Adult Vaccinations
Observations from Coast
2008

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PSSST... FLU SHOTS?
## Year 2010 Health Objectives

Table 2. Influenza Vaccine Baseline and 2010 Target percentages

<table>
<thead>
<tr>
<th>Objective</th>
<th>Increase in Adults Vaccinated</th>
<th>1998 Baseline</th>
<th>2010 Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noninstitutionalized adults aged 65 years and older</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>14-29a.</strong> Influenza vaccine</td>
<td></td>
<td>64</td>
<td>90</td>
</tr>
<tr>
<td>Noninstitutionalized high-risk adults aged 18 to 64 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>14-29c.</strong> Influenza vaccine</td>
<td></td>
<td>26</td>
<td>60</td>
</tr>
<tr>
<td>Institutionalized adults (persons in long-term or nursing homes)†</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>14-29e.</strong> Influenza vaccine</td>
<td></td>
<td>59</td>
<td>90</td>
</tr>
</tbody>
</table>

“Fight the Flu”
Campaign Stamford
Influenza Vaccination – A Collaborative Effort to Improve the Health of the Community

Stamford Hospital and City of Stamford Department of Health launched a collaborative program to increase influenza vaccine coverage in the community in 1998. The partnership is designed to increase the numbers of citizens receiving influenza vaccine and to decrease the severity of lower respiratory illness during the winter season. A variety of methods have been used to increase public awareness, enhance vaccine delivery, and create a relatively seamless service for the community. All promotional materials were done jointly so as to create a unified delivery system.
STAMFORD COMMUNITY FLU COALITION

• The coalition used multiple techniques to increase the public’s awareness and enhance vaccine delivery:
  ✓ advertising fliers, hotline
  ✓ easy access in multiple venues
  ✓ senior health fair, public “kickoff”
  ✓ common electronic database; roster billing
  ✓ vaccine availability, preservative-free, prefilled syringes, vaccine sharing policy (with MD’s, SNF’s, etc)
  ✓ homebound program
  ✓ seniors outreach program
  ✓ an identical fee charged by the DPH and hospital
  ✓ volunteers staffing
  ✓ administrative support
Results:

Over 10 seasons, to 2007, influenza vaccination rates increased to almost 300% of baseline. By 2004, this represented immunization of 16% of the entire community and >75% of residents over age 65 years. Hospital employee vaccination rates also rose from 34% to 52%; the campaign reduced average annual emergency department visits for all respiratory diagnoses by 34% and exacerbations of chronic obstructive pulmonary disease by 46% compared with other hospitals in the county in 2003/4.

Basic Staffing for Vaccination Program

- **Basic** staffing for 240 patients per hour. Assumes we have the set-up arranged and all vaccine is supplied in pre-filled syringes.
  - 8 RN's to vaccinate
  - 4 trained volunteers (three at the payment desk, one at the reception/registration area. You need more if they are less proficient.)
  - 4 security (one registration, one central/numbers, one desk/back corridor, one parking and outside triage)
  - 2 reception (e.g., one of whom needs to be an RN plus one other; security and volunteers mentioned above add two more to this mix)
  - 1 supervisor / rover / troubleshooter / fill-in (you need two on the first day, and ability to call more as necessary; these people need authority and knowledge of the entire process)
Stamford Influenza Vaccination 1998-2008

Season | Number of vaccinations given
---|---
1998-1999 | 7387
1999-2000 | 12559
2000-2001 | 14988
2001-2002 | 18471
2002-2003 | 18071
2003-2004 | 20836
2004-2005 | 18761
2005-2006 | 20000
2006-2007 | 18923
2007-2008 | 15048
New Emphasis

- Influenza immunization recommendations now apply to approximately 218 million Americans, but only 70 million are vaccinated\(^1\)
- Children 5-18 years of age included
- Influenza vaccine supply is improving -- between 150 and 200 million doses anticipated in the next few years\(^2\)
- The Advisory Committee on Immunization Practices (ACIP) emphasizes that immunization providers should offer influenza vaccine and schedule immunization clinics throughout the influenza season” —MMWR. 2007;56(RR-6):3.
  - It is extremely challenging to vaccinate everyone in the current 2 to 3 month immunization “window”

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Vaccinations Need To Be Administered Throughout the Entire Season

- **Demand**
  - Health-care provider recommendations are a key driver in creating consumer demand for influenza vaccine

- **Supply**
  - Supply is no longer a barrier to influenza immunization
  - Between 150 and 200 million doses are anticipated in the next few years

- **Opportunity**
  - Access to unimmunized high-risk patients exists throughout the entire immunization season
Disease Activity Usually Peaks after the Traditional Immunization Effort

Attempts to Expand the Immunization Season

• American Academy of Pediatrics (AAP)
  – Revised its influenza immunization recommendation; “influenza immunizations should be given through April 30th”
• National Influenza Vaccination Week (NIVW): Nov. 26 – Dec. 2
  – Scheduled after Thanksgiving to promote the need for immunization throughout the full season
  – Led by the Department of Health and Human Services (HHS), CDC and other partners
• American Medical Association (AMA)
  – Modified its influenza immunization strategies to reflect the need to immunize throughout the full season
• Center for Medicare Services (CMS)
  – Changed the inpatient immunization standard end from March 1 to March 31 to expand the immunizing season
Prevention and Control of Influenza -- Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2008. MMWR 7/17/08
Connecticut DPH Data

Figure 3. 2007-08, 2006-07, 2005-06, 2004-05, and 2003-04 Influenza Seasons: Laboratory Confirmed Tests (LCT)
Stamford Hospital
ED Screening Program

- Aggressively marketed to ED physicians
- RN or MD initiated
- Rapid method
- Short turnaround
- Weekly feedback to ED staff
  - Posting graphs of positive and negatives
- Transport vials saved and sent to State DPH for typing and statistical purposes
- Allows optional RSV / culture
Pneumonia Admissions
Connecticut Data

Figure 4. Hospital Admissions Syndromic Surveillance (HASS) System,
Statewide Pneumonia Admissions: 2007-08, 2006-07, & 2005-06
Pneumonia Admissions
Connecticut Data

Figure 4. Hospital Admissions Syndromic Surveillance (HASS) System,
Statewide Pneumonia Admissions: 2007-08, 2006-07, & 2005-06
Influenza-like Illness at Stamford Hospital

RSV and Influenza Cases at Stamford Hospital 2007-2008
Healthcare Worker Vaccinations

Stamford Hospital
Experience 2007-2008
• Only 40% of U.S. healthcare workers are vaccinated each year against influenza

• 2006 guidelines by HICPAC and ACIP recommend that healthcare workers refusing vaccination be required to sign a declination form

• Few data exist regarding the effectiveness of declination forms

• The purpose of this study was to gather preliminary information about how declination (refusal) policies at different institutions have been implemented and to determine the effect of such policies on vaccination rates among healthcare workers
Use of Influenza Vaccination Declination Statements in 17 U.S. Hospitals: Results of an IDSA Emerging Infections Network Survey

Susan Beekmann RN MPH\textsuperscript{1}, Thomas Talbot MD MPH\textsuperscript{2}, Ed Septimus MD\textsuperscript{3}, Michael Parry MD\textsuperscript{4}, YiYi Chen MS\textsuperscript{1}, Philip Polgreen MD\textsuperscript{1} and the Infectious Diseases Society of America Emerging Infections Network

\textsuperscript{1}University of Iowa, Iowa City, IA; \textsuperscript{2}Vanderbilt University, Nashville, TN; \textsuperscript{3}The Methodist Hospital System, Houston, TX; \textsuperscript{4}Stamford Hospital, Stamford, CT

Infection Control and Health Care Epidemiology, July 2008
Study Background

• Survey distributed in April 2007 to 100 infectious diseases consultant members in the U.S. who had indicated previously either that their institutions had or were considering a declination program, or had responded to a listserv posting about this topic

• 45/100 (45%) physicians responded; two had duplicate institutional data

• Respondents came from each of the 9 U.S. Census Bureau Divisions

• 31 of 43 respondents indicated that their institution had implemented an influenza vaccination declination policy
INFLUENZA VACCINATION REFUSAL
2007/2008

I understand that due to my occupation in health care, I may be at risk of acquiring influenza. In addition, I may be at risk of spreading influenza to my patients, other healthcare workers, and my family, even if I have no symptoms. This can result in a serious infection, particularly in hospitalized patients and other persons at high risk for influenza complications.

I have received education about influenza and its complications, and the effectiveness of influenza vaccination, including its potential adverse effects. I understand that I cannot get influenza from the flu vaccine. I have also been given the opportunity to be vaccinated with influenza vaccine at no charge to myself. However, I refuse influenza vaccination at this time. I understand that by refusing this vaccine, I continue to be at risk of acquiring influenza, potentially resulting in transmission to my patients.

If in the future I want to be vaccinated with influenza vaccine, I can receive the vaccine at no charge to me as long as it is still available.

The reasons I have for refusing vaccination at this time are:

- I already had the vaccination this season
- I’m allergic to eggs or egg products
- I’m afraid of getting side effects from the vaccine:
  - Fever
  - General adverse effects
  - Allergic reaction
  - Guillian-Barré syndrome
- I never get the flu, so I don’t think I need it
- I don’t like vaccinations
  - But I am willing to receive the nasal spray Flu Mist
- Other medical reason ____________________________

PRINTED NAME __________________ DEPARTMENT __________________

SIGNATURE ____________________________ DATE _____________________
Results

First influenza season that declination statements were implemented

- 2005-06: 8
- 2006-07: 22
- 2007-08: 1
Results

Completion of the declination form was:
Optional – 15 institutions
Mandatory – 16 institutions

Penalties if mandatory

- None: 11
- Supervisor notified: 2
- Notice in file: 2
- No answer: 1

None
Resistance to the declination policy was encountered from:

- None reported: 11
- Individual HCWs: 13
- Administrators: 2
- Unions: 1
- Those responsible for campaign: 3

Results
Results

Other concurrent interventions

- None reported: 3
- New educational programs: 19
- New vaccination locations: 6
- New use of vaccination carts: 4
- Other: 2
Outcome: 11.6% Increase in Mean Vaccination Levels

(paired t-test, P=0.0002; Confidence Interval 6.3-16.9)

Years around implementation of vaccine declination policies

Percent

<table>
<thead>
<tr>
<th>Years before</th>
<th>Percent</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 yrs before</td>
<td>44.5</td>
<td>4</td>
</tr>
<tr>
<td>2 yrs before</td>
<td>42.2</td>
<td>5</td>
</tr>
<tr>
<td>1 yr before</td>
<td>51.9</td>
<td>25</td>
</tr>
<tr>
<td>Year of</td>
<td>64.9</td>
<td>24</td>
</tr>
<tr>
<td>Year after</td>
<td>79.5</td>
<td>4</td>
</tr>
</tbody>
</table>
Top reasons cited when HCWs decline vaccine

- Makes me sick/ causes influenza: 17
- Never get flu/ don’t need: 11
- Fear of side effects: 8
- Vaccine doesn’t work: 8
- Personal choice: 6
- Afraid of needles: 4
- Other: 4
Summary

• The use of declination (refusal) statements was associated with an 11.6% increase in vaccination rates among HCWs.

• The true impact of these statements is unclear due to the concurrent implementation of other strategies to increase HCW vaccination rates as well as the lack of consequences for those who refused vaccination but failed to sign a declination statement.

• Significant resistance from hospital employees was encountered in a number of institutions, and the costs of implementing such a system may be significant.

• Declination policies without penalties will not solve the problem of low vaccination rates among HCWs, as the observed effects were modest.

• Declination policies appear to be another component to increase the effectiveness of influenza vaccine campaigns.
Methicillin-resistant Staphylococcus aureus (MRSA) and Influenza
Deaths among children that have been attributed to co-infection with influenza and *Staphylococcus aureus*, particularly methicillin resistant *S. aureus* (MRSA), have increased during the preceding four influenza seasons (70; CDC, unpublished data, 2008). The reason for this increase is not established but might reflect an increasing prevalence within the general population of colonization with MRSA strains, some of which carry certain virulence factors (71, 72).
Who (used) to get MRSA

- Age >60
- ICU stay in past 5 years
- History of surgery in past 5 years
- Open skin lesions
- Diabetes
- Hospitalization
- IVDU
- Antibiotic use
Then........

- 1999 report of 4 children in the Midwest who died from multi-organ MRSA infections
- No risk factor for MRSA
- Isolates were identical to each other but different from the local hospital strains
- Isolates demonstrated new genetic properties
- Named the USA 300 strain
Surviving the New Killer Bug

A nasty, drug-resistant staph infection—the kind usually seen in hospitals—is racing across the U.S.

BY CHRISTINE CORNAN

Dr. Alan Smith, a 49-year-old orthopedist in Chicago, is lucky to be alive. A scrape on his left knee that he picked up riding his bike last October turned into a runaway infection that spread in a matter of days through his body, leaving him large ridge with holes. Jemans managed to survive, but what worries doctors most about his near-death experience is that it's not an isolated case.

The bacteria that infected his knee has become resistant to the most common antibiotics and is on the march across the U.S. It has spread rapidly through parts of California, Texas, Illinois and Alaska and is beginning to show up in Pennsylvania and New York.

"This bug has gone from 9 to 80 in just five years," says Elizabeth Bancroft, a medical epidemiologist at the Los Angeles County Department of Health Services. "It's spreading by contact, and it's getting into any community that's close contact, so it all needs to be passed around."

This is not just an issue or one or an "easy-curing bacteria" of today's fame. But it's a very bad news. Several strains have been making round the corners of all the hospitals in the past 10 years or so, often posing a greater risk for patients than the condition they were admitted for. And as the late 1980s, epidemiologists assumed that the problem was restricted to large hospitals and nursing homes.

The MRSA strains turning up in the community at large are related to but different from the ones found in medical institutions. The hospital variety usually needs intervention with powerful intravenous antibiotics and is so hard to catch. By contrast, the new strains of MRSA respond to a broader range of antibiotics, but spread much more easily among otherwise healthy folk. The bugs can be picked up on playgrounds, in gyms and in meeting rooms. All of these places have been the source of contaminated objects in poorly laundered towels.

The ubiquity of staph bacteria adds to the problem. The strains are part of the usual microscopic landscape of your outer and inner skin, including theธรรมชาติของป้องกันไม่ให้เกิดการติดเชื้อ. MRSA, or methicillin-resistant Staphylococcus aureus, is the most common type of staph infection. Unlike MRSA, most staph infections can be treated with antibiotics. But for some people, MRSA can be more dangerous. MRSA infections can spread to other parts of the body, causing more serious problems. MRSA infections are often treated with antibiotics that are more powerful than those used to treat MRSA.

WHAT YOU CAN DO

Try to avoid cuts and scrapes as much as possible. Wear gloves and practice good hygiene while gardening, doing repair work or mowing the lawn. Thoroughly wash all wounds with soap and water. Do not use hydrogen peroxide. Cover wounds with a clean, dry bandage. Wash your hands regularly and be sure that any antiseptic or disinfectant you use is effective against MRSA. MRSA infections can be treated with antibiotics that are more powerful than those used to treat MRSA. MRSA infections are often treated with antibiotics that are more powerful than those used to treat MRSA.
MRSA Infections in Texas

Purcell and Fergie Pediatr Infect Dis J 2002;21:989
Emergence of MRSA over 30 years
Stamford Hospital Microbiology Lab data
(community and hospital strains)
Influenza-Associated Deaths among Children in the United States, 2003-2004


N Engl J Med
Volume 353;24:2559-2567
December 15, 2005
Study Overview

- During the 2003-2004 influenza season in the United States, 153 influenza-associated deaths were reported in children (median age, three years).
- 96 of them (63 percent) were younger than five years old.
- Forty-seven of the children (31 percent) died outside a hospital setting.
- Fifty-three percent of the children had a condition conferring a high risk of influenza or had another chronic condition, and 47 percent were classified as "previously healthy."
- 45 (29 percent) died within three days after the onset of illness.
- Bacterial coinfections were identified in 24 of the 102 children tested (24 percent).
## Distribution of Cases and Mortality Rates

### Table 1. Distribution of Cases and Mortality Rates According to Geographic Location and Age Group among 153 Children with Fatal Influenza — United States, 2003–2004 Season.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Children (%)</th>
<th>Deaths per 100,000 Children (95% CI)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>153 (100)</td>
<td>0.21 (0.18–0.24)</td>
</tr>
<tr>
<td>Geographic census region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>13 (8)</td>
<td>0.10 (0.05–0.17)</td>
</tr>
<tr>
<td>Midwest</td>
<td>36 (24)</td>
<td>0.22 (0.15–0.31)</td>
</tr>
<tr>
<td>South</td>
<td>67 (44)</td>
<td>0.25 (0.20–0.32)</td>
</tr>
<tr>
<td>West</td>
<td>37 (24)</td>
<td>0.21 (0.15–0.29)</td>
</tr>
<tr>
<td>Age group†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;6 mo</td>
<td>18 (12)</td>
<td>0.88 (0.52–1.39)</td>
</tr>
<tr>
<td>6–11 mo</td>
<td>12 (8)</td>
<td>0.59 (0.30–1.02)</td>
</tr>
<tr>
<td>1 yr</td>
<td>31 (20)</td>
<td>0.77 (0.52–1.09)</td>
</tr>
<tr>
<td>2 yr</td>
<td>14 (9)</td>
<td>0.35 (0.19–0.58)</td>
</tr>
<tr>
<td>3 yr</td>
<td>9 (6)</td>
<td>0.23 (0.11–0.44)</td>
</tr>
<tr>
<td>4 yr</td>
<td>12 (8)</td>
<td>0.31 (0.16–0.54)</td>
</tr>
<tr>
<td>5–10 yr</td>
<td>26 (17)</td>
<td>0.11 (0.07–0.16)</td>
</tr>
<tr>
<td>11–17 yr</td>
<td>31 (20)</td>
<td>0.11 (0.07–0.15)</td>
</tr>
</tbody>
</table>

* CI denotes confidence interval.
† Ages are those on the date of the onset of illness or, if that information was unavailable, at the date of death. P for trend <0.001 by a chi-square test of age-specific mortality rates.

# Bacterial Coinfections in 24 Children with Fatal Influenza - United States, 2003-2004 Season

**Table 4. Bacterial Coinfections in 24 Children with Fatal Influenza — United States, 2003–2004 Season.**

<table>
<thead>
<tr>
<th>Bacterial Agent</th>
<th>No. of Children</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>11</td>
</tr>
<tr>
<td>Methicillin-resistant</td>
<td>6</td>
</tr>
<tr>
<td>Methicillin-susceptible</td>
<td>1</td>
</tr>
<tr>
<td>Unknown sensitivity</td>
<td>4</td>
</tr>
<tr>
<td><em>Staphylococcus</em>, species not specified</td>
<td>1</td>
</tr>
<tr>
<td><em>Streptococcus pneumoniae</em>†</td>
<td>2</td>
</tr>
<tr>
<td>Group A streptococcus</td>
<td>3</td>
</tr>
<tr>
<td><em>Bordetella pertussis</em>‡</td>
<td>1</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>4</td>
</tr>
<tr>
<td>Nontypeable</td>
<td>2</td>
</tr>
<tr>
<td>Type a</td>
<td>1</td>
</tr>
<tr>
<td>Type b</td>
<td>1</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>1</td>
</tr>
<tr>
<td><em>Enterococcus faecalis</em></td>
<td>1</td>
</tr>
<tr>
<td><em>Neisseria meningitidis</em></td>
<td>1</td>
</tr>
<tr>
<td><em>Mycoplasma pneumoniae</em>§</td>
<td>1</td>
</tr>
</tbody>
</table>

* All organisms were isolated by culture from normally sterile sites, except for *B. pertussis* and *M. pneumoniae*. In addition, *Escherichia coli* and *Enterobacter cloacae* were isolated from one child each but were of uncertain clinical significance, and 15 other positive cultures were classified as probable contaminants on the basis of clinical and pathological review. Polymicrobial infections were considered likely in two children.

† *S. pneumoniae* was isolated from a cerebrospinal fluid specimen in one case.

‡ *B. pertussis* infection was diagnosed on the basis of the result of PCR analysis of a nasopharyngeal specimen.

§ *M. pneumoniae* infection was diagnosed on the basis of the result of latex-agglutination testing of a serum specimen. This child also had a methicillin-resistant *S. aureus* coinfection.

Severe Methicillin-Resistant *Staphylococcus aureus* Community-Acquired Pneumonia Associated with Influenza --- Louisiana and Georgia, December 2006--January 2007

*Staphylococcus aureus* infection has been reported infrequently as a cause of community-acquired pneumonia (CAP) and typically has been associated with influenza virus infection or influenza-like illness (ILI). During the 2003--04 influenza season, methicillin-resistant *S. aureus* (MRSA) gained attention as a cause of 13 cases of influenza-associated CAP [1]. No formal surveillance has been conducted, and few additional cases of MRSA CAP were reported to CDC during the 2004--05 and 2005--06 influenza seasons. However, in January 2007, CDC received reports of 10 cases of severe MRSA CAP, including six deaths, among previously healthy children and adults in Louisiana and Georgia during December 2006--January 2007. These were the first reported cases of severe MRSA CAP during the 2006--07 influenza season in the two states, and 10 was a higher number than expected for the 2-month period. A case of severe MRSA CAP was defined as pneumonia requiring hospitalization or resulting in the death of a patient from whom a specimen (i.e., sterile site or sputum sample) yielded MRSA when collected ≤48 hours after hospitalization or arrival at an emergency department (ED). Association with influenza was determined by either a positive result on a laboratory test or a diagnosis of ILI. This report describes three of the MRSA CAP cases as examples and summarizes all 10 of the reported cases. These cases underscore the need for health-care providers to be vigilant, especially during the influenza season, for severe cases of CAP that might be caused by MRSA.
CT Influenza-associated Pediatric Deaths Reported to CDC*

<table>
<thead>
<tr>
<th>#</th>
<th>Month/year of death</th>
<th>Age Range</th>
<th>Sex</th>
<th>Flu Type</th>
<th>Co-infection**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>February 2006</td>
<td>&lt;1 year</td>
<td>Female</td>
<td>Flu A</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>April 2007</td>
<td>15-17 years</td>
<td>Female</td>
<td>Flu A</td>
<td>Yes (MSSA)</td>
</tr>
<tr>
<td>3</td>
<td>March 2008</td>
<td>10-14 years</td>
<td>Female</td>
<td>Flu B</td>
<td>Yes (MRSA)</td>
</tr>
<tr>
<td>4</td>
<td>March 2008</td>
<td>5-9 years</td>
<td>Female</td>
<td>Flu A</td>
<td>Possibly (strep)</td>
</tr>
</tbody>
</table>


** The CDC also seeks information on bacterial co-infections based on the observation that many influenza-associated pediatric death cases are also infected with Methicillin-resistant *Staphylococcus aureus* (MRSA), Methicillin-sensitive *Staphylococcus aureus* (MSSA), or other bacteria such as *Streptococcus* species.
Conclusion

- Influenza-associated deaths have occurred among children in the US during the past 4 seasons.
- Some of these are due to bacterial superinfection, especially Staph aureus, including MRSA.
- Treatment of acutely ill patients with suspected bacterial pneumonia complicating influenza should include MRSA coverage.
- High priority should be given to improvements in influenza-vaccine coverage at all levels:
  - Traditional “at-risk” population, children, healthcare workers
  - Expansion of the vaccination season
  - Consider deploying underutilized live vaccine for many lower risk patients.