



Factors Associated with Antiviral Treatment among Hospitalized Influenza Patients in California During Pandemic (2009-2010) and Post Pandemic (2010-2012) Seasons

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Background

- Antiviral treatment was recommended for all persons ≥1 year old, hospitalized with suspect or laboratory confirmed influenza during 2009-2012 influenza seasons.¹

- Treatment as early as possible was recommended for high risk groups including:

- children, ages 1-4
- adults, ages >64, and
- persons with underlying medical conditions.¹

- The FDA approved the emergency use of antiviral treatment for patients <1 year during the summer of 2009, which remained in place until indications were expanded to include patients < 1 year on December 21, 2012.²

- Disparities in administration of antiviral treatment are a public health concern, since previous studies have demonstrated a reduction in severe influenza outcomes associated with antiviral use.^{3,4}

- Epidemiologic characteristics are described for 2192 hospitalized patients with confirmed influenza during the 2009-2010 pandemic season through the 2010-2012 post pandemic seasons.

Methods

- Active, population-based surveillance was conducted in Alameda, Contra Costa, and San Francisco counties in California as part of the Centers for Disease Control and Prevention (CDC) FluSurv-Net surveillance system.

- A case was defined as a resident hospitalized with laboratory-confirmed influenza. Medical charts were reviewed for demographic and clinical information.

- Data were used from 2009-2012 influenza seasons from October 1–April 30. Data from summer 2009 were also included in some analyses since additional data collection took place to monitor high flu activity.

- Patients <1 year old were excluded from selected analyses due to a lack of antiviral treatment recommendations.

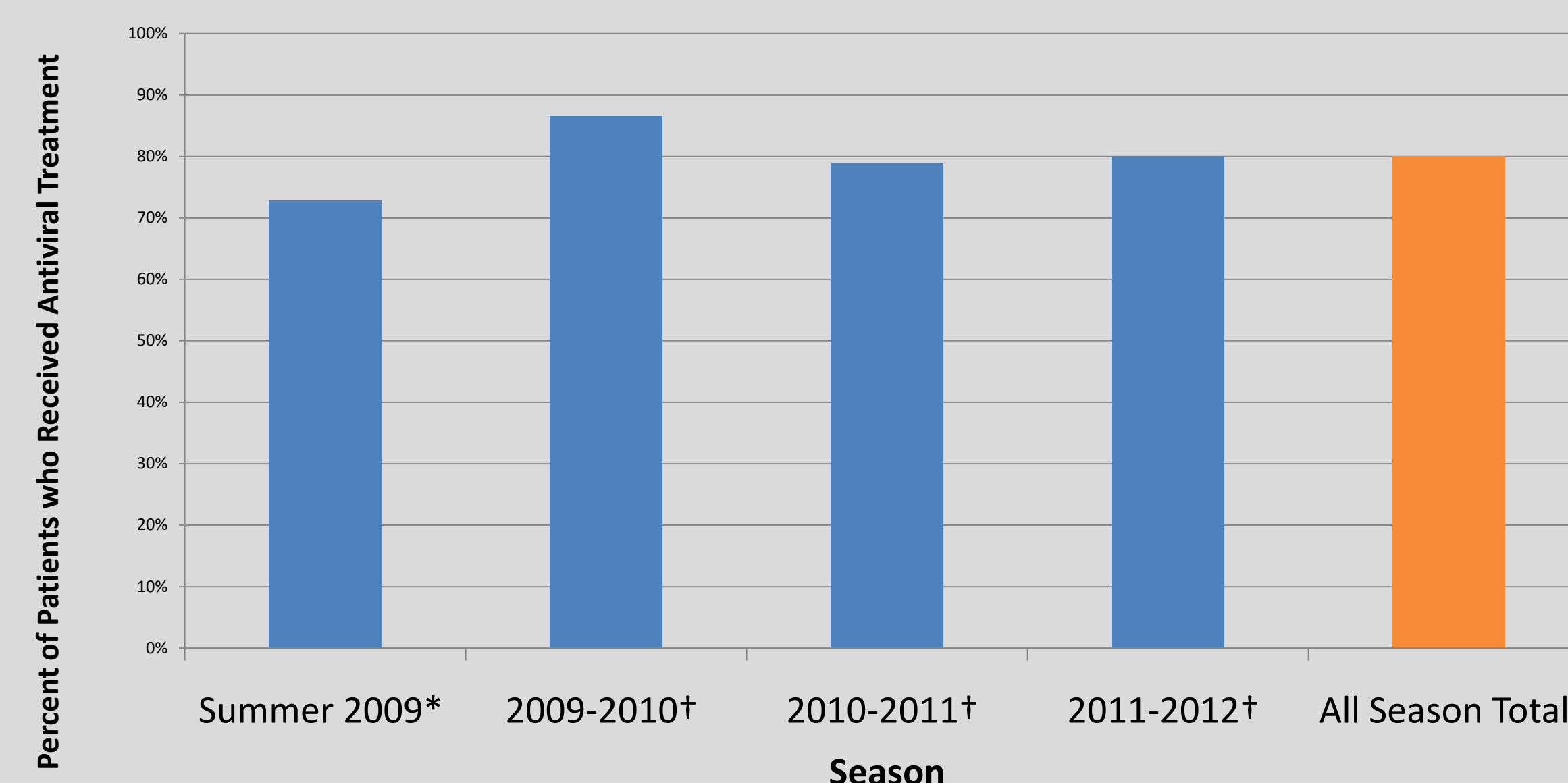
- Associations between risk factors and antiviral treatment were evaluated using chi-square and p-trend tests.

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Tables and Figures

Figure 1. Percentage of Hospitalized Patients who Received Influenza Antiviral Treatment during 2009-2012 Influenza Seasons



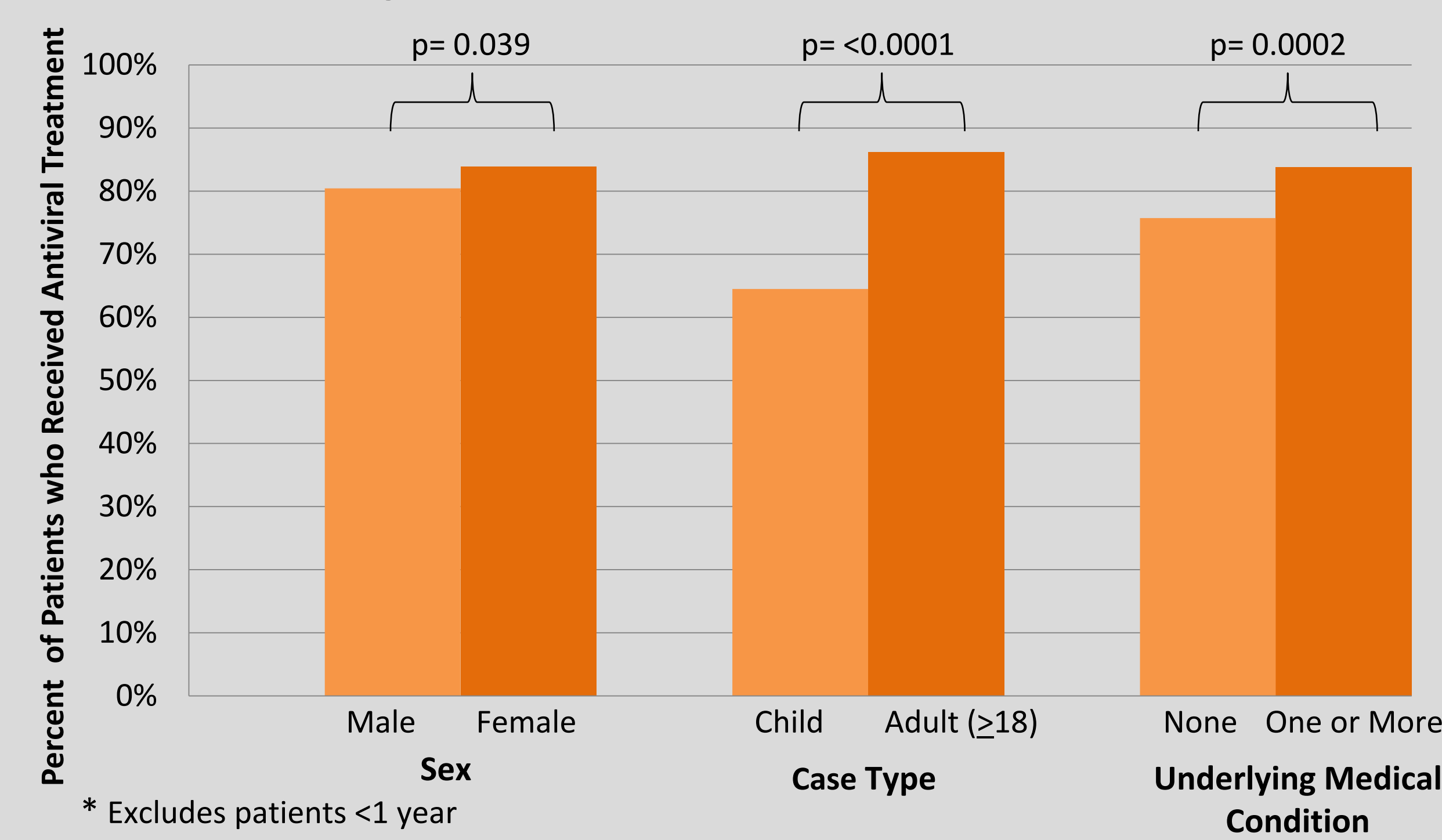
* Includes influenza cases between October 1st - April 31st
 † Includes influenza cases between May 1st - September 30th

Table 1. Demographic Characteristics of Patients Hospitalized with Laboratory-Confirmed Influenza who Received Treatment by Season.*

Characteristic	2009 Summer (N=491) N (%)	2009-2010 (N=540) N (%)	2010-2011 (N=546) N (%)	2011-2012 (N=451) N (%)	Total (N=2028) N (%)
Sex					
Male	179(77.5)	239(88.5)	216(75.8)	176(74.9)	840(77.8)
Female	199(76.5)	240(88.9)	251(83.4)	206(85.5)	915(82.2)
Case Type					
Pediatric	69(58.5)	116(81.1)	56(53.3)	33(50.8)	323(63.2)
Adult (≥18)	309(82.8)	393(91.4)	411(85.5)	349(84.9)	1429(85.0)
Underlying Medical Conditions					
One or More	292(78.1)	387(89.6)	377(83.8)	322(82.8)	1378(83.8)
None	86(73.5)	92 (85.2)	67(69.8)	45(72.6)	290(75.7)

*Excludes patients <1 year

Figure 2. Comparisons of Patients Hospitalized with Laboratory-Confirmed Influenza during 2009-2012 Influenza Seasons who Received Antiviral Treatment*†



* Excludes patients <1 year
 † Includes summer of 2009

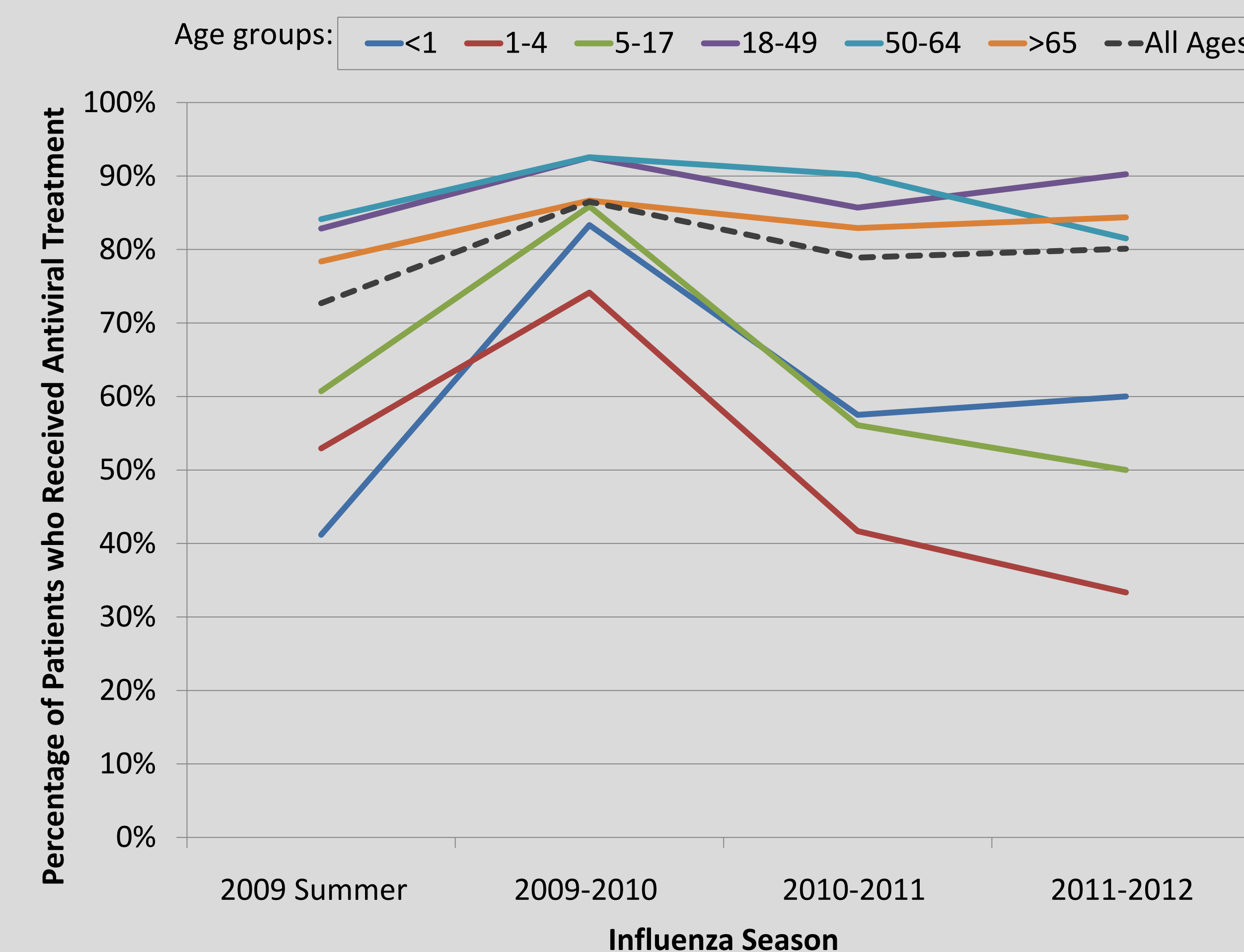
Table 2. Antiviral treatment trends across the 2009-2010, 2010-2011 and 2011-2012 influenza seasons (excluding Summer 2009).*

Characteristic	Pandemic			Post-Pandemic			p for trend
	2009-2010 Season N (%)	2010-2011 Season N (%)	2011-2012 Season N (%)	2009-2010 Season N (%)	2010-2011 Season N (%)	2011-2012 Season N (%)	
Agegroup							
<1	35(83.3)	23(57.5)	15(60.0)				0.0244
1-4	43(74.1)	10(41.7)	4(33.3)				0.001
5-17	73(85.9)	23(56.1)	14(50.0)				<.0001
18-49	186(92.5)	102(85.7)	74(90.2)				0.3402
50-64	112(92.6)	110(90.2)	75(81.5)				0.0141
>64	69(86.7)	199(82.9)	200(84.4)				0.8437
Case Type†							
Pediatric	116(81.1)	33(50.8)	18(45.0)				<.0001
Adult	363(91.4)	411(85.5)	349(85.0)				0.0059
All Ages Combined	479(88.7)	444(81.3)	367(81.4)				0.0012

*Excludes unknown antiviral treatment status and patients aged <1 year

†Excludes patients <1 year

Figure 3. Age Group Comparisons of Patients Hospitalized with Laboratory-Confirmed Influenza who Received Antiviral Treatment by Season



Results

- From 2009-2012 (including summer 2009), 2192 cases were identified and 1755 (80.9%) received antiviral treatment. (Figure 1.)

- Females received antiviral treatment more frequently compared to males (77.8% vs. 82.2%; p=.039). Patients with one or more underlying medical condition received antiviral treatment more frequently than patients with no underlying medical condition (83.8% vs. 75.7%; p=.0002). (Table 1, Figure 2)

- Pediatric patients received antiviral treatment less frequently than adults (64.5% vs. 86.2% p<.0001). (Table 1, Figure 2)

- Patients ages 1-4 received antiviral treatment less frequently than all other age groups across every season (Summer 2009; 52.9%, 2009-2010; 74.1%, 2010-2011; 41.7% and 2011-2012; 33.3%). (Table 2, Figure 3)

- Compared to adults, patients ages 5-17 received treatment less frequently across every season (Summer 2009; 60.7%, 2009-2010; 85.9%, 2010-2011; 56.1% and 2011-2012; 50.0%). (Table 2, Figure 3)

- When all ages were combined, there was a significant trend in declining antiviral treatment from pandemic to post pandemic seasons (p-trend=.0012), especially in ages 1-4 (p-trend=.001) and 5-17 (p-trend<.0001). (Table 2)

- No significant trend in declining antiviral treatment was found for ages 18-49 (p-trend=.3402) or ages >64 (p-trend=.8437) from pandemic to post pandemic seasons. (Table 2)

Conclusions

- Despite recommendations for antiviral treatment of all hospitalized influenza patients, there was significant differences in treatment depending on gender, age, underlying conditions, and season.

- Most notably, pediatric patients were treated less frequently than adults and there was a significant trend in declining use of antiviral treatment for pediatric patients during successive post pandemic seasons.

Limitations

- Regardless of complete medical chart review, antiviral treatment and other demographic variables vary across providers. Quality of data may be affected.

- Data only represent hospitalized influenza cases. Thus, results may not be applicable to all persons with influenza.

References

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