy, 2017). Contributing factors identified to the decrease in satisfaction were: stress related to the work environment, staffing, and difficulty acquiring a day shift position (Lin et al., 2014; Medas et al., 2015). The rebound in satisfaction noted could be related to an increase in confidence and management of workload by the end of the NRP (Lin et al., 2014).

3. Limitations

There were three common themes amongst the twelve articles related to limitations and risk of bias: (a) economic hardships, (b) poor response rate, (c) and voluntary participation. Economic hardship related to the economic decline in the United States in 2008 was noted as a potential limitation in two studies. The researchers felt that the poor economic conditions could have influenced increased nurse retention (Olsen-Sitki et al., 2012; Trepanier et al., 2012).

Low response rates were reported as a limitation in five of the articles. (Fiedler et al., 2014; Goode et al., 2013; Medas et al., 2015; Olsen-Sitki et al., 2012; Smith et al., 2015). One article had a response

rate of less than 25% which negatively impacted the quality of the study (Medas et al., 2015).

A risk for selection bias was identified as a limiting factor in two studies (Fiedler et al., 2014; Lin et al., 2014). The authors reported that since participants were aware that they were participating in a survey and that participation was voluntary, there was an identified risk for participants reporting "superficially increased changes in satisfaction" (Lin et al., 2014, p. 448).

Another limitation to this study was the lack of evidence studying just BSN nurse hires, as the majority of the studies included both ASN and BSN graduates. Only three out of the twelve studies included just BSN nurse graduates in their program (Goode et al., 2013; Fiedler et al., 2014; Rosenfeld et al., 2015). This could be considered a confounding variable as one's level of education may impact how he or she handles stressful work environments and increased patient acuity. Additionally, confidence in skill and critical judgment may be different amongst ASN and BSN graduates. Based upon differences in level of education, ASN graduates and BSN graduates may require different elements to be included in the NRP in order to successfully complete the program (Cochran, 2017).

Furthermore, there were no studies found during the literature review that compared traditional orientation programs to NRPs during the same time period. This may decrease the reliability of the findings as retention and satisfaction during different time periods may vary due to factors such as job availability and economic conditions.

4. Discussion

4.1. Review of Evidence

Review of evidence analyzed in this review yielded two important findings. Based upon the literature reviewed there is a strong correlation between the use of a NRP and increased nurse retention of new nurses in their first year of hire (Cline et al., 2017; Edwards et al., 2015; Fiedler et al., 2014; Goode et al., 2013; Medas et al., 2015; Van Camp and Chappy, 2017). The improved retention rates were also shown to have positive financial implications, saving some facilities up to \$15,228,000 (Trepanier et al., 2012). This is vital information that is beneficial for nurse educators in the hospital setting as well as nurse graduates looking for their first job. Through the use of the NRP, it can be assumed based upon the literature, that more new nurses will remain in their role within the first year of hire, which will also have positive financial outcomes for the facility compared to facilities offering only traditional orientation programs (Trepanier et al., 2012). Furthermore, newly graduated nurses may be more prone to apply to a hospital offering a NRP due to the positive outcomes of NRPs present in current literature.

There is moderate evidence to support an increase in satisfaction with the use of a nurse residency program. Although literature showed a decrease in satisfaction in new nurse hires after six months of employment, satisfaction rates stabilized and were still considered to be high based upon the McCloskey Mueller Satisfaction Scale (Goode et al., 2013; Fiedler et al., 2014; Lin et al., 2014).

4.2. Implication for Practice

These findings reinforce the need for medical institutions to develop NRPs in place of traditional orientations for new nurse hires. The correlation between NRPs and improved satisfaction and retention amongst new nurses is promising in terms of encouraging new nurses to remain in their role and continue to develop and grow professionally. This will have a positive implication for the facility in terms of financial savings and increased experience and satisfaction amongst staff members.

5. Conclusion

NRPs have been identified as a successful method, in comparison to traditional orientation, in easing new nurses into the role as a professional nurse (Van Camp and Chappy, 2017). Increased retention and satisfaction of new nurse hires have been proven outcomes of NRPs,

positively impacting nurse turnover rates and finances in healthcare institutions. Further research is needed in the following areas in order to strengthen research supporting the implementation of NRPs: comparing traditional orientations with NRPs during the same time period, studying the effect of NRPs on just BSN graduates, and implementing methods to increase participation in the studies being conducted.

Appendix A. Evidence Matrix Table

| Article name | Author and date | Evidence type | Sample size, setting | Findings that help answer the EBP question | Observable measures | Limitations | Evidence level, quality |
|--|---|---|--|--|---|--|-------------------------|
| Longitudinal outcomes of an institutionally developed nurse residency program | Cline, D., La Frentz, K., & Fellman, B. (2017) | Longitudinal Retrospective analysis Purpose: To present a 10-year retrospective review of outcomes from an internally developed nurse residency program | Sample: 1118 nurse residents who completed the NRP between the summer of 2005 until November of 2014 Setting: A Comprehensive cancer center. Students were assigned to the hematologic, surgical, medical oncology, intensive care, and emergency center units. | - Greater than 90% retention rate after one year - Moderate decline in satisfaction over the course of the residency program. | The Casey-Fink Graduate Nurse Experience Survey was used to measure data obtained | - Data collected over 10-year period had some variability in questions asked - Residency program curriculum changed over time to stay in line with the NCSBN guidelines, making it difficult to draw conclusions about how aspects of curriculum impacted survey scores Responses were originally completed on paper for the first few years of study and then had to be manually inputted into electronic data collection spreadsheet | III A |
| A systematic review of the effectiveness of strategies and interventions to improve the transition from student to newly qualified nurse | Edwards, D., Hawker, C., Carrier, J., & Rees, C. (2015) | Systematic Review Purpose: To determine the effectiveness of the strategies used to support newly qualified nurses during the transition into the clinical workplace | N/A | - Studies showed a higher 12-month job satisfaction with use of NRP and retention rates were between 73 and 94% at one year | Evaluation of the impact of support strategies and programs on individual and organizational outcomes | - The search was restricted to the English language | II A |
| Long-term outcomes of a post baccalaureate nurse residency program | Fiedler, R., Read, E. S., & Lane, K. A. (2014). | Descriptive case study Purpose: To determine what influence a nurse residency program (NRP) | Sample: 170 graduates who were still employed at the medical center Setting: NPR employed at | - Only 5.6% of residents left during their first year of hire Satisfaction remained high with the highest | The survey was released by SurveyMonkey analyzed using McClockey/Mueller Satisfaction Scale | - Small sample size -Response rate of 30.2% - Participation was voluntary which increases risk of selection | III A |

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| | | has on long-term outcomes including turnover rates, career satisfaction, and leadership development | medical center between July 2008 and August 2010 | rating for interaction with the coworkers | | bias - Trying to locate nurse residents once they graduated from the yearlong program | |
| Lessons learned from 10 years of research on a post-baccalaureate nurse residency program | Goode, C. J., Lynn, M. R., & McElroy, D. (2013). | Longitudinal survey Purpose: To examine the outcomes from 10 years of research on a post-baccalaureate new graduate nurse residency program | 10-years of data of 31,000 graduate nurses across 100 hospitals in the United States who participated in the AACN Nurse Residency Program | - High job satisfaction initially, with a significant decrease at 6 months which then stabilized at 12 months. - Pre-NRP retention 70.5%. - 1-year Post-NRP retention 94% | Data was measured by the Casey-Fink Graduate Nurse Experience Survey, the MMSS, Gerber's Control Over Nursing Practice Scale, and the Graduate Nurse Residency Program Evaluation | - Resident participation rate slowly declined over the length of the 10-year study to 48% by the end of the 10 years. | III B |
| Factors influencing job satisfaction of new graduate nurses participating in nurse residency programs: A systematic review | Lin, P. S., Viscardi, M. K., & McHugh, M. D. (2014). | Systematic Review Purpose: To explore the relationship between nurse residency program and new graduate nurse's job satisfaction | N/A | Studies saw a decline in satisfaction at 6 months with an increase in satisfaction by the completion of the nurse residency program | The Cummings and Estabrooks' quality rating tool was used to appraise the articles | Participants were made aware that they were participating in the survey | II B |
| Outcomes of a comprehensive nurse residency program | Medas, J. C., Amato, S., Grimm, D., Radziewicz, R., Rhodes, C., VanHorn, C., & McNett, M. (2015). | Prospective Cohort Study Purpose: to study the effects of a one year long comprehensive nurse residency (CNRP) program over an 18-month period | Sample: 79 participants of the CNRP in 2010 Setting: Public Hospital in Northeast Ohio with Magnet recognition | - Satisfaction amongst the participants was the highest at hire, then decreased at 6 months with a gradual increase by 18 months with the mean satisfaction being a 3.789 (5 being the highest possible response using MMSS.) - Retention rates have been between 90 and 94% | The McClockey-Mueller Satisfaction Scale (MMSS) was used to measure satisfaction amongst the participants | - Response rate decreased from 37% at the beginning of the study to 35% at 6 months, 15% at 12 months and 11% at 18 months post hire. - Was a single-site study which may have impacted the generalizability of the results | II B |
| Evaluating the impact of a nurse residency program for newly graduated registered nurses | Olson-Sitki, K., Wendler, M. C., & Forbes, G. (2012). | Descriptive Case Study with repeated measures, time series mixed-methods design Purpose: To evaluate a year-long nurse residency program using a non- | Sample: 50 new nurse graduates (Both BSN and ADN) who were hired in the summers of 2006 and 2007 into their first nursing position after graduation in facility's nurse residency program | - Nurse turnover rate for those in the NRP a year post hire was 7% compared to 15% before the implementation of the program. Participants reported a high level of satisfaction with | The Casey-Fink tool was used to analyze results | There was a 38% attrition rate of those who started in the study and completed it. - The one-year post hire mark signified a time of economic decline in the United States. It is unknown if this | III A |

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| | | experimental, repeated measures design with qualitative questions. | Setting: A 207-bed Magnet-designated regional medical center | the program at 6 and 12 months post hire. | | had an influence on the low turn-over rate | |
| Evaluating the short and long-term outcomes of a post-BSN residency program | Rosenfeld, P., Glassman, K., & Capobianco, E. (2015). | Retrospective case study Purpose: To evaluate the short and long-term outcomes of the nurse residency program (NRP) at NYO Langone Medical Center from the perspective of former residents | Sample: 671 former nurse residency program participants from 2005 to 2012 Setting: New York University Langone Medical Center | - 90.6% of NR was still employed one year after their hire date. - 65.6% of these residents were still employed in 2013 | A survey, developed by Qualtrics survey in Utah was sent electronically to the residency participants who were located by the Human Resources department at NYU Langone Medical Center | - Study was conducted in one institution with a consistently large number of nurse residents - Super Storm Sandy in 2012 closed the facility for 3 months, making it difficult to assess the impact of these developments on responses to this evaluation study | III A |
| Long-term care nurse residency program: Evaluation of new nurse experiences and lessons learned | Salmon, S. W., Cadmus, E., Black, K. K., Bohnarczyk, N., & Hassler, L (2017). | Mixed-Methods study Purpose: To identify if implementing a new nurse residency program increase retention and job satisfaction in long-term care environments | Sample: 37 nurse residents of mixed bachelor and associates degree background Setting: 36 LTC facilities in NJ | - Retention rates after one year were 86% - Total Satisfaction decreased 9% from pre to post test. However, personal satisfaction, satisfaction workload, and satisfaction with training increased 9%, 6%, and 5% respectively. | Surveys were administered and analyzed by the John J. Heldrich Center for Workforce Development. The Casey-Fink tool were used to analyze data | Nonparticipants workload on new nurse education days, the perception that the program was not always valued by the nurse residents' managers or colleagues, and inconsistent preceptor support | III A |
| Exploring the structure and content of hospital-based pediatric nurse residency programs | Smith, J. B., Robinson, D., Echtenkamp, D., Brostoff, M., McCarthy, A. (2015) | Longitudinal Quantitative Survey Purpose: To present the results of the survey regarding benefits and challenges of the pediatric nurse residency program | Sample Size: 83 nurse educators responsible for NRP or traditional orientation programs Setting: 81 hospitals across the United States who have a certified pediatric unit | - Turnover after one year ranged from 0 to 16%. | - Survey was developed by the Pediatric Nursing (IPN) Board of Directors and dispersed to the participants through Survey Monkey | - Poor response to survey of 25.6% | IV A |
| New graduate nurse residency program: A cost-benefit analysis based on turnover and contract labor usage | Trapanier, S., Early, S., Ulrich, B., & Cherry, B. (2012) | Stepwise regression analysis Purpose: To conduct a cost-benefit analysis of nursing residency program utilizing turnover rate and contract labor usage | □ N/A Sample: 524 nurses – 87% female, 13% male, with 52% between the ages of 23 and 30 years of age. Setting: 15 hospitals in California, Florida, Georgia, | - Nurse Graduate 1-year turnover rate went from 36.8% pre-residency to 6.41% post-residency. - Decreased turnover rates lead to a \$15,228,000 | Data was analyzed using the health care system Accounting and Human Resources databases and residency company database | -Study utilized a secondary analysis of a health care corporation's community-hospital database and may not be applicable to other health care settings | III A |

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| | | Nebraska, Missouri, Tennessee, and Texas | | profit across the 15 hospitals studied. | | - The time the study was conducted (2008 to 2010) was during an economic decline which could've contributed to increased turnover rates | |
| | | □ N/A | | | | | |
| The effectiveness of nurse residency programs on retention: A systematic review | Van Camp, J. & Chappy, S. (2017) | Systematic Review Purpose: examine new graduate NRPs, perceived satisfaction, and retention rates | □ N/A | - Studies showed a high level of job satisfaction - Studies showed between a 78.3–100% retention rates after the first year hired. | - Manual review of 48 articles for inclusion. | - Many organizations did not clearly define measurement of retention at one year - More quasi-experimental studies are needed to compare retention rates amongst graduate students compared to non-NRP. | II B |

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TOPIC: **TO INCREASE AWARENESS OF THE IMPORTANCE OF ANNUAL TCD STROKE SCREENING IN CHILDREN WITH SCD**

SUBMITTED BY: **California State University, San Marcos
San Marcos, CA**

AUTHORS: **Andrea Dunning**

WHEREAS, Strokes are the most common cause of lasting complications in children with Sickle Cell Disease (SCD) (DeBaun et al., 2020, p. 1554); and

WHEREAS, One third of children show evidence of ischemic strokes before age 18 (Guilliams et al., 2017, p. 49); and

WHEREAS, Transcranial Doppler (TCD) can be used to assess stroke risk, and regular TCD screening and treatment with blood infusion has been shown to decrease stroke prevalence by over 90% (DeBaun et al., 2020, p. 1554-1555; Kanter et al., 2021, p. 1); and

WHEREAS, Annual TCD stroke screening for children ages 2 to 16 was recommended in 2002 by the American Academy of Pediatrics, in 2014 in an expert panel report, and again in 2020 by The American Society of Hematology (Kanter et al., 2021, p. 1; DeBaun et al., 2020, p. 1556); and

WHEREAS, A recent study of 5,116 U.S. children with SCD reported that only 49.9% received an annual TCD stroke screening and 18.0% did not have any screenings during the course of the study (Kanter et al., 2021, p. 4); and

WHEREAS, "Clinician and patient knowledge deficit ... impede[s] the ability to provide evidence-based care for patients with Sickle Cell Disease" (Brennan-Cook et al., 2018, p. 1); and

WHEREAS, In interviews with caregivers and providers, education on the importance of stroke screening was regarded as an important step to facilitate regular TCD stroke screenings (Phillips et al., 2021, p. 6); therefore be it

RESOLVED, that the California Nursing Students' Association (CNSA) help to increase awareness among nursing students of the importance of annual TCD stroke screening in children with SCD ; and be it further

RESOLVED, that the CNSA collaborate with other healthcare professionals whenever possible to increase awareness among SCD patients and their families about the importance of annual TCD stroke screening; and be it further

RESOLVED, that the CNSA publish articles and highlights in CNSA online publications on the importance of annual TCD stroke screening for children with SCD; and be it further

RESOLVED, that the CNSA provide education on the importance of annual TCD stroke screening through panels or breakout sessions at CNSA Membership North Meeting, CNSA Membership South Meeting, or the Annual Convention, if feasible; and be it further

RESOLVED, that the NSNA send a copy of this resolution to the National Student Nurses Association, American Nurses Association, American Academy of Nursing, Society of Pediatric Nurses, California Association of Colleges of Nursing, American Association of Colleges of Nursing, National League for Nursing, the Organization for Associate Degree Nursing, and all others deemed appropriate by the NSNA Board of Directors.

TOPIC: TO INCREASE AWARENESS OF IMPORTANCE OF ANNUAL TCD STROKE
SCREENING IN CHILDREN WITH SCD

SUBMITTED BY: California State University, San Marcos
San Marcos, CA

AUTHORS: Andrea Dunning

ABSTRACT: It is the intent that this resolution will help increase awareness of the importance of annual transcranial Doppler (TCD) stroke screening in children with Sickle Cell Disease (SCD). By raising awareness that annual screening can help assess stroke risk and guide preventative treatment, the goal is to promote education of patients and families on the importance of annual TCD stroke screening in preventing cerebral damage due to strokes and silent cerebral infarcts.

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American Society of Hematology 2020 guidelines for sickle cell disease: prevention, diagnosis, and treatment of cerebrovascular disease in children and adults

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Background: Central nervous system (CNS) complications are among the most common, devastating sequelae of sickle cell disease (SCD) occurring throughout the lifespan.

Objective: These evidence-based guidelines of the American Society of Hematology are intended to support the SCD community in decisions about prevention, diagnosis, and treatment of the most common neurological morbidities in SCD.

Methods: The Mayo Evidence-Based Practice Research Program supported the guideline development process, including updating or performing systematic evidence reviews. The panel used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach, including GRADE evidence-to-decision frameworks, to assess evidence and make recommendations.

Results: The panel placed a higher value on maintaining cognitive function than on being alive with significantly less than baseline cognitive function. The panel developed 19 recommendations with evidence-based strategies to prevent, diagnose, and treat CNS complications of SCD in low-middle- and high-income settings.

Conclusions: Three of 19 recommendations immediately impact clinical care. These recommendations include: use of transcranial Doppler ultrasound screening and hydroxyurea for primary stroke prevention in children with hemoglobin SS (HbSS) and hemoglobin S β^0 (HbS β^0) thalassemia living in low-middle-income settings; surveillance for developmental delay, cognitive impairments, and neurodevelopmental disorders in children; and use of magnetic resonance imaging of the brain without sedation to detect silent cerebral infarcts at least once in early-school-age children and once in adults with HbSS or HbS β^0 thalassemia. Individuals with SCD, their family members, and clinicians should become aware of and implement these recommendations to reduce the burden of CNS complications in children and adults with SCD.

Summary of recommendations

Background

Stroke, silent cerebral infarcts (silent strokes), and cognitive morbidity are the most common permanent sequelae of sickle cell disease (SCD) in children and adults. Prior to 1990 in the United States, a large prospective cohort study demonstrated that by 40 years of age, ~20% and ~10% of adults with phenotype hemoglobin SS (HbSS) or hemoglobin SC (HbSC) had a cerebrovascular accident, respectively (Figure 1).¹ Over the last decades, screening with transcranial Doppler ultrasound (TCD)

and treatment with regular blood transfusion in children with abnormal TCD velocities may result in a 10-fold decrease in the prevalence of strokes in children with HbSS and hemoglobin S β^0 (HbS β^0) thalassemia living in high-income settings.²

The most common cause of permanent neurological injury in children and adults with HbSS and HbS β^0 thalassemia is a silent cerebral infarct, occurring in ~39% of children by 18 years³ of age and >50% of adults by 30 years of age (Figure 2).⁴ Silent cerebral infarcts require magnetic resonance imaging (MRI) to detect and a formal neurological examination to exclude the presence of an overt stroke.⁵ Both stroke and silent cerebral infarcts are associated with significant cognitive impairments⁶ that may significantly alter educational attainment, employment status, and quality of life.

One of the panel's chief objectives was to establish guidelines applicable to the >95% of children born with HbSS and HbS β^0 thalassemia in low-middle-income countries. Conservatively, <5% of all children born in the world with HbSS or HbS β^0 thalassemia live in the United States and Europe.⁷ This estimate is based on the consensus that there are ~300 000 children annually born with HbSS or HbS β^0 thalassemia in the world,⁷ coupled with the evidence that there are a total of 1971, 334, and 353 infants born with SCD per year in the United States, United Kingdom, and France, respectively.⁸⁻¹⁰ Children and adults with HbSS living in low-middle-income settings without resources to implement evidence-based strategies for primary and secondary stroke prevention have high lifetime stroke risk,¹¹ a risk similar to that documented in the 1990s among children with HbSS in high-income settings prior to the implementation of TCD screening and regular blood transfusion therapy.¹

The panel recognized that most of the recommendations would be difficult to implement in low-middle-income settings where the majority of children and adults with SCD live; however, when applicable, the panel provided recommendations for these regions based on the best available evidence. Major barriers to transferring knowledge about neurological injury prevention from high-income to low-middle-income settings include the low number of TCD machines and MRI scanners to detect central nervous system (CNS) pathology; the lack of sufficiently trained health care providers to perform TCD; the low number of physicians with expertise in hematology, neurology, and neuroradiology; and access to therapy for primary and secondary stroke prevention.

Given the high prevalence of neurological morbidity in children and adults with SCD, a critical component of the recommendations includes involving individuals with SCD and their families in medical decision-making. Families must be informed of (1) the presence of neurological morbidity as diagnosed through imaging, cognitive testing, or both; (2) the increased risk for future neurological morbidity; and (3) plausible disease-modifying therapies that may attenuate or abate risks of further neurological injury without data from phase 3 randomized controlled trials. The panel developed 19 recommendations with evidence-based strategies to prevent, screen, and treat CNS complications of SCD in low-middle- and high-income settings.

These guidelines are based on original and updated systematic reviews of evidence conducted under the direction of the Mayo Evidence-Based Practice Research Program. The panel followed best practices for guideline development recommended by the Institute of Medicine and the Guidelines International Network (GIN).¹²⁻¹⁵ The panel used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach¹⁶⁻²¹ to assess the certainty in the evidence and formulate recommendations.

Interpretation of strong and conditional recommendations

The strength of a recommendation is expressed as either strong ("the guideline panel *recommends*...") or conditional ("the guideline panel *suggests*...") and has the following interpretation:

Strong recommendation

- For patients: Most individuals in this situation would want the recommended course of action, and only a small proportion would not.
- For clinicians: Most individuals should follow the recommended course of action. Formal decision aids are not likely to be needed to help individual patients make decisions consistent with their values and preferences.
- For policy makers: The recommendation can be adopted as policy in most situations. Adherence to this recommendation according to the guideline could be used as a quality criterion or performance indicator.
- For researchers: The recommendation is supported by credible research or other convincing judgments that make additional research unlikely to alter the recommendation. On occasion, a strong recommendation is based on low or very low certainty in the evidence. In such instances, further research may provide important information that alters the recommendations.

Conditional recommendation

- For patients: The majority of individuals in this situation would want the suggested course of action, but many would not. Decision aids may be useful in helping patients to make decisions consistent with their individual risks, values, and preferences.
- For clinicians: Different choices will be appropriate for individual patients, and clinicians must help each patient arrive at a management decision consistent with the patient's values and preferences. Decision aids may be useful in helping individuals make decisions consistent with their individual risks, values, and preferences.
- For policy makers: Policy-making will require substantial debate and involvement of various stakeholders. Performance measures about the suggested course of action should focus on whether an appropriate decision-making process is duly documented.
- For researchers: This recommendation is likely to be strengthened (for future updates or adaptation) by additional research. An evaluation of the conditions and criteria (and the related judgments, research evidence, and additional considerations) that determined the conditional (rather than strong) recommendation will help identify possible research gaps.

Interpretation of good practice statements

As described by the GRADE Guidance Group, good practice statements endorse interventions or practices that the guideline panel agreed have unequivocal net benefit yet may not be widely recognized or used.²² Good practice statements in these guidelines are not based on a systematic review of available evidence. Nevertheless, they may be interpreted as strong recommendations.

Recommendations

Primary stroke prevention for children with SCD living in low-middle- and high-income settings

Recommendation 1.1. For children with HbSS or HbS β^0 thalassemia (ages 2-16 years), the American Society of Hematology (ASH) guideline panel *recommends* annual TCD screening (strong recommendation based on moderate certainty in the evidence about effects $\oplus\oplus\oplus\oplus$).

Recommendation 1.2. For children who have compound heterozygous SCD other than HbSC and have evidence of hemolysis in the same range as those with HbSS, the ASH guideline panel *suggests* TCD screening (conditional recommendation based on very low certainty in the evidence about effects $\oplus\circ\circ\circ$).

Recommendation 2.1. For children with HbSS or HbS β^0 thalassemia (ages 2-16 years) who have abnormal TCD velocities and live in a high-income setting (where regular blood transfusion therapy, typically every 3-4 weeks, is feasible to maintain the maximum HbS level <30% and maintain the hemoglobin level >9.0 g/dL), the ASH guideline panel *recommends* regular blood transfusion for at least a year (vs no transfusion) with the goal of keeping maximum HbS levels below 30% and maintaining hemoglobin levels >9.0 g/dL to reduce the risk of stroke (strong recommendation based on moderate certainty in the evidence about effects $\oplus\oplus\oplus\circ$).

Recommendation 2.2. For children who have compound heterozygous SCD other than HbSC, who have evidence of hemolysis in the same range as those with HbSS, an abnormal TCD velocity, and live in a high-income setting (where regular blood transfusion therapy is feasible), the ASH guideline panel *suggests* regular blood transfusion for at least a year (vs no transfusion) with the goal of keeping maximum HbS levels below 30% to reduce the risk of stroke (conditional recommendation based on very low certainty in the evidence about effects $\oplus\circ\circ\circ$).

Recommendation 2.3. For children with SCD (ages 2-16 years) and abnormal TCD results who have been receiving transfusion therapy for at least 1 year and are interested in stopping transfusion, according to the clinical trial risk stratification with an MRI and magnetic resonance angiography (MRA) of the brain (see Technical remarks in supplemental File 5), the ASH guideline panel *suggests* that hydroxyurea treatment at the maximum tolerated dose can be considered to substitute for regular blood transfusions (conditional recommendation based on low certainty in the evidence about effects $\oplus\oplus\circ\circ$).

Recommendation 3. For children (ages 2-16 years) with HbSS, HbS β^0 thalassemia, or compound heterozygous SCD who have abnormal TCD screening and live in low-middle-income settings (where regular blood transfusion therapy and chelation therapy are not available or affordable), the ASH guideline panel *suggests* hydroxyurea therapy with at least 20 mg/kg per day at a fixed dose or the maximum tolerated dose (conditional recommendation based on low certainty in the evidence about effects $\oplus\oplus\circ\circ$).

Acute and timely treatment of suspected or confirmed ischemic stroke or TIA

Recommendation 4.1. For children or adults with SCD and acute neurological deficits, including transient ischemic attack (TIA), the ASH guideline panel *recommends* prompt blood

transfusion. The transfusion should be given immediately upon recognition of symptoms without delay beyond 2 hours of acute neurological symptom presentation. The type of transfusion (simple, modified exchange, or apheresis) is dependent on individual patient factors and local transfusion resources (strong recommendation based on high certainty in the evidence about effects $\oplus\oplus\oplus\oplus$).

Recommendation 4.2. For children or adults with SCD and acute neurological deficits including TIA, the ASH guideline panel *suggests* exchange transfusion vs simple transfusion. When exchange transfusion is not available within 2 hours of presentation for medical care and hemoglobin is ≤ 8.5 g/dL, simple transfusion can be performed to avoid delays in treatment while a manual exchange transfusion or an automated apheresis is planned (conditional recommendation based on low certainty in the evidence about effects $\oplus\oplus\circ\circ$).

Secondary prevention of ischemic strokes in children and adults with HbSS or HbS β^0 thalassemia

Recommendation 5. For children with HbSS or HbS β^0 thalassemia and a history of prior ischemic stroke, the ASH guideline panel *recommends* blood transfusion goals for secondary stroke prevention of increasing the hemoglobin above 9 g/dL at all times and maintaining the HbS level at <30% of total hemoglobin until the time of the next transfusion (strong recommendation based on low certainty in the evidence about effects $\oplus\oplus\circ\circ$).

Recommendation 6. For adults and children with SCD, moyamoya syndrome, and a history of stroke or TIA, the ASH guideline panel *suggests* evaluation for revascularization surgery in addition to regular blood transfusion (conditional recommendation based on very low certainty in the evidence about effects $\oplus\oplus\circ\circ$).

Acute management of ischemic strokes and the use of tPA for adults with SCD presenting with stroke symptoms

Recommendation 7. For adults with SCD presenting with symptoms of acute ischemic stroke who are being evaluated for IV tissue plasminogen activator (tPA; age ≥ 18 years, no hemorrhage on computed tomography [CT] scan, within 4.5 hours of onset of symptoms/signs and without contraindications for thrombolysis), the ASH guideline panel *suggests* management using a shared decision-making approach that follows these principles:

1. For all patients, the administration of tPA should not delay prompt simple or exchange blood transfusion therapy.
2. Patients may be considered for IV tPA based on its established inclusion and exclusion criteria detailed in stroke management algorithms.
3. The following factors suggest likely benefit from IV tPA: older age, atrial fibrillation, diabetes, hypertension, and hyperlipidemia. Management of younger patients without these risk factors should emphasize early transfusion.
4. There are no validated risk stratification or reliable age cutoff criteria to guide the choice of initial therapy. IV tPA is not recommended for children with SCD (<18 years of age).
5. IV tPA is not recommended for children with SCD (<18 years of age).

(Conditional recommendation based on very low certainty in the evidence about effects $\oplus\circ\circ\circ$).

not discussed in the 2014 NHLBI Expert Panel Report on the Evidence-Based Management of Sickle Cell Disease. The SIT Trial²⁵ was published after the 2014 panel review and was not referenced in the 2014 NHLBI Expert Panel Report.¹⁶² The recent AHA/ASA statement on pediatric stroke management⁸⁶ provides guidance for initial management of suspected or confirmed acute ischemic strokes in children with SCD, as well as primary and secondary stroke prevention with regular blood transfusion. Their recommendations are similar to the ASH CNS panel recommendation.

For children and adults with SCD presenting with a focal neurological deficit, the panel recommends increasing the hemoglobin level with a red blood cell transfusion to achieve the goal of improving oxygen delivery to the brain. Given the challenge of distinguishing between MRI diffusion-weighted negative ischemic strokes and TIAs,¹⁶³ the clinical decision to manage an individual with SCD and a suspected ischemic infarct should not be based solely on the results of the MRI, but rather should be a bedside decision where the risks and benefits of transfusion must be considered. In most cases, the benefit of transfusing a child or adult with SCD and with acute focal neurologic deficits will outweigh the risks.

The panel did not include the role of HSCT for primary and secondary stroke prevention, an emerging treatment strategy in high-income settings. The panel's absence of any recommendation for HSCT for primary stroke prevention or secondary prevention of infarct recurrence does not reflect an absence of data or priority for the panel, but rather a decision to defer this subject matter to the ASH HSCT Guideline Panel.

The panel members determined that there was sufficient evidence to support guidelines for initial screening and subsequent surveillance for developmental delays and cognitive impairment for the general population, where the prevalence of impairments is significantly lower than in children and adults with SCD, to be applied to individuals with SCD. The panel's strong recommendation for screening for developmental delay and cognitive impairment in children with SCD was based on 3 factors. First, the American Academy of Pediatrics recommends that all children be screened for both developmental delay and cognitive impairment¹²²; second, children with SCD have a high prevalence of these impairments; and third, there is high impact for securing educational resources for children with significant impairments via individualized education plans. Similarly, the ASH guideline panel's conditional recommendation for screening for cognitive impairment in adults with SCD was based on at least 2 dominant factors. The first was the recommendation by the American Academy of Neurology for screening for mild cognitive impairment in adults¹²³; the second was the high prevalence of these impairments in adults with SCD.⁶ Research in implementation science is required to define the optimal reach (proportion of individuals that receive screening and ongoing surveillance) for detecting developmental delay and cognitive impairment in SCD. The ASH Guideline Panel endorsed the evidence-based recommendations by the American Congress of Rehabilitation Medicine for cognitive rehabilitation.¹²¹

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Revision or adaptation of the guidelines

Plans for updating these guidelines

After publication of these guidelines, ASH will maintain them through surveillance for new evidence, ongoing review by experts, and regular revisions.

Updating or adapting recommendations locally

Adaptation of these guidelines will be necessary in many circumstances. These adaptations should be based on the associated EtD frameworks.¹⁶⁴

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Authorship

Contribution: M.R.D. wrote the first draft of the manuscript; as an iterative process, L.C.J. and M.H.M. revised the manuscript based on the suggestions of the other authors; guideline panel members (A.A.K., J.S., E.V., C.K.F., R.C.M., P.T., M.A.K., L.D., and F.J.K.) critically reviewed the final version of the manuscript and provided suggestions for improvement; L.D. led the team of investigators from the Mayo Clinic Evidence-based Practice Center who conducted the evidence synthesis; all authors approved the content; M.R.D. was chair of the panel, with CNS content knowledge expertise; M.H.M. jointly chaired the panel, with content knowledge of guidelines and systematic review expertise; and M.R.D. and M.H.M. led multiple panel meetings.

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Original Article

Large-Vessel Vasculopathy in Children With Sickle Cell Disease: A Magnetic Resonance Imaging Study of Infarct Topography and Focal Atrophy



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ABSTRACT

BACKGROUND: Large-vessel vasculopathy (LVV) increases stroke risk in pediatric sickle cell disease beyond the baseline elevated stroke risk in this vulnerable population. The mechanisms underlying this added risk and its unique impact on the developing brain are not established. **METHODS:** We analyzed magnetic resonance imaging and angiography scans of 66 children with sickle cell disease and infarcts by infarct density heatmaps and Jacobian determinants, a metric utilized to delineate focal volume change, to investigate if infarct location, volume, frequency, and cerebral atrophy differed among hemispheres with and without LVV. **RESULTS:** Infarct density heatmaps demonstrated infarct “hot spots” within the deep white matter internal border zone region in both LVV and non-LVV hemispheres, but with greater infarct density and larger infarct volumes in LVV hemispheres (2.2 mL versus 0.25 mL, $P < 0.001$). Additional scattered cortical infarcts in the internal carotid artery territory occurred in LVV hemispheres, but were rare in non-LVV hemispheres. Jacobian determinants revealed greater atrophy in gray and white matter of the parietal lobes of LVV compared with non-LVV hemispheres. **CONCLUSION:** Large-vessel vasculopathy in sickle cell disease appears to increase ischemic vulnerability in the borderzone region, as demonstrated by the increased frequency and extent of infarction within deep white matter, and increased risk of focal atrophy. Scattered infarctions across the LVV-affected hemispheres suggest additional stroke etiologies of vasculopathy (i.e., thromboembolism) in addition to chronic hypoxia-ischemia.

Keywords: sickle cell, stroke, vasculopathy, infarction, atrophy, MRI, heatmap

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Introduction

Stroke is a well-recognized, sometimes devastating, consequence of sickle cell disease (SCD).¹ Approximately one in three affected children has radiographic evidence of ischemic strokes before adulthood.² In a minority of

patients, strokes are accompanied by acute symptoms and focal deficits, termed “overt” strokes, whereas a much larger proportion of children are affected by nonlocalizable ischemic brain injury, termed “silent” strokes.

Beyond ischemic brain injury, recent attention has focused on progressive cognitive decline and failure of

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Conclusions

In this cohort of children with SCD, LVV was associated with increased volumes of infarction and focal atrophy. Further work is needed to prospectively investigate metabolic and hemodynamic stress as risk factors for ischemic stroke in children with SCD as well as how LVV confers additional vulnerability to the young brain. Prospective investigation of the cerebral physiologic responses to commonly prescribed treatments, such as transfusion therapy and cerebral revascularization procedures, aimed at prevention of infarction and neurocognitive decline are warranted.

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Transcranial Doppler Screening in a Current Cohort of Children With Sickle Cell Anemia: Results From the DISPLACE Study

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Summary: Stroke prevention guidelines for sickle cell anemia (SCA) recommend transcranial Doppler (TCD) screening to identify children at stroke risk; however, TCD screening implementation remains poor. This report describes results from Part 1 of the 28-site DISPLACE (Dissemination and Implementation of Stroke Prevention Looking at the Care Environment) study, a baseline assessment of TCD implementation rates. This report describes TCD implementation by consortium site characteristics; characteristics of TCDs completed; and TCD results based on age. The cohort included 5247 children with SCA, of whom 5116 were eligible for TCD implementation assessment for at least 1 study year. The majority of children were African American or Black, non-Hispanic and received Medicaid. Mean age at first recorded TCD was 5.9 and 10.5 years at study end. Observed TCD screening rates were unsatisfactory across geographic regions (mean 49.9%; range: 30.9% to 74.7%) independent of size, institution type, or previous stroke prevention trial participation. The abnormal TCD rate was 2.9%, with a median age of 6.3 years for first abnormal TCD result. Findings highlight real-world TCD screening practices and results from the largest SCA cohort to date. Data informed the part 3 implementation study for improving stroke screening and findings may inform clinical practice improvements.

Key Words: pediatrics, sickle cell anemia, transcranial Doppler screening

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Stroke is a devastating complication of sickle cell disease (SCD). Ischemic stroke is more common in the first decade of life while hemorrhagic stroke is more common in the second-third decades. Although stroke can occur in all genotypes, ischemic stroke is more common in sickle cell anemia (SCA). In 1998, the Stroke Prevention Trial in Sickle Cell Anemia (STOP) demonstrated that a high risk group of children with SCA could be identified using transcranial Doppler ultrasound (TCD) and that chronic red cell transfusion (CRCT) could reduce risk of first ischemic stroke by over 90%.¹ The STOP protocol was further validated in follow-up studies which demonstrated a persistent, significantly reduced rate of ischemic stroke.^{2,3} Before STOP protocol implementation, the estimated chance of overt stroke by age 20 was 11%.⁴

The STOP protocol has been incorporated into several SCD-related treatment recommendations, including endorsement from the National Heart, Lung, and Blood Institute (NHLBI) following the STOP study, health supervision recommendations from the American Academy of Pediatrics in 2002, recommendations from the 2014 NHLBI Evidence-Based Management of Sickle Cell Disease: Expert Panel Report, and the recently published 2020 American Society of Hematology (ASH) cerebrovascular guidelines.^{5–7} The STOP protocol recommends children with SCA, ages 2 to 16, undergo an annual TCD to identify those individuals with abnormal (high) blood flow who are at high risk of stroke. The protocol then recommends initiating CRCT therapy for children with abnormal TCD. This is one of few endorsements designated as a “Strong Recommendation, High-Quality Evidence” in the NHLBI’s graded report.

Despite this recommendation, a retrospective study using Medicaid Claims Data and the recent post-STOP study, as well as single-center projects, show poor implementation.^{8–12} Although a few institutions have conducted quality improvement projects for TCD screening at their institutions,^{9,13,14} a systematic, multisite assessment of implementation of TCD screening in a nationally representative sample of institutions caring for children with SCA has not been undertaken. A real-world assessment of TCD implementation overcomes limitations of prior studies that rely on successfully billed TCD screenings and do not capture unbilled screenings, such as those conducted in the clinic setting and those not conducted by a certified ultrasonographer. In addition, studies conducted only with Medicaid

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TABLE 1. Subject Demographics

| Characteristic | N | n (%) |
|-----------------------------------|------------|-------------|
| Baseline characteristics | 5116 | |
| Age*, mean (SD), median (IQR) | | |
| First recorded TCD in study years | 5.9 (4.1) | 5.0 (2-9) |
| End of study (December 31, 2016) | 10.5 (5.3) | 10.0 (6-15) |
| Sex* | 5116 | |
| Male | | 2575 (50.3) |
| Female | | 2541 (49.7) |
| Ethnicity* | 5116 | |
| Hispanic or Latino | | 124 (2.4) |
| Not Hispanic/Latino | | 4661 (91.1) |
| Unknown | | 331 (6.5) |
| Race†* | 5116 | |
| Native American | | 13 (0.3) |
| Asian | | 8 (0.2) |
| African American or Black | | 4850 (94.8) |
| Pacific Islander | | 8 (0.2) |
| White | | 64 (1.3) |
| Unknown | | 188 (3.7) |
| Insurance‡ | 3972 | |
| Medicaid | | 2505 (63.1) |
| CHIP | | 43 (1.1) |
| Tricare | | 62 (1.6) |
| Private | | 782 (19.7) |
| Local | | 88 (2.2) |
| None | | 52 (1.3) |
| Unknown | | 545 (13.7) |
| Genotype*§ | 5106 | |
| Hb SS or sickle cell anemia | | 4782 (93.7) |
| Hb s beta thalassemia | | 273 (5.4) |
| Hb S+Hb FH | | 37 (0.7) |
| Hb SE | | 4 (0.1) |
| Hb SD | | 5 (0.1) |
| Hb SO | | 5 (0.1) |
| Treatment | | |
| Hydroxyurea* | 5116 | 3009 (58.8) |

*Rates per subject (subjects are only represented once but hydroxyurea use could be at any time from 2012 to 2016).

†Not mutually exclusive.

‡Baseline rates per subject (subjects are only represented once).

§Missing 10.

||Included at the discretion of the local CI (not genetically defined).

CI indicates consortium institution; CHIP, Children's Health Insurance Program; IQR, interquartile range; TCD, transcranial Doppler.

TCD implementation was measured for study years 2012 to 2016. TCD screening rates were collected per patient/year/institution and the mean and median were calculated for better representation of overall screening rates. Overall TCD screening rates varied widely among institutions ranging from 30.9% to 74.7% (mean 49.9%, median 48.6%; Table 2). No trends in TCD rates were observed across the study years. During this time, 3655 patients registered in the database had at least 1 TCD during the study period (71.4%) and 1461 (28.6%) did not have a single TCD. Among patients who were eligible for at least 4 study years and should have had at least 4 TCDs, 601 patients (18.0%) did not have a single TCD (Table 3).

Secondary Outcomes

Site Characteristics

Screening variation both within site (from year to year) and between sites was high. Institution size and number of patients were not statistically significantly related to TCD implementation rates ($\chi^2=0.22$, $P=0.895$ obtained from

Kruskal-Wallis test for nonparametric distributions; $r=-0.20$, $P=0.313$ from the Pearson correlation, respectively). No difference in implementation of TCD by participation in STOP I and/or II trials was noted (all sites: 48.4%; STOP I/II sites: 46.4%; non-STOP sites: 51.2%). A comparison of the 3 sites with the highest implementation rates and the 3 sites with the lowest implementation rates by size and participation in STOP trials indicated no trends by size. Specifically, the lowest 3 sites included 2 small sites and 1 large site as well as 1 site that participated in STOP I and/or II. The highest 3 sites included 1 small, 1 medium, and one large site and no sites that participated in STOP I and/or II.

TCD Characteristics

Assessment of TCD results included patients studied from 2012 to 2016 who had at least 1 TCD and were not on CRCT. There were 104 (2.8%) patients with abnormal TCD and 495 (13.5%) patients with a conditional TCD during this time period (Table 3). Mean age at time of first abnormal TCD during study years was 6.3 years (median: 6, interquartile range of 4 to 8 y). Of note, the oldest patient to develop a new, abnormal TCD was 16 years old. More TCDs were conducted using dedicated Doppler (66.2%) compared with TCDi (32.8%). There was no difference in abnormal results seen with TCD vs. TCDi. Nearly all TCDs were conducted at the study hospital (96.9%) and the majority were conducted at the same time as a clinic appointment (67.3%).

DISCUSSION

The STOP study dramatically changed stroke prevention practices for children with SCA, offering a preventive strategy to a devastating complication.² Results from DISPLACE Part 1 highlight real-world stroke screening practices and TCD results in the modern era in the largest SCA cohort to date. This real-world assessment of TCD implementation overcomes limitations in prior studies conducted with administrative data sets and illustrates the need for a clinical longitudinal registry for more accurate monitoring of clinical care and patient outcomes. Unfortunately, findings demonstrate wide variability in TCD screening implementation not because of geographic location, institution size, number of patients, or prior participation in the STOP trials.

Barriers and facilitators to TCD implementation occur at multiple levels (patient level, provider level, and system level). We previously reported data from qualitative interviews performed during Part 2 of DISPLACE that reveal predominant barriers and facilitators that likely explain the variability observed in TCD rates. These results showed that predominant barriers included patient/caregiver logistical difficulties and competing life demands and gaps in scheduling, communication, and coordination. Predominant facilitators included coordination, scheduling, and reminders (especially when there was a single identified coordinator) and education and information (patient/caregiver knowledge of TCD).¹⁶ These results suggest that a combination of patient-level, provider-level, and systems-level issues are involved in TCD implementation, consistent with previous, single-center studies,^{10-12,17-24} and suggest that targeted multilevel interventions are likely needed to improve TCD screening rates.

Overall, the abnormal TCD rate is considerably lower in this large, real-world sample of children with SCA compared with the STOP study.¹ STOP was a prospective study to assess CRCT for patients with abnormal TCD. Thus, the findings in this retrospective, real-world study cannot be directly compared with those in STOP. However, the

Previous studies have compared results using dedicated Doppler versus TCDi in SCA and recent guidelines from ASH have formally recommended the use of lower velocities for identifying abnormal results when using TCDi (compared with dedicated Doppler).^{27–31} More specifically, these guidelines recommend using the STOP criterion of ≥ 200 time average mean of the maximum velocity for dedicated Doppler vs. ≥ 185 time average mean of the maximum time for TCDi. Our previous paper on practice patterns for TCD screening in the consortium suggested variation in how TCDi studies were categorized as there were no clear guidelines during the time of data collection¹⁵; however, there was no clinically significant difference in the number of abnormal TCD results between methods. Nonetheless, it is possible that the rate of abnormal TCDs was affected by variation in practices.

Limitations

DISPLACE is a real-world evaluation of current practice in 28 centers in the United States. There was potential bias in the site selection. First, most CI were academic centers; however, the majority of children with SCD receive care in the US at academic institutions.³² Thus, screening rates were likely representative of typical care. Second, 7 of the original 35 sites approached chose not to participate in the study. Two of these sites had already conducted single-center quality improvement projects and had new screening processes in place. Five others did not have sufficient research staff. While the 2 sites who had previously undertaken projects to improve screening rates now have better rates, these were not likely representative screening rates. The sites that did not participate might have had lower screening rates as their ability to participate and track these outcomes was limited. TCDs were conducted according to institutional practice and not per a single study protocol, and only abnormal TCD were adjudicated by the PI and confirmed to meet the “STOP protocol” definition. Thus, data reported are based on institutional judgment, which may be regarded as a limitation but is consistent with real-world practice. All data were collected by intensive chart review, but testing was not performed prospectively for this study. Thus, it is possible that TCD classifications in DISPLACE would not be consistent with STOP protocol definitions.

CONCLUSION

TCD screening was one of the most strongly recommended practices by the NHLBI SCD guidelines.⁶ Despite being the most common inherited blood disorder in the United States, SCD is still affected by multiple health disparities, including a lack of funding, well-defined quality metrics and assessments, and novel drug development that exists in other life-limiting conditions, such as cystic fibrosis.³³ Further, there are limited treatment guidelines or oversight for individuals with SCD compared with other conditions.^{34,35}

Current TCD implementation is lacking. Findings in DISPLACE likely reflect other areas of profound gaps between guidelines and practice. DISPLACE seeks to optimize implementation of stroke risk screening in SCD as one means for improving care. New SCD guidelines have recently been published by ASH,^{7,36,37} and new therapies have been approved. Lessons learned from the DISPLACE implementation study are expected to provide new strategies to improve quality of care and reduce health outcome inequities for this at-risk population.

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Barriers to Care for Persons with Sickle Cell Disease: The Case Manager's Opportunity to Improve Patient Outcomes

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Abstract

Purpose and Objectives—The purpose of this discussion is to review the barriers to care for patients with sickle cell disease (SCD). Chronic pain and the perception of addiction, implicit bias, frequent hospitalizations and emergency department visits, **clinician and patient knowledge deficit and sickle cell disease stigma all impede the ability to provide evidence-based care for patients with sickle cell disease.** Case managers can coordinate and advocate for appropriate care that improves patient outcomes.

Primary Practice Setting—This discussion is relevant to case managers working with patients with SCD in the clinic, hospital and emergency department.

Findings/Conclusions—Case managers can serve an important advocacy role and intervene to improve the coordination of services and efficient use of resources. This will lead to improved quality of life and optimal healthcare utilization for persons with SCD.

Implications for Case Management Practice—As a constant member of the health care team, the case manager may be the only health care team member that has broad knowledge of the patient's experience of acute and chronic pain, usual state of health, social behavioral health needs, and how these factors may affect both in-patient and out-patient healthcare use and health outcomes. This paper explores the barriers to care and suggests specific interventions within the

RESEARCH

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Identified barriers and facilitators to stroke risk screening in children with sickle cell anemia: results from the DISPLACE consortium



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Abstract

Background: Children with sickle cell anemia are at risk for stroke. Ischemic stroke risk can be identified among children ages 2–16 years with sickle cell anemia using transcranial Doppler ultrasound. Despite strong recommendations for transcranial Doppler screening in guidelines released by the National Heart, Lung, and Blood Institute, implementation of transcranial Doppler screening in sickle cell anemia remains suboptimal. The purpose of this study was to identify barriers and facilitators to transcranial Doppler screening in a large national consortium to inform subsequent implementation interventions.

Methods: A qualitative descriptive approach was used to conduct 52 semi-structured interviews with a sample of patients with sickle cell anemia, their parents or primary caregivers, and healthcare providers dispersed across the United States. Interviews took place from September 2018 through March 2019. Directed content analysis was conducted with an adapted version of the Multilevel Ecological Model of Health as an initial coding framework, completed July 2019. Frequency analysis was conducted to determine predominant barrier and facilitator themes.

Results: Fourteen barrier themes and 12 facilitator themes emerged representing all levels of the ecological framework. Two barrier themes (*Logistical Difficulties and Competing Life Demands* and *Gaps in Scheduling and Coordination*), and 5 facilitator themes (*Coordination, Scheduling and Reminders; Education and Information; Provider and Staff Investment and Assistance; Positive Patient Experience; and Convenient Location*) were predominant.

Conclusions: Barriers and facilitators to transcranial Doppler screening in children with sickle cell anemia are complex and occur across multiple ecological levels. One barrier theme and 3 facilitator themes were found to be optimal to address in subsequent implementation interventions.

Keywords: Sickle cell anemia, Qualitative, Transcranial Doppler screening, Children, Caregivers, Healthcare providers, Social ecological model

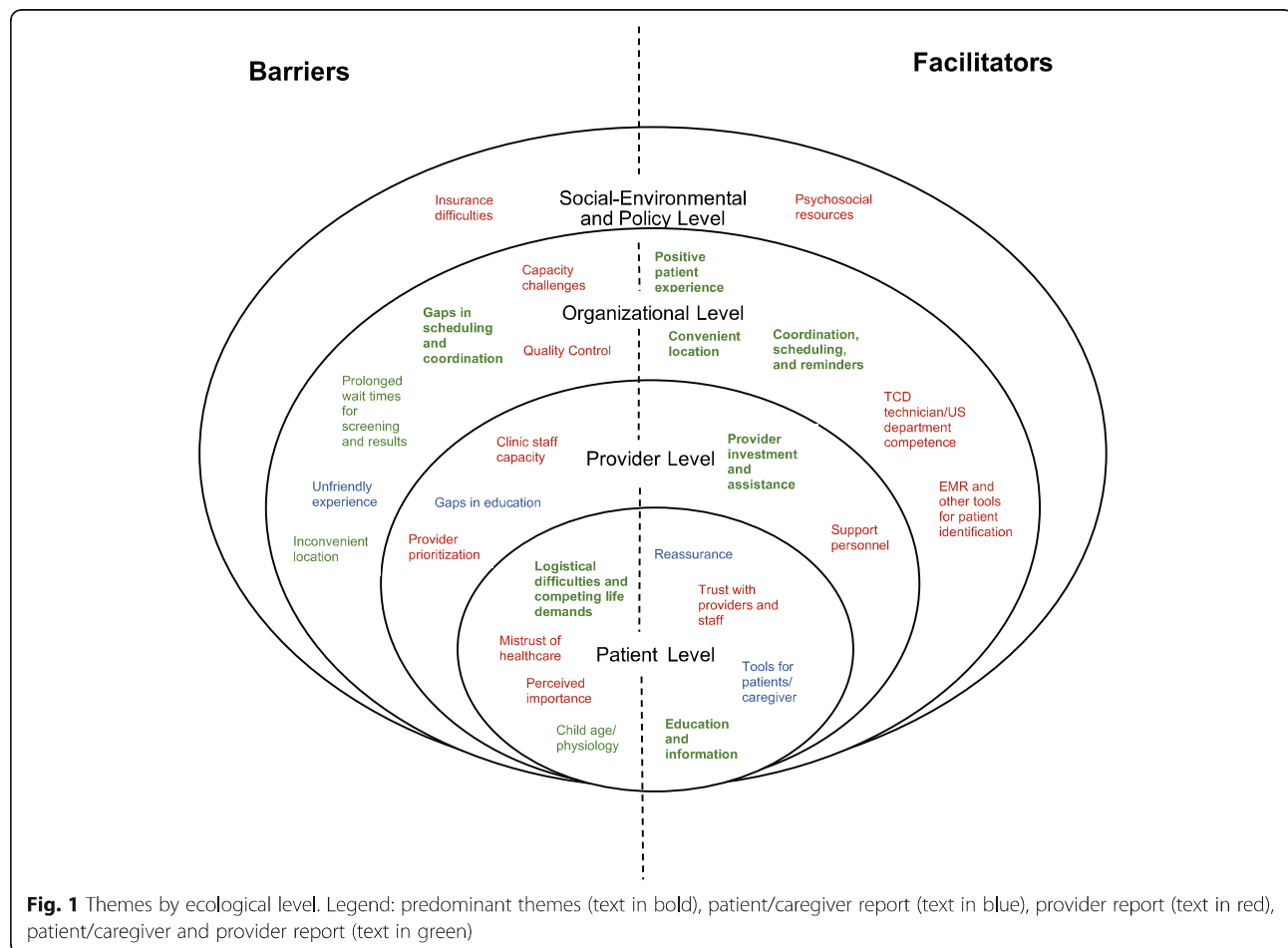
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perceived patients/caregivers who understood the utility of TCD screening and the importance of the results were more likely to be adherent. Both groups of participants believed it necessary to educate the parent/caregiver and child about TCD screenings and stroke risk to help patients and families better understand the importance of screening. Patients/caregivers further discussed the benefit of radiology staff who are knowledgeable and communicative and explain the procedure as it is being done, while providers further discussed the need for repeated education to families and providing information from multiple sources and by multiple methods.

Positive patient experience (patient level)

Patients/caregivers ($n = 9$) more frequently discussed positive patient experience as a facilitator to TCD screenings than providers ($n = 2$). Patients/caregivers and providers mentioned the importance of resources that improve the child's experience during a TCD, such as child life specialists and televisions for distraction. In addition, patient/caregiver participants mentioned keeping the child relaxed during the procedure and offering a reward for cooperation were facilitators.

Patients/caregivers also described efforts made by parents toward making the child comfortable during the procedure, such as preparing the child the day before and offering an electronic device for distraction. According to patient/caregiver participants, the short duration of the TCD procedure was fundamental to facilitating the child's cooperation.

Provider and staff investment and assistance (provider level)

Many participants noted that coordinating appointments with both radiology and the clinic could be challenging. Five patient/caregiver participants explicitly described sickle cell clinic staff making the TCD appointments for them as a facilitator to overcoming this challenge. Ten provider participants described additional efforts undertaken by sickle cell clinic staff and radiology staff as facilitators. Provider participants described nurses at sickle cell clinics who "call and beg" for same-day TCD screenings for patients in urgent need, such as those who were late for screening or needed a follow-up screening for a prior abnormal result. Efforts also included attempts by sickle cell clinic staff to resolve quality concerns by