



## Student health administrator perspectives on college vaccine policy development and implementation



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### ABSTRACT

**Background:** Immunization policies at colleges and universities differ greatly for many reasons, including prior experience with disease outbreaks and state immunization requirements. Few studies comprehensively explore the range of factors that influence the development of college vaccine policies or facilitators and barriers to their implementation.

**Objective:** To explore the perceptions and decision-making process that influence college vaccine policy development and implementation from the perspective of student health administrators.

**Methods:** This qualitative study used semi-structured interviews with student health administrators (N = 10) from ten U.S. colleges and universities purposefully sampled by school type (public vs. private) and geographic region. A descriptive codebook was developed from the interview guide, and each interview was double-coded using NVivo 11 software ( $\kappa = 0.87$ ; inter-observer reliability = 99.4%).

**Results:** We coded 5785 phrases. Administrators positively viewed their institutions' vaccine requirements, but some expressed concerns about the acceptance of philosophical and religious exemptions. They noted that students were generally ambivalent towards vaccine requirements, and while students recognized the benefits of vaccination, they did not prioritize immunizations. All administrators cited reliance on governmental and professional organizations as well as state regulations for decisions regarding vaccine requirements and recommendations at their institutions. Partnerships with other school departments, pharmaceutical companies, immunization coalitions, and healthcare providers were frequently cited as facilitators of college vaccine programs. Costs of purchasing, storing, and tracking vaccines were identified as major barriers.

**Conclusions:** We identified key themes that can be evaluated in subsequent studies to identify factors associated with successful implementation of university immunization programs and inform initiatives to increase vaccine acceptance and optimize immunization rates on college and university campuses.

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## 1. Introduction

Universities are a high-risk setting for the transmission of various infectious diseases because of higher levels of interpersonal contact and increased engagement in risky behaviors among students [1–5]. In response, immunization recommendations for college students have expanded in recent years to reduce the incidence of vaccine-preventable diseases and prevent disease outbreaks [2,5–9]. However, implementing recommendations can be

challenging due to lack of awareness about required vaccines, cost of vaccines, and low prioritization of preventive health services among college students at a time when they are beginning to make their own decisions regarding vaccines for the first time [10].

Many schools require at least one vaccine for attendance, but school-entry vaccination requirements for colleges and universities differ greatly [6,11–13]. Previous studies have identified factors that may be associated with this variability, including history of prior infectious disease outbreaks and specific state vaccine requirements [2,4,5,8,11,13–15]. However, these studies did not comprehensively explore how colleges and universities make decisions about immunization requirements or evaluate the facilitators and barriers to program implementation. Other recently published studies explore student perspectives on college

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immunization programs, yielding some insights on attitudes towards vaccine requirements [16–19]. Student health administrators can also provide important perspectives on knowledge of, and attitudes towards vaccine requirements given their unique role in both vaccine policy development and implementation.

Understanding the decision-making process administrators use to establish vaccine policy and the facilitators and barriers they face in vaccine program implementation can provide insights into how universities can more effectively increase vaccine uptake. The objective of this qualitative study was to explore key themes that both support and challenge college vaccine policies from the perspective of university health administrators.

## 2. Methods

We used a national sample of U.S. colleges and universities with vaccine requirements from a previously published cross-sectional study to purposefully select university student health administrators from all four regions (Northeast, South, Midwest, West) of the United States, as defined by the Centers for Disease Control and Prevention (CDC) [13,20,21]. From this sample, we contacted 45 student health centers in total via email based on their geographical region and institution type (public vs private) [13]. Nine schools were in the Northeast, ten in the Midwest, and thirteen were in the West and South, respectively [22]. Thirty-five of the contacted schools declined participation. Recruitment was performed in the following phases: initially, twenty schools were contacted, of which four schools agreed to participate; next, an additional fifteen schools were contacted, of which another four schools agreed to participate; and finally, ten schools were contacted, of which two schools agreed to participate. To ensure geographic representation, in each phase of recruitment we contacted additional schools until we had at least two schools from each geographical region, and achieved thematic saturation (N = 10). All schools who agreed to participate were included in the study. Characteristics of the schools are summarized in Table 1 below. Recruitment and interviewing took place from November 2016 to April 2017.

The interview guide was developed iteratively by meeting with two qualitative methods experts to develop and refine salient themes within the questions. Additionally, the interview guide was revised as interviews progressed to include emerging themes impacting vaccine policy development for university administrators (Appendix A). Interviews were conducted over the phone using the interview guide, and verbal consent was obtained to record the interview. All recorded interviews were transcribed by a professional transcription service. The transcripts were analyzed and double-coded for common themes by two members of the study team using NVivo 11 software. The research team met regu-

larly to iteratively develop the codebook and resolve any discrepancies (Appendix B). The agreement between coders for the themes within the codebook was measured using the kappa ( $\kappa$ ) statistic and inter-observer agreement, both of which were also calculated using NVivo 11 software [23].

## 3. Results

### 3.1. Kappa and Inter-observer reliability

We interviewed ten student health administrators from ten colleges and universities and coded 5785 phrases across all ten transcripts. Kappa statistic and inter-observer reliability were 0.87 and 99.4%, respectively.

### 3.2. Study population

Among the colleges and universities represented in our sample, six of ten were private institutions, and 30% were located in the South and Midwest, respectively (Table 1). The majority of schools had a medium-sized (5000–15,000) undergraduate population (50%), while nearly one third had more than 15,000 students. The average number of required vaccines among participating schools was 3.2 (95% CI: 1.5–4.8), and the average number of recommended vaccines was 3.1 (95% CI: 1.3–4.9). The most frequently required vaccine was Measles, Mumps, and Rubella (MMR) (100% of schools), and the most frequently recommended vaccine was Human Papillomavirus (HPV) (60% of schools). Most schools used registration hold (80%) as an enforcement strategy for students who were noncompliant with vaccine requirements; however, one participating school had no enforcement strategy.

Study participants served a wide range of roles within their student health programs. Approximately 50% of participants were the directors of their student health centers. The other 50% of participants held roles as sub-directors, program coordinators, or supervisors of specific programs within the student health center (Table 2). Participants also had varied educational backgrounds as determined by their highest degree obtained (Table 2).

### 3.3. Perceptions about vaccines and requirements: Domestic students

Administrators commented on various vaccine perceptions from domestic and international students, parents of students, as well as themselves. Overall, respondents reported that domestic students generally viewed requirements either unfavorably or as a routine part of business, and while they understood the overall benefit of vaccines, they did not enjoy the procedural obstacles of obtaining vaccines. Most students had previous experience with requirements in school, so they were accustomed to having to comply with immunization requirements in college. One administrator described student perceptions as “Well, I think sometimes,

**Table 1**  
Characteristics of Universities and Colleges.

Characteristic	Number (%)
School Type	
Public	4 (40)
Private	6 (60)
Region of the United States	
Northeast	2 (20)
South	3 (30)
Midwest	3 (30)
West	2 (20)
Size of Undergraduate Population	
Small ( $\leq 5000$ )	2 (20)
Medium (5000–15,000)	5 (50)
Large ( $>15,000$ )	3 (30)

**Table 2**  
Role and Training of Interview Participants.

Role	Training
Director of Public Health, Student Health	Education/Philosophy
Director, Student Health and Wellness	MHA
Health Director	BSN, BS
Interim Director, Student Health Services	DO
Medical Director	MD
Program Coordinator, Student Health Center	BS
Director, University Health Services	WHNP, CFNP*
Director, Health Services	PhD, MHA
Campus Nurse Coordinator	RN
Nursing Supervisor, Student Health Center	RN

\* Women's Health Nurse Practitioner, Certified Family Nurse Practitioner.

they do it in high school and grade school and everything. I just think it's just a routine part of business. It's just providing the proof that they seem to lag with. I mean, they have the shots. We just need to see that they've had them. I don't think they have any problems getting the shots. It's just providing us the documentation. But they're very compliant once I figure out what they need to do." In contrast, many participants cited negative attitudes attributed to dissatisfaction with enforcement strategies used for students who are not compliant with vaccine requirements, particularly registration holds that are placed on student accounts to prevent them from registering for the next semester of classes. "They hate it. There's nothing that we do that makes them more angry is when those holds go out for their measles/mumps/rubella and TD. There's really nothing else because they're literally watching classes fill up that they can't get because they haven't been in compliance with the policy." One administrator noted that the students' reluctance may also be due to a lack of knowledge since "They have no clue what's what or how many they need. But after we're through with them they have a better idea".

#### 3.4. Perceptions about vaccines and requirements: International students

For international students, there were specific challenges related to accessibility of required vaccines in their home countries and inability to provide acceptable documentation showing proof of vaccination (Table 3). Documentation may be provided in a different language and require translation. Additionally, the home country of an international student might have had different immunization requirements than the ones set by the school. Some administrators stated that when faced with these barriers, international students would submit an exemption request just to satisfy compliance for school-entry so that they could begin classes and receive required vaccines at a later time (Table 3).

#### 3.5. Perceptions about vaccines and requirements: Parents

Over half of the administrators reported that parents generally were very supportive of and understood the benefits of vaccination requirements. However, participants also reported that some parents viewed requirements unfavorably when non-compliance impacted their child's matriculation for classes. Administrators noted that most parents, like students, accept vaccine requirements as a precondition for school attendance since they have participated in similar requirements through their child's elementary and secondary education. Specifically, one administrator stated: "I think they see it as a necessary evil. I mean, it's something they need to do and it's for the best interest of the community health. And they know that their students are living in residence halls

**Table 3**  
Administrator interview quotes regarding perceptions of international students about vaccines and vaccine requirements.

"A lot of international students, it's just not a priority for them. They're here to get an education, not necessarily focused on their healthcare, and I get that. But I'd say the biggest one is just perception that it's not a priority."	"I see a larger part of that from international students and things that don't have the insurance and don't want to pay for the immunizations basically."
"One of the barriers for international students is just the availability for them to receive vaccinations or have documented vaccine documentation before coming to campus."	"International students pose a different set of problems. And oftentimes they will waive out of a vaccine upon entrance into the institution to satisfy compliance. But then over the course of time receive those vaccines."

and the odds of getting sick are greater than what they were. And they've done them in high school and they've done them in junior high. So I don't think they have much of an issue with it. They only have an issue when I block the registration. Then they call me up and say, you're blocking it. And I say, yes I know, all you need to do is send me the documentation and I can release them with just one click of the mouse here. I think that's their biggest frustration".

#### 3.6. Perceptions about vaccines and requirements: Administrators

While administrators reported that vaccine requirements were largely accepted by parents and students, their own perceptions of their institutions' vaccine policy focused on the following policy facets: enforcement strategy, exemption allowance, and vaccine requirements. Eight administrators (80%) mentioned a registration hold on student accounts as the primary enforcement strategy for required vaccines (Table 4), and two administrators (20%) mentioned that students were not given their room key until they were compliant. All administrators reported that their schools allowed for non-medical exemptions (Table 4). Administrators reported concerns about existing religious and philosophical exemptions that allow students to opt out of requirements (Table 4). One administrator explicitly expressed a desire for the removal of the personal belief exemption in which students can opt out of requirements based on a philosophical objection to receiving a particular vaccine.

Administrators themselves generally had a positive regard for their institution's vaccine program. Seven administrators said they felt that their vaccine programs were "appropriate" or "just right." Two administrators thought their vaccine programs were "too lenient," and one thought it was "onerous." Five administrators were in favor of requiring more vaccines for their university, especially HPV, Tetanus-Diphtheria-acellular Pertussis, and the

**Table 4**  
Administrator interview quotes concerning policy enforcement strategy and vaccine exemptions.

<b>Vaccine Enforcement Strategy</b>	
"So Student Health Services enforces, oversees the compliance. Students who do not comply will not be given their room key upon entrance to campus in the fall."	"So we don't make the changes until this time of year. So we only do it once a year because it's pretty hard to make the requirement middle of the year because we really don't have any way of regulating it. Whereas at the beginning of the year we can withhold housing and we have a little more control over that".
"We block their registration. They can't register for next semester if they don't have them into us."	"So everyone starts out with a hold. And by submitting their immunizations and having them be accurate and complaint the hold is removed".
<b>Vaccine Exemptions</b>	
"We've turned that into a non-compliant waiver. We don't call it religious. We just say, I've chosen to not comply with. But not very many – it's kind of interesting. More people than you would think, when you realize it's a non-compliant waiver, they kinda shore up and do it."	"Well, the religious one, they have to provide documentation from their religion on their letterhead and why. The medical one, they have to provide – they have to have some kind of a physician PA or advanced practice nurse that writes down why. Our medical director reviews those and I review the religious ones".
"But for the bulk of it we have Idaho students. And Idaho has allowed, for generations now, students to get out from under immunizations just because of personal beliefs. And so the biggest barrier is overcoming that".	"I would say – I mean, it's not huge. I would say we've got probably 95 plus percent of folks compliant with the required vaccines. So we're probably maybe looking at five to seven percent, in that range".

seasonal influenza vaccine. One administrator said, “I’d like to require the meningitis vaccine and not allow for personal exemptions. I probably would view that differently for religious and for medical exemptions, but I think for personal exemptions that don’t involve those two issues, I would certainly want to require it. And I would require other vaccines like the flu vaccines like the HPV vaccine.” However, participants anticipated barriers such as cost to implementing new vaccine requirements.

### 3.7. Vaccine policy decision-making

Overwhelmingly, all of the student health administrators stated that they rely on governmental and professional organizations as well as state regulations for guidance on developing and updating vaccine requirements and recommendations at their institutions. The CDC, Advisory Committee on Immunization Practices (ACIP), American Association of Family Practitioners (AAFP), and American College Health Association (ACHA) were all frequently mentioned as sources of information (Table 5). ACIP was also helpful to administrators in determining what vaccines to stock in the case of an infectious disease outbreak. Additionally, administrators stated that vaccine requirement guideline updates among governmental and professional organizations also informed their policy. For example, when the CDC issued a Category B recommendation for the Meningococcal Serogroup B (MenB) vaccine in 2015, some administrators added it to their list of recommended vaccines for students.

While all administrators indicated that their universities followed their respective state vaccine requirement laws, all but one also implemented additional requirements based on recommendations from organizations such as the ACHA and ACIP that went beyond state requirements (Table 5). For public institutions, their respective state laws and regulations had an added layer of importance because some public institutions had a Board of Regents, or an independent governing body that oversees a state’s public Colleges and Universities, also directing their policy [24]. This governmental role in public institutions directly affected which vaccines are required at their universities.

Most administrators who were interviewed identified themselves as key players in the decision-making process regarding vaccine policy within their respective student health centers. However, administrators indicated that they also worked with broader school administration to change or update requirements, and that their institutions utilize committees comprised of relevant parties (i.e. safety officers, division of student life, etc.) to determine which vaccines should be required for students. Only two administrators stated that prior infectious disease outbreaks influenced the vaccine requirements of their institutions. Many administrators indicated that outbreaks would generally result in

**Table 5**  
Administrator interview quotes concerning vaccine requirement decision-making.

“So we look at it with obviously with CDC and ACIP. The American College Health Association publishes recommendations. So we use probably those agencies the most, in addition to again any state-specific policies.”	“We do follow the CDC. We do pull all of our information from the CDC.gov. And as me being the nurse now and me kind of being the boss, if anything were to change, any recommendations were recommended, I would definitely change things around to keep current with the CDC”.
“The decision is made on the MMR and the varicella – those are actually state guidelines that we follow.”	“So we usually follow the American College Health guidelines, in conjunction with the PA state guidelines. At least we try to mirror it as closely as possible with the ACIP”.

special vaccination clinics and temporary vaccine requirements for the outbreak disease as an outbreak control measure: “Well, we just had a big mumps outbreak last year and we vaccinated over 5,000 students and it just reaffirmed that the two MMRs is required to be on campus. We ended up giving over 5000 third MMRs.”

### 3.8. Facilitators and barriers

Administrators shared several university-specific facilitators and barriers to vaccine policy implementation (Table 6). Administrators frequently mentioned that partnering with other providers such as public health departments and local hospitals was a facilitator to their vaccine programs (Table 6). Partnerships typically centered on bringing vaccines that institutions were unable to provide themselves to campus. In some cases, partners provided required as well as recommended vaccines, or facilitated seasonal vaccine campaigns like flu clinics. One of the administrators collaborated with both state and local public health departments to best manage students who had vaccine exemptions during a Mumps outbreak. This participant stated that such partnerships were helpful in sharing strategies used at other universities in the area and how that might improve vaccine policies at their own institution. Furthermore, university administration was cited as both a facilitator and as a barrier. Student health administrators mentioned that university administrations were generally supportive of the vaccine program and helped enforce requirements through various strategies such as preventing students from registering for classes or barring them from entering student housing until vaccine requirements were fulfilled. This partnership with the registrar’s office, housing office, and even in some cases, athletic coaches, help ensure that vaccine requirements are being met by incoming students. Additionally, one respondent noted that the university administration helped student health services procure and pay for vaccines during a disease outbreak. On the other hand, some participants felt that university administration was sometimes hesitant to adopt new vaccine requirements because they feared that such requirements would negatively impact matriculation rates.

Both the individual cost of vaccines and the overall cost of running a vaccine program were mentioned as barriers by all

**Table 6**  
Administrator interview quotes concerning facilitators and barriers to college vaccine programs.

“I guess the one other thing is the overall cost of maintaining a requirement system. If you expand it, it’s at great expense. Tracking systems are very expensive at a college like this”.	“I think a really strong relationship with the public health system probably does the most for us”.
“For a case of an outbreak we would have to work with either pharmaceutical companies or local hospital partners or local health department to bring vaccines onto campus”.	“I would tell you, the biggest factor that impacts it is administration’s fear that requiring more vaccines would interfere with enrollment. That I would damage their enrollment numbers”.
“Well, when we had the mumps outbreak last year, the university paid for the vaccine so the students wouldn’t get charged. So yeah, they just told us to take it out of our funds and then give them a bill. And then, so what we did is we just did everything, kept track of our costs, and then turned it back into them and they reimbursed us”.	“The barriers are getting students to read information that’s been sent to them. And in the past we’ve tried alternative methods for example mailing information as well as putting it on email”.

respondents (Table 6). Not all vaccines are covered by insurance, so students often opt out of recommended vaccines for which they must pay out of pocket. Procurement, storage and tracking of vaccines at student health services is a significant incurred cost for universities (Table 6). Administrators also expressed that they would want more thorough ways to assess a student's vaccination status. This would include better vaccine tracking systems that would incorporate vaccines that students might have received elsewhere (Table 6).

#### 4. Discussion

In this qualitative study of a sampling of student health administrators, we found salient themes that likely influence the development and implementation of vaccine policies across several U.S. colleges and universities. Our results suggest that student health administrators view immunization requirements favorably and perceive that parents and students generally support the utility of vaccinations but are ambivalent about the supporting paperwork and barriers to school enrollment. Administrators receive guidance and support for vaccine policy development from professional and public health institutions. However, there are also important challenges to immunization program implementation, such as cost and student buy-in. Some challenges may be shared across institutions but others may be unique to a school's size, region, or policy environment. These results uniquely characterize student health administrator perceptions of their school's vaccine policies and identify potential areas for improvement.

Overall, vaccine policy appears to be largely influenced by governmental and professional organizations, as well as state laws and health departments. Student health administrators reported a reliance on guidance from these institutions for the development of immunization requirements and recommendations. All interviewees indicated that their school followed state requirements of which there are few specific to college students. Most also had additional requirements, highlighting the influence of different professional and public health organizations on institutional requirements. In addition to policy guidance, school health administrators cited the importance of partnership with health departments who also facilitate access to required and recommended vaccines and provide support for special immunization clinics. Maintaining partnerships and communication with professional and public health organizations will continue to be an important opportunity for influencing specific vaccine recommendations for college students. Though most schools interviewed had more requirements than states required, states' policies may also be an important target for efforts to expand or strengthen vaccine requirements at colleges and universities. It should be noted that few states have immunization requirements that target adults or college campuses. Working toward the expansion of requirements or more stringent exemption policies at the state level can further solidify and support enforcement of the minimum requirements for public universities. Additionally, many requirements for college students are consistent with elementary and secondary school requirements. Strengthening the enforcement of such requirements may also help ensure that students have received required and recommended vaccines before matriculation.

While administrators were generally satisfied with their schools' immunization programs and felt well supported by their administration, respondents also reported challenges in their ability to accurately assess students' immunization status. Accurate assessment is a key function of any immunization program to identify individuals who are due for needed vaccines and to evaluate overall vaccination rates. As vaccine-preventable disease outbreaks continue to occur on college campuses, [25] coverage rates among

students are particularly important to determine risk for vaccine preventable disease transmission. Administrators expressed an interest in improving their ability to evaluate students' immunization history for both required and recommended vaccines. Most respondents indicated that documentation is particularly challenging for international students whose immunization records may require translation or may reflect a different schedule. International students are an especially important student population given rising percentages of international students attending U.S. universities and different exposure risks related to the epidemiology of vaccine-preventable diseases in their home countries [6]. Increased utilization of immunization registries, particularly for domestic students, may help address some of these challenges. Schools may also want to consider catch-up vaccination programs for international students especially when required vaccines are not available in their home country or when completed documentation is not available. This may help reduce the use of convenience exemption requests cited by some respondents as a barrier to immunization program implementation.

Administrators also highlighted additional facilitators and barriers to the implementation of vaccine programs. Cost of vaccines impacted both students who were not able to receive vaccines that were not covered by insurance and administrators who could not afford the cost of stocking more vaccines at their student health centers. These trends suggest that increased funding by university administration for student health services could help to expand resources in support of immunization services delivery. Such a cost-benefit analysis could be performed in the future to convince institutions to give more financial support to their vaccine programs.

Student health administrators also shared perspectives on attitudes towards immunization requirements among parents and students. Perceived perceptions of the vaccine program by parents and students reflected overall support of immunization requirements but negative attitudes towards enforcement strategies that might interfere with students' ability to register for and attend classes. Coupled with the results from our previous study regarding student perceptions about college immunization requirements, [26] our findings suggest that improved communication about school vaccine policies and the consequences for non-compliance can help raise awareness about the implications of delaying vaccination and could potentially increase timely compliance. Student health websites often do not explicitly note vaccine requirements and consequences of non-compliance, [13] therefore, they could be updated to serve as a crucial resource for students and parents before matriculation. Communication strategies, such as electronic reminders in the forms of texts or emails, can also help to increase compliance with vaccination requirements and promote the salience of vaccination as an important part of health maintenance for college students. Since appropriate, consistent documentation is also a substantial area for concern, universities could explore standardized forms or leverage use of existing electronic information systems to streamline immunization record-keeping.

##### 4.1. Strengths and limitations

One limitation of this study was the small sample size (N = 10) of university administrators. Our sample may not capture all attitudes towards immunization requirements and barriers to implementation among student health centers across the U.S. However, we sought to enroll participants from schools of variable sizes and locations. We also conducted interviews until we achieved thematic saturation, suggesting that we were able to consistently identify salient themes related to university vaccine policy development and implementation.

## 4.2. Conclusions

University student health services can play an important role in teaching students about the benefits of vaccines that might help to increase their overall positive perceptions of vaccine requirements and recommendations. Supporting colleges and universities as they work to expand their own vaccine programs is crucial to reducing the risk vaccine-preventable diseases pose to students on college campuses across the nation. Planned future studies include a comprehensive evaluation of a national sample of student health administrators to more rigorously identify factors associated with the structure and implementation of immunization programs. Additionally, future research will elucidate the relationship between immunization program structure and immunization rates. Results from these investigations can inform the development of best practices related to vaccine policy development on college and university campuses.

## Declaration of Competing Interest

None.

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## Authorship

All authors were substantially involved in the data analysis and interpretation of data. In addition to extensive drafting and revising of the manuscript, all authors approved the final version of this submission.

All authors attest they meet the ICMJE criteria for authorship.

## Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2019.05.073>.

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