



## Major Article

## Vaccination for child clients and employees in St Louis childcare agencies: Vaccine uptake and policies versus parents' perceptions



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childcare  
presenteeism

**Background:** Little is known about childcare agency staff vaccination requirements, parents' perceptions of these requirements, or vaccine uptake in these populations.

**Methods:** A questionnaire was administered to St Louis parents and childcare agency staff in fall of 2014. The  $\chi^2$  tests compared staff's versus parents' uptake of hepatitis A, pertussis, and seasonal influenza vaccines. Multivariate logistic regression was used to examine individuals being fully immunized (ie, having received influenza, hepatitis A, and pertussis vaccines).

**Results:** Overall, 351 parents and staff from 23 agencies participated (response rate, 32%). One-third of staff (34.4%, n = 33) and parents (37.6%, n = 96) were fully immunized. Parents and staff were equally likely to have received the influenza vaccine (48.8% and 47.3%, respectively), but more staff received the hepatitis A vaccine (85.3% vs 67.5%,  $\chi^2 = 11.0$ ,  $P < .001$ ), and more parents received the pertussis vaccine (66.5% vs 45.8%,  $\chi^2 = 12.5$ ,  $P < .001$ ). Determinants of being fully immunized included having previously received the influenza vaccine, being offered the vaccines, belief that vaccination is important, having immunization recommendation awareness, and not having vaccine misperceptions.

**Conclusions:** Childcare agency staff vaccination can protect employees and children from disease, but their uptake of vaccines needs improvement. Future interventions should be aimed at increasing uptake to lower disease transmission in childcare settings.

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Children <1 year of age are susceptible to infection from multiple vaccine-preventable diseases, and infants <2 months old are at particularly high risk. With the exception of the hepatitis B vaccine, which is given at birth, infants typically do not receive their first round of vaccinations until 2 months of age.<sup>1</sup> Measles-mumps-rubella (MMR) and influenza vaccination follow at 6 months, and varicella is given at 12 months.<sup>1</sup> During this vulnerable period, nursing mothers confer some level of immune protection to their infants through transfer of maternal immunoglobulins via breastmilk.

However, only 49% and 27% of infants are breastfed for 6 months and 1 year, respectively,<sup>2</sup> and breastfeeding alone is insufficient to protect infants who have not received their first vaccinations. Consequently, caregiver vaccination has often been used as a method of indirect protection for these children.<sup>3</sup>

Because childcare agencies accept children as young as 6 weeks old, staff are likely to provide care for infants at high risk for vaccine-preventable diseases. Older children aged 19-35 months in these settings can be susceptible as well; uptake of recommended vaccines in this population has been found to be suboptimal and is a target for improvement by Healthy People 2020.<sup>4</sup> Research indicates that outbreaks of vaccine preventable diseases occur within childcare agencies,<sup>5-7</sup> and both attendees and staff are at risk from infection.<sup>6,8,9</sup> These outbreaks reinforce the need to focus on vaccination of both child attendees and staff caregivers.

In the United States, minimum vaccination requirements for educational settings, including childcare centers, are established at the state level. Although all U.S. states legally mandate that child clients attending licensed childcare agencies be vaccinated,<sup>10,11</sup> little is known about regulations for vaccination requirements for childcare agency

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staff. Some states, such as Massachusetts<sup>12</sup> and California,<sup>13</sup> have established legislation requiring vaccination of childcare personnel. In addition to state-level mandates, childcare agencies can also establish a vaccine policy for their staff. Historically, this action has been reactive, rather than proactive. For example, following the 2015 measles outbreak that originated in California, a national childcare agency revised its policy to require all staff who interact with children  $\leq 15$  months to provide proof of measles vaccination.<sup>14</sup> To our knowledge, the only research examining the frequency or extent to which childcare agency staff have been vaccinated against high-risk diseases for their clients, such as hepatitis A, pertussis, or influenza, has been reported in conjunction with outbreak investigation or control,<sup>5,6,15</sup> rather than examining baseline rates. In addition, no research has specifically examined attitudes and beliefs about staff vaccination policies in parents of children in childcare, childcare staff, or administrators. The primary purposes of this study were to assess existing immunization policies for childcare agency attendees and staff and to evaluate parents', staff's, and administrators' attitudes and beliefs surrounding childcare agency staff vaccination requirements. A secondary purpose was to assess agency policies versus staff practices regarding working while ill.

## METHODS

All parents and staff at 23 St Louis City and County childcare agencies were invited to participate in a survey between September-December 2014. A recruitment e-mail was sent that included a link to an electronic survey created through Qualtrics, an online survey software program. Paper questionnaires were also available at participating childcare agencies. The Saint Louis University Institutional Review Board approved this study.

### Instrument

The instrument was developed based on previous questionnaires assessing vaccine compliance.<sup>16-18</sup> In addition, other constructs specific to this study were added, such as parents' knowledge of vaccination recommendations by the Centers for Disease Control and Prevention (CDC). Instrument content validity was assessed using 10 professionals working in the fields of vaccine development, uptake, or public health. A content validity index was calculated for each item.<sup>19</sup> All content validity indexes were  $> .80$ ; therefore, all questions remained. The instruments were also pilot tested with 10 parents and 10 childcare agency staff, and questions were revised based on feedback from participants. The final questionnaire contained 41 items plus demographic questions and included (1) knowledge of CDC recommendations and local vaccination regulations (3 items), (2) agency client and staff vaccination policies (14 items), (3) parents' and staff's uptake of hepatitis A, seasonal influenza, and pertussis vaccines (5 items), (4) parents' perceptions of staff vaccination requirements (5 items), (5) attitudinal questions regarding staff vaccination (5 items), (6) whether the individual is encouraged or required to get vaccinated (4 items), and (7) practices and policies regarding working while ill (ie, presenteeism; 5 items).

### Data analysis

SAS 9.4 (SAS Institute, Cary, NC) and SPSS Statistics 23.0 (IBM, Armonk, NY) were used for all analyses. The  $\chi^2$  tests were used to compare staff's versus parents' uptake of each assessed vaccine and all other comparisons of 2 categorical variables. Multivariate logistic regression controlling for sex, race, and income level was used to determine predictive models for parents' asking about staff vaccine status when selecting a childcare provider and the individual being

fully immunized (ie, having received all 3 assessed vaccines). Non-significant variables were not included in the final models; only final models are reported. A critical *P* value of .05 was used for all analyses.

## RESULTS

Twenty-three agencies agreed to participate, from which 351 parents, staff, and administrators were recruited and completed a survey (response rate, 32%). Demographics of the participants are outlined in Table 1. Most participants were parents or guardians (72.6%, *n* = 255), and the response rate was approximately the same among parents and staff (33.4% vs 30.4%, respectively). Most respondents were white (69.8%, *n* = 245), women (86.6%, *n* = 304), and worked full-time (73.2%, *n* = 257). Most participating agencies (81.5%, *n* = 286) were licensed and large in size as defined by the number of children for which they provide care. Three-quarters of participants (75.5%, *n* = 265) worked in or had a child in an agency that provides care to  $\geq 51$  children.

### Knowledge of CDC's recommendations and other regulations for adult vaccination

The CDC's Advisory Committee on Immunization Practices (ACIP) currently recommends that all adults without medical contraindications receive seasonal influenza vaccine annually.<sup>20</sup> The ACIP recommends that all pregnant women receive a dose of the

**Table 1**  
Participant and agency demographics (*N* = 351)

Characteristics	% (n)*
Individual characteristics	
Parent, staff, or administrator	
Parent	72.6 (255)
Staff	22.2 (78)
Agency administrator	5.1 (18)
Sex (female)	86.6 (304)
Race	
White	69.8 (245)
Other	24.2 (85)
Opted not to answer	6.0 (21)
Employment status	
Full time	73.2 (257)
Part time	19.7 (69)
Unemployed or retired	7.1 (25)
Age (y)	
$\leq 30$	24.8 (87)
31-40	48.4 (170)
41-50	16.5 (58)
51-60	6.3 (22)
$\geq 61$	4.0 (14)
Education level	
High school, GED, or less	7.4 (26)
Some college or associate's degree	26.9 (94)
Bachelor's degree	32.3 (113)
Master's degree or higher	25.1 (88)
Doctoral degree (MD, PhD, or equivalent)	8.3 (29)
Household income	
$\leq \$20,000$	26.9 (94)
$\$20,001-\$39,000$	10.5 (37)
$\geq \$39,001$	54.1 (190)
Opted not to answer	8.5 (30)
Agency characteristics (from 23 agencies)	
Size	
$\leq 10$ children	1.1 (4)
11-25 children	10.3 (36)
26-50 children	13.1 (46)
51-99 children	52.1 (183)
$\geq 100$ children	23.4 (82)
Licensed (yes)	81.5 (286)

GED, General Educational Development.

\*Denominator varies because of missing or incomplete data.

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