

Dental Interventions Improve Youth HPV Vaccination Rates to Help Prevent Oral Cancer

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ABSTRACT

Background: There is a quiet epidemic in the cancer world. It is oral cancer in middle-aged men. [1,2]. The cases of oropharyngeal cancer linked to human papillomavirus (HPV) infection are steadily rising, and outpacing the rate of HPV infection-related cervical cancer [3]. HPV is the most prevalent sexually-transmitted infection (STI), affecting 79 million Americans, most in their late teens and early twenties. HPV can be prevented with a series of vaccines administered to male and female children, starting as early as age nine [4-7]. Preventing HPV may also result in preventing up to six types of HPV-related cancer, including oral cancer [8-10].

Methods: Zufall Health Center's Project Aim integrated dental and medical teams for a collaborative program to prevent oral cancers by increasing the HPV vaccination rates of our young patients. Working with an original medical/dental cohort of 900 male and female patients ages nine to eighteen, our project goal was to improve our immunization rate 10% by January 1, 2020.

Zufall's Project Aim was implemented by eight Community Dental Health Coordinators (CDHCs) using the PDSA improvement model. Project objectives included engaging patients using Motivational Interviewing; communicating oral cancer risk to families; improving HPV vaccination completion rates; enhancing patient follow-up; monitoring and reporting immunization rates; improving operational performance; and maintaining process improvements.

Results: Project Aim exceeded its program goal, significantly improving the Centers' immunization rate: from 12% at project start to 31.08% by January 2020.

Conclusion: To our knowledge, we accomplished a first-of-its-kind project. There has been no data that showed improvement on HPV vaccination rates as a result of dental interventions. By changing our workflow, integrating our medical and dental homes, and empowering our CDHCs to lead the integrated effort and promote vaccination, we achieved significant improvement in HPV immunization rates in our young patients.

Keywords

CDHCs, Dental/medical integration, HPV vaccination, Oropharyngeal cancer.

Introduction

The Need...and Opportunity

According to the NIH, the majority of oropharyngeal cancers (70%) in the United States are caused by human papillomavirus

(HPV). With the number of new cases increasing each year, oropharyngeal cancers are now the most common HPV-related cancer in the United States, tripling in the past several decades. The same strain of HPV responsible for cervical, penile, and anal cancer is now a leading cause of head and neck cancer [11].

In April of 2019, New Jersey's Zufall Health Center, a federally qualified health center (FQHC), charged the team of new

Community Dental Health Coordinators (CDHCs) with a project that would expand their skills and improve patient outcomes. Due to a 2007 initiative by the American Dental Association (ADA), CDHCs are dental hygienists and dental assistants who are trained as community health workers to navigate patients to appropriate dental services. CDHCs coordinate care and manage cases; build bridges from the community to the dental clinic by addressing social determinants of health; improve continuity of care; resolve barriers to care (transportation, housing, language, etc.); and enhance the health literacy of patients.

The HPV project was the perfect fit for our CDHCs since HPV vaccinations are not yet a federally-required reporting measure; our HPV vaccination rates were low; we wanted to improve HPV data collection and analysis; and we were concerned about the soaring rates of HPV-related oral cancers. Empowering CDHCs to coordinate the HPV vaccination effort starting at youth dental visits was critical to project success.

Zufall's Project Aim was created with the mission of using quality improvement methods to increase HPV vaccination rates 10% by January 2020, and to help prevent oral cancers. The Zufall baseline HPV immunization rate was 12% at project start (October 2018 to October 2019). Our approach was unique: to integrate the medical and dental departments into one aligned HPV vaccine promotion and completion team focused primarily on a cohort of 900 young patients receiving both medical and dental services at our Centers, ages nine to eighteen. To our knowledge, this was new ground in the HPV vaccination arena: There was no data that showed improvement on vaccination rates due to dental interventions. This project provides that landmark data.

About Zufall Community Health Centers

Zufall Community Health Centers is a FQHC founded in 1990. In 2018, we served 39,071 patients in northwest and central New Jersey with 142,621 visits across our nine sites and two mobile units. There are seven dental offices. Zufall primarily serves special populations consisting of the homeless, public housing residents, and farm workers: 86% of patients are below 200% of the federal poverty level, 47% of patients are uninsured, 67% of patients are Hispanic, and 49% of patients are best served in a language other than English.

Methods

Project Aim Methods

The Project Aim goals were to enhance parent and patient knowledge of HPV and vaccination (counseling), improve the HPV immunization protocol with an integrated dental/medical approach to promoting it (integration and referral), and increase the immunization rate for the Zufall target population of girls and boys ages nine to eighteen (vaccination).

The project development methodology was the PDSA improvement model: Plan, Do, Study, Act. This rigorous improvement model required our team to continuously refine what we were trying to accomplish, including how to know when a change was an

improvement and which changes we could make to improve our process. Because it was a first-of-its-kind initiative, our CDHCs started small: pilot-testing one interaction at a time with one dentist and one parent at one site. The CDHCs assessed the impact of each interaction, and then refined the process before enlarging the scope to include additional interactions with dentists and patients at additional sites.

Patient/family engagement was vital; Motivational Interviewing (MI) was used throughout the project. Using MI, our dental team quickly discovered discussions about sexual activity and cervical cancer with parents of nine- to eleven-year-old children were not effective. Using the PDSA model, we adapted our approach and evolved conversations to position HPV as a risk for oral cancer. This new message resonated with parents of young children and became the conversational springboard to inspire behavior change that led to higher rates of HPV vaccination, surpassing original projections. We created a dynamic PDSA log to track what we learned about our communications efforts with patients and families, and to facilitate course correction through the duration of the project.

Along with the foundational change in messaging from sexual activity to cancer prevention, our PDSA logs revealed several other vital considerations. We learned parents were receptive to our project: they were interested in preventing oral cancer and getting HPV vaccinations for their children, as well as for themselves. We found that brochures and educational materials enhanced engagement and strengthened our face-to-face interactions. We discovered most of our dental patients (those receiving medical care elsewhere) were not certain they had been vaccinated by their private medical doctors. We learned effective cross-team communication (dental to medical and vice versa) was crucial to timely scheduling and vaccination of patients. We identified the need to improve our data capture processes, including the creation of new, smart billing codes to improve reporting of results and the development of a dashboard.

Experiential review revealed that creating custom educational materials for the Centers' dental health providers and families about HPV infection was not necessary. Resources outlining the oral cancer screening process in English and Spanish already existed. TeamMaureen.org, an organization focused on ending cervical cancer by educating about the HPV/cancer connection and sharing the importance of prevention and early detection has excellent resources [12]. We augmented those materials with customized fliers and questionnaires to educate patients and to facilitate referral.

The Integrated Dental/Medical Team

Our new, integrated dental/medical implementation plan included building team synergy and a coordinated response. Our CDHCs partnered with Zufall's Patient-centered Medical Home care coordinators (PCMHs), to follow up on patient education and navigation, continue training, and work the quality improvement plan to promote longer, healthier lives through necessary

preventive services. The project team started with forty staff and eventually expanded to more than seventy people, to include front desk receptionists and site managers. Staff training, supported with an ongoing quality improvement system, were key elements of the project. Zufall received resources via a grant that the Partnership for Maternal and Child Health of Northern New Jersey received in November 2018, “HPV and Cancer Prevention Initiative,” from The Whitehill Foundation, which enabled us to augment ADA CDHC training resources and scholarships with webinars and in-person training at all sites.

Our training goal was to align all staff on the basic science and recommendations regarding HPV-related oral cancer and vaccination. There was also extensive training in MI. To promote continuous improvement, camaraderie and friendly competition, we instituted weekly project update meetings across our sites as a feedback, brainstorming, and incentive mechanisms to compare results and discuss successes and challenges.

Working the Project Aim Plan

Our integrated team identified a cohort of 900 male and female patients who received both dental and medical services at Zufall, ages nine to eighteen. The overarching goal was to increase HPV vaccination rates in this target population, with the long-term goal of reducing HPV-related infections and cancers. Project objectives included engaging patients using MI techniques; communicating oral cancer risk to families; improving HPV vaccination and completion rates; enhancing patient follow-up; monitoring and reporting immunization rates; improving operational performance; and maintaining process improvements. We worked with our medical team to establish referral protocols for dental patients to follow up for vaccination in our medical departments using our electronic health records system (EHR). We tracked both referrals and actual immunizations. Our medical colleagues paved the way for us to partner with NJIIS (New Jersey Immunization Information System), a confidential online immunization database, to obtain vaccination histories for Zufall patients who received additional healthcare services outside our system.

The HPV Project Aim Flow Chart that was developed as a result of PDSAs was simple to implement. Most important of all, it was easy for our sites and mobile dental units to customize. Our CDHCs were designated to connect with young patients and walk families through the HPV vaccination process. First, the dental team checked the immunization record of each patient in the target population (either our internal EHR or the statewide database NJIIS). Next, we used MI and supporting materials to educate the parent and patient (depending on age) on oral cancer prevention and the benefits of HPV vaccination. If the patient was in the Zufall system, they were given an HPV vaccination due date appointment card, then contacted at a later time to ensure follow-up on the appointment and vaccination. If the patient was not in the Zufall system, it was recommended they visit their primary care doctor to ask about the HPV vaccine. The last step occurred at the next dental visit with a review of the patient’s immunization status and necessary reinforcement or reeducation, if needed.

Data Collection

Enhanced data collection to facilitate more accurate reporting and analysis was a major project objective, ultimately resulting in the streamlining of our data capture within the EHR to improve information upload and reports. The Project Aim data points and deliverables included validation of all existing patient data; the number of patients referred for HPV vaccinations from our dental department to our medical department; the number of patients receiving HPV vaccinations in medical and dental sites; the PDSA log outlining tests of change and the process improvements we implemented to improve vaccine referrals and same-day vaccinations; and immunization rates following dental intervention.

The first step was to validate all existing patient data. Our IT department helped us develop basic patient information as well as a list of current patients requiring a vaccine, by site. We created a new HPV dashboard to dynamically capture dental and medical outcome metrics as part of our continuous improvement effort, enabling our team to view and filter progress against objectives daily, by site.

Another of our data collection milestones was the development of HPV smart codes to ensure accurate reporting on our outreach efforts, such as which patients received HPV counseling and what was their progress on self-management goals. We incorporated key information obtained through MI and our customized questionnaires and forms into patients’ charts. And we worked with our IT department to provide weekly reports of number of encounters and success rates for referrals and completion of immunization, which we used at the weekly team meetings to spark dialogue and improve processes.

Challenges

Brand-new endeavors introduce brand-new challenges. Zufall has a culture of integrated services and, at most of our sites, dental and medical offices are in the same building. Despite this, we still found that there were silos between the dental and medical practices. There were challenges in quantifying the improvement of the relationship between the medical and dental teams and measuring the success of integration around this project; improving processes; finding the right uniform messaging; and facilitating cross-communication between teams. We discovered we could not make patient appointments for just an HPV immunization because our medical department required a physical within the last year. We experienced issues with vaccine availability at some sites. We learned there was misinformation and a lack of knowledge about HPV and the latest guidelines, which reinforced the importance of training of all staff on the most current, correct messaging. We initially struggled with finding and sharing our HPV vaccination messaging across departments. We knew at project launch that data collection was an issue: we wanted to streamline our EHR to improve our data capture and upload of information, and create new, better ways to report data and easily find relevant patient information—both inside and outside our system. We also worked with NJIIS to advocate for bidirectional data-sharing between the

registry and our EHR, which was not present at the time of the implementation of the project.

Results

Project Aim Results

In an effort to kick-start the project, we took a tiered approach. In the first phase, April 1 through August 15, 2019, we identified 658 joint medical/dental patients in need of HPV immunization. Our short-term goal was to improve HPV vaccination rates by 5% by August 16, 2019. Project Aim delivered HPV counseling to 158 patients (24%); 50 of them made follow-up appointments (33%), and half of those were compliant and kept the appointment (16.4%). We exceeded our short-term goal: 39 of the 158 counseled patients completed HPV immunization (24.6%), with an overall improvement of just over 5%. In this phase, we fine-tuned our messaging to patients, improved the process of referring patients to our medical team, and brainstormed ways to communicate more effectively between our dental and medical departments.

In the second phase of our project, extending until January 1, 2020, we expanded communications, patient and family education, and the number of participating staff. The CDHCs made an average of 15 case management calls per week to schedule patients for concurrent HPV vaccination and recall visits. Additionally, our chairside HPV counseling sessions increased steadily, from a handful in November 2019 to nearly 108 by the end of February. (Figure 1) From October 2018 to October 2019, the initiative's baseline HPV vaccine completion rate within the cohort of 890 patients was 12.13% (108 patients). Two months later, in December of 2019, the completion rate had nearly tripled, to 31.08% (276 patients). (Figure 2) We have continued to monitor progress and by mid-July 2020, out of a cohort of 887, our HPV vaccine completion rate was 40.07% (353 patients). In the next

phase of our initiative, through October 15, 2020, we'll continue to work the PDSA improvement model to enhance the dental/medical collaboration and integration; evaluate the relationship between the dental and medical teams; hone patient recall and scheduling of appointments; better align appointments for patient convenience; and increase the rate of same-day immunization. Our long-term plan is to advocate for HPV vaccination in the dental setting, which would be timely and convenient for families.

Conclusions

Project Aim demonstrated that interventions in the dental department improved HPV vaccination rates for our cohort: At the beginning of the project, our cohort had a 12% vaccination rate and this increased to 31.08% by January 1, 2020.

Integration of staff, systems, training, and communications and messaging was vital to our project's success. There is a tendency in health centers and health care organizations to operate in silos. Relevant medical information has an impact on dental care, and vice versa: health care providers cannot provide excellent care without fully understanding the whole patient. We successfully unified medical and dental staff's understanding of patients' overall health; created a continuous process improvement program as a benchmark; streamlined and integrated electronic data and records systems for easier and smarter access; and aligned training and messaging so staff could confidently and effectively interact with patients and families.

The CDHCs, with their unique skill set, service orientation, and dental expertise, were the right champions to propel this unique dental intervention project forward. At Zufall, the CDHC role was expanded from simply facilitating patients' access to dental care. Through Project Aim, not only were they the concierges of

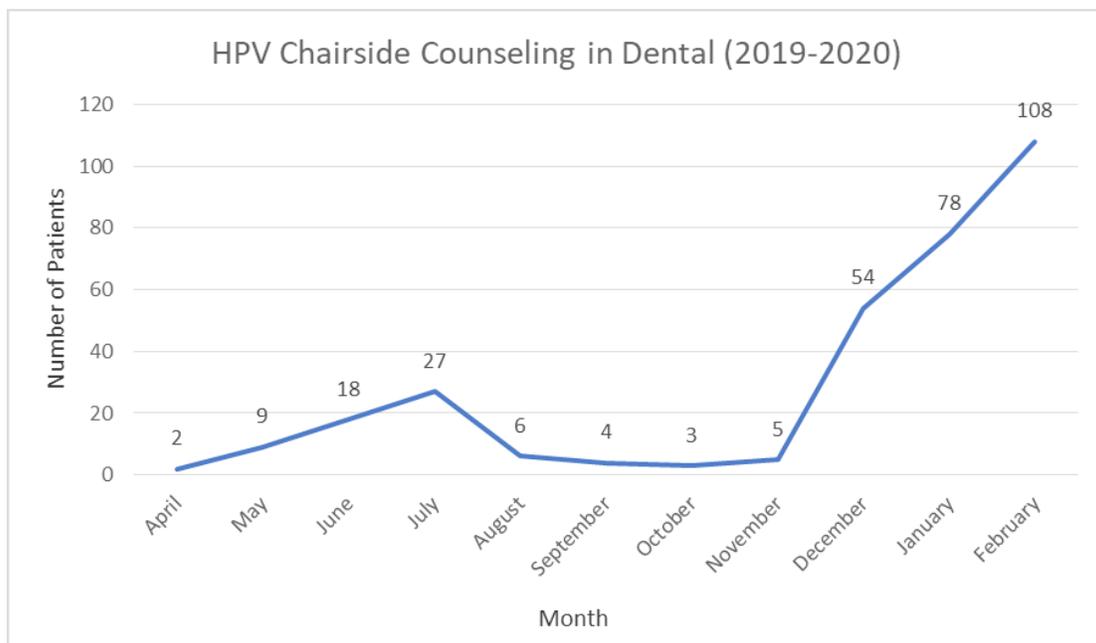


Figure 1: Indicates increasing dental patient counseling rates regarding HPV.

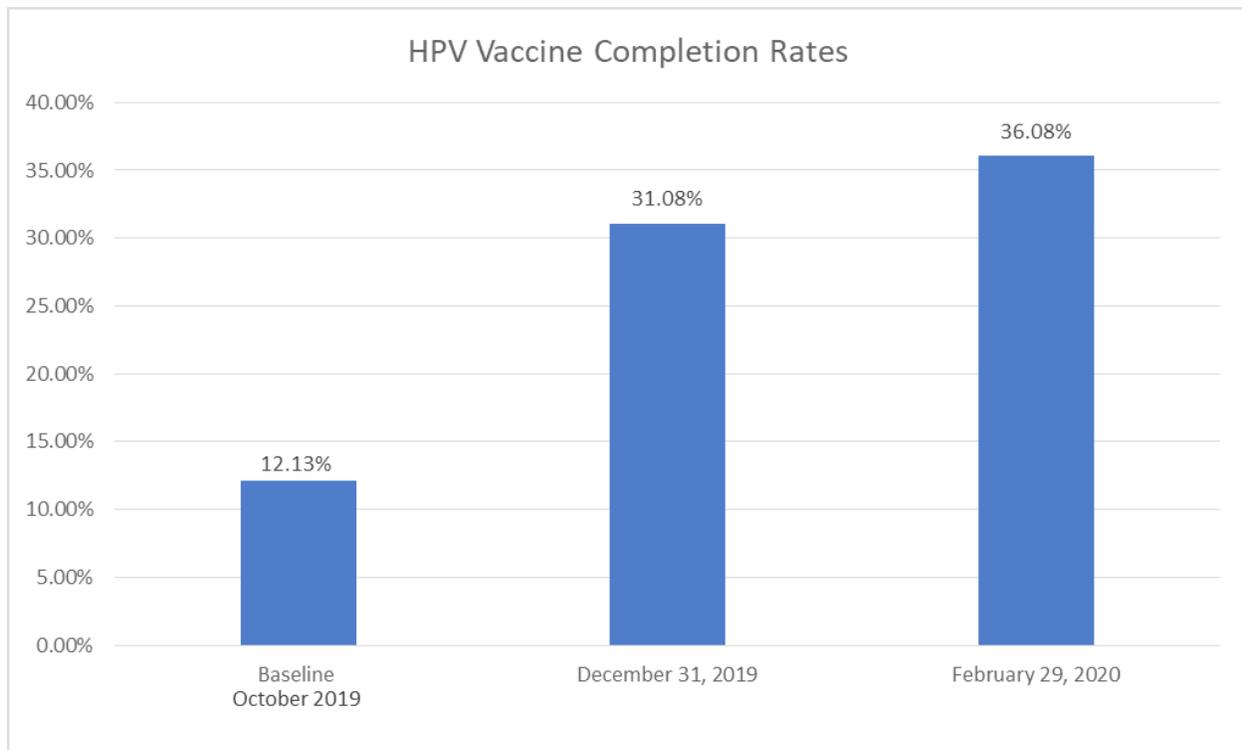


Figure 2: Project Aim results from baseline through February 29, 2020.

the dental experience, but they also helped young patients and their families navigate around the different healthcare offices and professionals engaged in the HPV vaccination process, facilitating the smooth transition from dental chair to medical exam table and back again.

The CDHCs assured patients and families that the HPV vaccine was safe, knowledgeably guided patients through the vaccination process from start to finish, and reminded them of the impact of the immunization on the young patient’s current and future good medical and oral health.

Several key findings in our PDSA improvement model guided the project. We realized through Motivational Interviewing that adherence was greatly enhanced by changing the HPV vaccination conversation with parents and young patients from sexual activity to oral cancer prevention. We discovered cancer prevention was a strong Project Aim team motivator for both our dental and medical departments: potentially saving lives mattered. We found that starting the HPV vaccination and oral cancer prevention conversation in the dental home by CDHCs, the trusted facilitators of the project, was highly effective. Most importantly, this project can be replicated in other community health centers and health care systems.

In summary, the unique combination of team integration and synergy, a rigorous process improvement system, a new and more accurate reporting and metrics systems, and putting real faces to the project (CDHCs, with their counterpart PCMHs) resulted in nearly tripling the baseline vaccination rate. Zufall’s Project Aim

did more than just appreciably increase HPV immunization. The Project reinforced the bridge between the medical and dental departments, unifying them behind a meaningful and compelling message, and a shared goal: HPV vaccines prevent oral cancer. Project Aim proved this mission can start in the dental chair. At Zufall, changing the paradigm resulted in blending traditionally siloed medical and dental homes into a single, collaborative, patient-centered practice.

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