protect hawaii’s Keikis
STOP FLU AT SCHOOL
HAWAI‘I STATE DEPARTMENT OF HEALTH
Lisa Mendez  
Immunization Program Manager

Dr. Sarah Park  
Disease Outbreak Control Division
Children Vaccinated Against Flu

Some promising data in the literature:

- Less medically-attended illness in kids
- Fewer school absences
- Less illness in the student’s family
- Limited evidence of reduced illness in the community at large

But most of the studies to date have been small.
Hawaii’s rationale for pursuing statewide school-based influenza vaccinations:

1. We have only one public school system statewide

2. We had previous success in implementing other school-based vaccination programs, i.e. hepatitis B for 5th graders
Hawaii’s rationale for pursuing statewide school-based influenza vaccinations:

3. We wanted to improve our vaccination coverage among children with conditions that place them at increased risk for flu.
Percentage of Children with Medical Condition Vaccinated Against Flu in Hawaii in 2006-07

- Only 40% of 8,154 privately insured children 5-13 years with asthma
- Only 50% of 68 privately insured children 5-13 years with diabetes
Hawaii’s rationale for pursuing statewide school-based influenza vaccinations:

5. Available data indicated many school-aged children without a medical condition were already recommended by ACIP to be vaccinated against flu because of the age or health of a household contact.
Percentage of Children with HHC Indication to be Vaccinated Against Flu in Hawaii in 2006-07

Hawaii Health Survey – 2005
19,309 Households with weighted responses representing 138,371 children 5-13 years of age.

HHC ill or pregnant: 24%
HHC < 5 or > 49 years: 57%
No HHC indication: 19%
Hawaii’s rationale for pursuing statewide school-based influenza vaccinations:

5. We wanted to determine if we can decrease community flu morbidity by decreasing transmission among school children.

6. We wanted to be better prepared for possible mass vaccinations of school children during an influenza pandemic.
Hawaii’s Stop Flu at School Program

- Grades K-8 (elementary and middle schools)
- All public and private schools in Hawaii invited
- Offered TIV and LAIV – ordered a 50-50 split
- Two clinics held ≥ 6 weeks apart if school had children < 9 years of age needing 2 doses
- Voluntary written consent of parents/guardians
STUDENT INFLUENZA VACCINATION CONSENT FORM

**STUDENT'S NAME (Last) (First) (MI) STUDENT'S DATE OF BIRTH**

**PARENT/GUARDIAN'S NAME (Last) (First) (MI) STUDENT'S GENDER (M/F) **

ADDRESS

CITY ZIP PHONE (Daytime)

SCHOOL NAME GRADE

HOME ROOM/TEACHER NAME (Last) (First)

The following questions will help us to determine if your child may receive the Inactivated Influenza Vaccine ("Flu Shot") or the Intranasal Influenza Vaccine (FluMist®). Please mark YES or NO for each question.

| 1. Has your child ever had a serious allergic reaction to eggs or to a component of any flu vaccine? | Yes | No |
| 2. Has your child ever had a serious reaction to a previous dose of flu vaccine? | Yes | No |
| 3. Has your child ever had Guillain-Barre Syndrome (GBS, i.e., progressive ascending paralysis)? | Yes | No |
| 4. Is your child less than 5 years of age? | Yes | No |
| 5. Does your child have a long-term health problem such as heart disease, kidney disease, lung disease such as asthma, metabolic disease such as diabetes, or blood disorders such as anemia? | Yes | No |
| 6. Does your child have a weakened immune system caused by, for example, cancer, cancer treatment such as chemo or drugs, HIV/AIDS, or is your child taking other drugs such as steroids that weaken the immune system? | Yes | No |
| 7. Does your child live with or have close contact with someone with a severely weakened immune system requiring care in a protected environment? | Yes | No |
| 8. Is your child receiving any other antiviral medications? | Yes | No |
| 9. Is your child taking any prescription medications to prevent or treat flu? | Yes | No |
| 10. Will your child be receiving a 2016-2017 measles-mumps-rubella (MMR) or varicella (chickenpox) vaccination after Sept. 8, 2017? | Yes | No |

Note: If you answered YES to questions 1, 2, or 3 or left any of these questions blank your child should NOT receive the any influenza vaccine through the school vaccination program. If you answered YES to left blank any question 4 through 10 your child should NOT receive the intranasal influenza vaccine (FluMist®) but they can receive the injectable influenza vaccine (Flu Shot).

**CONSENT FOR CHILD’S VACCINATION:** I have read the 2016-17 Vaccine Information Statements for the Inactivated Influenza Vaccine (“Flu Shot”) and the Intranasal Influenza Vaccine (FluMist®). I understand the risks and benefits associated with Inactivated Influenza Vaccine and the Intranasal Influenza Vaccine and give consent to the State of Hawaii Department of Health for my child named at the top of this form to receive:

- **Inactivated Influenza Vaccine (“Flu Shot”)** ONLY
- **Live Intranasal Influenza Vaccine (FluMist®) Only**
- **Either Inactivated Influenza Vaccine (“Flu Shot”) or Live Intranasal Influenza Vaccine (FluMist®)**

Signature Parent or Legal Guardian __________ Date __/__/____

**FOR CHILDREN 8 YEARS AND YOUNGER ONLY: CONSENT FOR CHILD’S 2ND DOSE OF VACCINE**

My child is 8 years of age or younger and this is the first time he/she is receiving the flu vaccine. I have read the 2016-17 Vaccine Information Statements for the Inactivated Influenza Vaccine (“Flu Shot”) and the Intranasal Influenza Vaccine (FluMist®), understand the risks and benefits, and give consent to the State of Hawaii Department of Health to give the second dose of:

- **Inactivated Influenza Vaccine (“Flu Shot”)** ONLY
- **Live Intranasal Influenza Vaccine (FluMist®) Only**
- **Either Inactivated Influenza Vaccine (“Flu Shot”) or Live Intranasal Influenza Vaccine (FluMist®)**

Signature Parent or Legal Guardian __________ Date __/__/____

Please send a copy of any child’s immunization record to his/her doctor at the following address:

**DOCTOR’S NAME (Last, First) ADDRESS CITY ZIP**
The following questions will help us to determine if your child may receive the Inactivated Influenza Vaccine ("Flu Shot") or the Intranasal Influenza Vaccine (FluMist®). Please mark YES or NO for each question.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Has your child ever had a serious allergic reaction to eggs or to a component of any flu vaccine?</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Has your child ever had a serious reaction to a previous dose of flu vaccine?</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Has your child ever had Guillain-Barré Syndrome (GBS, i.e., progressive ascending paralysis)?</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Is your child less than 5 years of age?</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Does your child have a long-term health problem such as heart disease, kidney disease, lung disease such as asthma, metabolic disease such as diabetes, or blood disorders such as anemia?</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Does your child have a weakened immune system caused by, for example, cancer, cancer treatment such as x-rays or drugs, HIV/AIDS, or is your child taking other drugs such as steroids that weaken the immune system?</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Does your child live with or have close contact with anyone with a severely weakened immune system requiring care in a protected environment?</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Is your child receiving aspirin or other salicylate medication?</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Is your child taking any prescription medicines to prevent or treat flu?</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Will your child be receiving a MMR (measles/mumps/rubella) &amp;/or varicella (chickenpox) vaccination after Sept. 8, 2007?</td>
<td></td>
</tr>
</tbody>
</table>

Note: If you answered YES to questions #1, 2, or 3 or left any of these questions blank your child should NOT receive the any influenza vaccine through the school vaccination program. If you answered YES or left blank any question #4 through #10 your child should NOT receive the intranasal influenza vaccine (FluMist®) but they can receive the injectable influenza vaccine (Flu Shot).
CONSENT FOR CHILD’S VACCINATION: I have read the 2007-08 Vaccine Information Statements for the Inactivated Influenza Vaccine (“Flu Shot”) and the Live Intranasal Influenza Vaccine (FluMist®). I understand the risks and benefits associated with Inactivated Influenza Vaccine and the Live Intranasal Influenza Vaccine and give consent to the State of Hawaii Department of Health and its authorized staff for my child named at the top of this form to receive:

☐ Inactivated Influenza Vaccine (“Flu Shot”) ONLY
☐ Live Intranasal Influenza Vaccine (FluMist®) ONLY
☐ EITHER Inactivated Influenza Vaccine (“Flu Shot”) OR Live Intranasal Influenza Vaccine (FluMist®)

Signature/Parent or Legal Guardian ___________________________ Date: __/___/___
Hawaii’s Stop Flu at School Program

Timeline

- Order Vaccines
- Schools Invited
- Schools Scheduled
- Staffing Arranged
- Consents Due/Review
- Consent Sent
- Clinics

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan

59 Working Days
Hawaii’s Stop Flu at School Program

School Participation

- 341/377 (90%) of all schools with grades K-8
  - 242/251 (96%) of **public** schools
  - 99/126 (79%) of **private** schools

- 622 school-based clinics (277 of which were second dose clinics)
Hawaii’s Stop Flu at School Program

Student participation:

62,970 (94%) of 67,203 students who consented

45% of 140,636 children at participating schools vaccinated

44% of 142,564 children aged 5-13 years in Hawaii according to 2006 census
Hawaii’s Stop Flu at School Program

Student participation (continued):

15,228 children < 9 years old received 2nd dose (24% of all vaccinated children)

78,198 total flu vaccine doses given to children
Hawaii’s Stop Flu at School Program

School staff participation:

9,329 school-based staff vaccinated, representing approximately 43% of the workforce cohort
Number of children aged 5-13 years receiving first dose flu vaccine, by county

- Hawaii
- Honolulu
- Kauai
- Maui

Preliminary data – Do not distribute
Percent of children aged 5-13 years receiving first dose flu vaccine, by county

Hawaii
Honolulu
Kauai
Maui

K
N
O

0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
Number of Children receiving first doses of Flu Vaccine, by Age

Age in Years

Preliminary data – Do not distribute
Percent of Children receiving first doses of Flu Vaccine, by Age

Preliminary data – Do not distribute
Proportion of Public vs. Private students vaccinated

<table>
<thead>
<tr>
<th></th>
<th>Median</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>43%</td>
<td>42%</td>
</tr>
<tr>
<td>Private</td>
<td>47%</td>
<td>44%</td>
</tr>
</tbody>
</table>
Throughput times at school vaccination clinics, Hawaii 2007-08

- 72% within 0 to 5 minutes
- 20% within 6 to 10 minutes
- 5% within 11 to 15 minutes
- 3% > 15 minutes

Average: 0:05
Median: 0:04
Mode: 0:02

n = 1970 students at 199 schools; approx. 10 students per school
Influenza Vaccine Formulations
Vaccine Formulation Chosen

- TIV: 57%
- LAIV: 26%
- EITHER: 17%

Preliminary data – Do not distribute
Vaccine Formulation Chosen, by Gender of Student

Male
- TIV: 57%
- LAIV: 25%
- EITHER: 18%

Female
- TIV: 56%
- LAIV: 27%
- EITHER: 17%

Preliminary data – Do not distribute
Vaccine Formulation Chosen, by Percent of First doses by Age

- **TIV**
- **Either**
- **LAIV**

Preliminary data – Do not distribute
Vaccine Formulation Actually Administered - First doses

- TIV: 61%
- LAIV: 39%

Preliminary data – Do not distribute
Hawaii’s Stop Flu at School Program

Adverse events: (All post TIV)

- **VAERS**
  1. 13 y/o hives at injection site
  2. 11 y/o temporarily couldn’t move arm
  3. 12 y/o fever, vomiting → H/A and malaise for 1 month

- **Other**
  1. 5 y/o sick one hour p vax – fever 102.4 F
  2. 9 y/o syncope after receiving TIV – sent ED
  3. 7 y/o syncope and questionable Sz for 5-10 seconds
  4. Middle school student with syncopal episode
Hawaii’s Stop Flu at School Program

Sources of Staffing

- HDOH
- Nursing Schools
- Medical Reserve Corps
- Contract Nurses
- Military
Clinic Staffing


Clinic Managers: 1006 hours 3.1/clinic
Vaccinators: 5947 hours 18.3/clinic
Registration: 5554 hours 17.1/clinic

Translates to approximately 3.5 hour clinic w/
1 manager
5-6 vaccinators
4-5 registration
Clinic Staffing - Clinic Manager

Clinic Manager - 578 Clinics (10/15/07 to 1/31/08)

Contract Nurse
- 1% (17 h)
- 0% (3 h)

DOH
- 12% (189 h)

PHN
- 80% (1254 h)

Other Staffing Sources:
- PHN
- IMMUNIZATION/DOCD/DIB
- DOH VOLUNTEERS
- CONTRACT NURSES
- NURSING SCHOOL
Clinic Staffing — Registration

Registration - 578 Clinics (10/15/07 to 1/31/08)

- DOH
- CONTRACT NURSES
- NURSING SCHOOLS
- MILITARY
- MRC
- OTHER (i.e. parent volunteers, no affiliation listed)

Parents: 15% (984 h)
MRC: 8% (557 h)
DOH: 72% (4892 h)
non-PHN: 1% (108 h)

Preliminary data – Do not distribute
Clinic Staffing - Vaccinators

Vaccinators - 578 Clinics (10/15/07 to 1/31/08)

- Contract Nurses: 48% (3575 h)
- Contract Nurses: 27% (2032 h)
- Contract Nurses: 15% (1132 h)
- MRC: 6% (475 h)
- MRC: 1% (66 h)
- Student Nurses: 3% (253 h)
- Others: 15% (475 h)

Legend:
- DOH
- CONTRACT NURSES
- NURSING SCHOOL
- MILITARY
- MRC
- OTHER (i.e. parent volunteers, no affiliation listed)
Hawaii’s Stop Flu at School Program

What did the program cost:

<table>
<thead>
<tr>
<th>Category</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine</td>
<td>$1,049,096</td>
</tr>
<tr>
<td>Medical Supplies</td>
<td>$135,000</td>
</tr>
<tr>
<td>Print Materials</td>
<td>$148,278</td>
</tr>
<tr>
<td>Data Entry</td>
<td>$42,230</td>
</tr>
<tr>
<td>Nursing Services</td>
<td>$300,000</td>
</tr>
<tr>
<td>Staff</td>
<td>$130,199</td>
</tr>
<tr>
<td>Curriculum &amp; Training</td>
<td>$35,300</td>
</tr>
<tr>
<td>Public Relations</td>
<td>$216,706</td>
</tr>
<tr>
<td>Courier</td>
<td>$19,300</td>
</tr>
<tr>
<td>Promotion &amp; Incentives</td>
<td>$7,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$2,083,108</strong></td>
</tr>
</tbody>
</table>

About $23 for each dose of vaccine administered.
Hawaii’s Stop Flu at School Program

What would we do differently next year?

- Plan for close to 100% of all schools
- Hold only 1 clinic per school (45% of all clinics were 2\textsuperscript{nd} clinics - diminishing returns)
- Target 50% vaccine uptake
- Anticipate more LAIV use
- Revise consent forms
- Use different syringes
In summary...

- Demonstrated ability to conduct statewide school-based influenza vaccination program using both TIV and LAIV
- Improved our pandemic preparedness
- Program was well received by parents and both public and private schools
- Foundation laid for comprehensive evaluation
- Need to maintain and expand program so that impact can be assessed over multiple flu seasons
Thank You

Questions & Discussion
Hawaii is an ideal setting for assessing the impact of school-based influenza vaccinations because:

- Hawaii’s geographic isolation means that residents usually receive medical care within state.
- Hawaii has a statewide hospital discharge database to capture of hospitalizations due to respiratory illness.
- Hawaii has two major health care insurers/payers that together provide coverage for > 70% of the population → comprehensive assessment of impact on outpatient visits is possible.
Evaluation

Multiple options… in progress

1. Historical comparisons of outpatient, inpatient, and death data
Outpatient Visits: Green = all respiratory

Preliminary data – Do not distribute
Outpatient Data Cost in $, July 1999 - June 2006

Outpatient Costs: Green = all respiratory

Preliminary data – Do not distribute
Hospitalization Data, 1995-2006

Inpatients: Green = all respiratory

Preliminary data – Do not distribute
Deaths in Hawaii, 1998-2006: Blue = all causes

Preliminary data – Do not distribute
Evaluation

Multiple options… in progress

1. Historical comparisons of outpatient, inpatient, and death data

2. Vaccine effectiveness studies using etiologically confirmed ILI as validation sets

3. Impact of school-based flu vaccinations for children ages 5-13 years on office-based vaccinations in all age groups
Evaluation

Multiple options… currently being evaluated

4. Characteristics of schools with low vs. high vaccination rates
5. Student absenteeism comparing School low vs. high school vax coverage rates
6. ILI in family members of vax vs. unvax kids
7. Hawaii Kaiser vs. Northern CA Kaiser populations
Hawaii’s Stop Flu at School Program

Funding Sources 2007-08

- VFC Vax: 23%
- Fed-IMZ: 19%
- PHEP Vax: 27%
- Sanofi: 12%
- State Vax: 1%
- State: 4%
- MedImmune: 1%
- PHEP: 13%

Operational

Vaccine

Preliminary data - Do not distribute