Figures & Tables for:

2009 H1N1 Influenza in Washington State
A summary of the first year—April 2009–May 2010

Prepared by the Washington State Department of Health (DOH)

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Table 1. Number and rate of severe 2009 H1N1 influenza cases reported to DOH with illness onset April 2009 through April 2010, by county of residence

County	Population	# Fatal Cases	# Severe Cases	Severe Case Rate/100,000/year
Adams	18,000	0	12	65.8
Asotin	21,500	0	2	9.2
Benton	169,300	2	29	16.9
Chelan	72,600	0	9	12.2
Clallam	69,500	3	9	12.8
Clark	431,200	6	142	32.5
Columbia	4,100	0	1	24.1
Cowlitz	99,600	0	27	26.7
Douglas	37,600	0	5	13.1
Ferry	7,800	0	2	25.3
Franklin	72,700	1	26	35.3
Garfield	2,250	0	0	0.0
Grant	86,100	1	33	37.8
Grays Harbor	71,200	1	12	16.6
Island	80,300	2	23	28.3
Jefferson	29,000	0	2	6.8
King	1,909,300	23	466	24.1
Kitsap	247,600	4	46	18.3
Kittitas	39,900	0	6	14.8
Klickitat	20,200	0	7	34.2
Lewis	75,200	2	30	39.4
Lincoln	10,450	1	7	66.1
Mason	56,800	5	2	38.2
Okanogan	40,500	3	21	51.2
Pacific	21,800	0	4	18.1
Pend Oreille	12,900	2	13	99.4
Pierce	813,600	12	126	15.3
San Juan	16,300	0	1	6.1
Skagit	118,900	1	28	23.2
Skamania	10,800	0	1	9.1
Snohomish	704,300	9	118	16.5
Spokane	465,000	8	200	42.4
Stevens	44,000	0	23	51.6
Thurston	249,800	3	50	19.7
Wahkiakum	4,100	0	3	72.2
Walla Walla	59,200	0	3	5.0
Whatcom	193,100	3	68	34.7
Whitman	43,300	0	8	18.2
Yakima	238,400	6	82	33.9
Total	6,668,200	98	1667	24.7

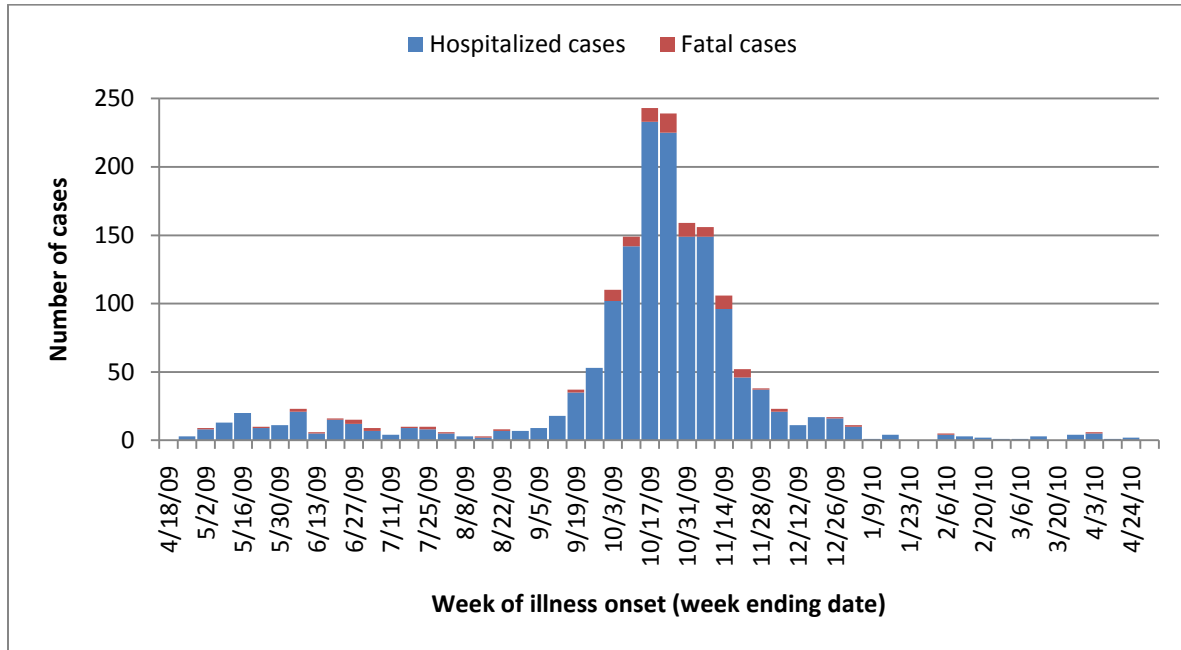Figure 1. Number of severe 2009 H1N1 influenza cases reported to DOH (n=1667)

Figure 2. Number of severe 2009 H1N1 influenza cases by region of residence (n=1667)
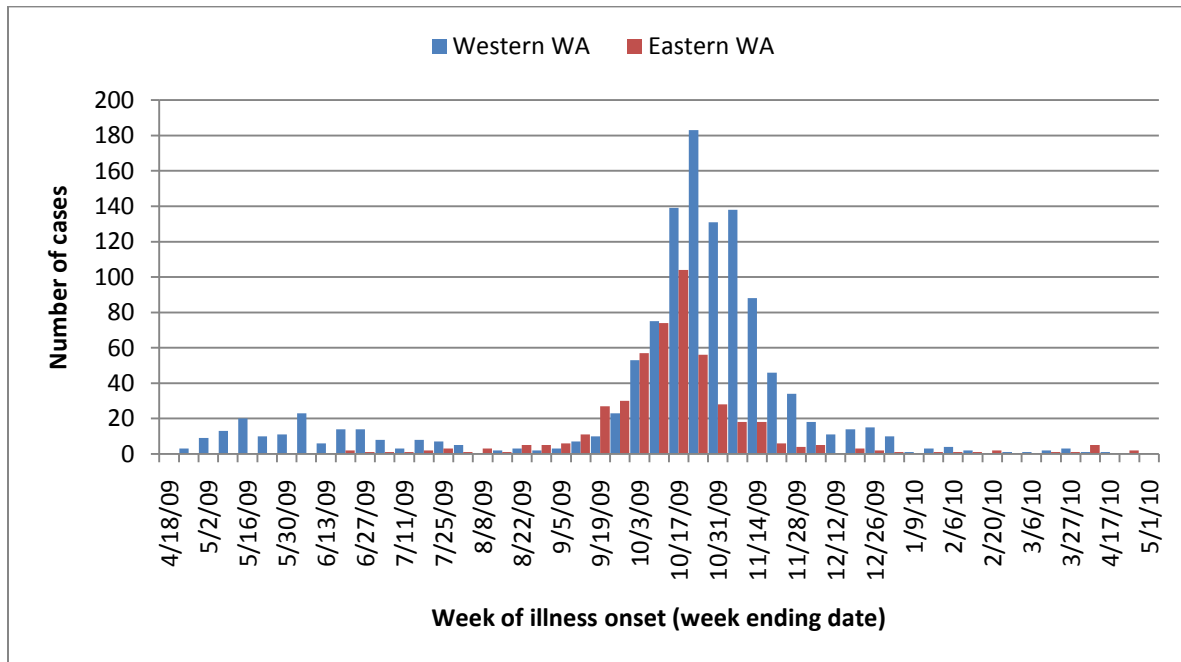
Figure 3. Rates of 2009 H1N1 cases by county of residence, April–May 2009 (n=576)
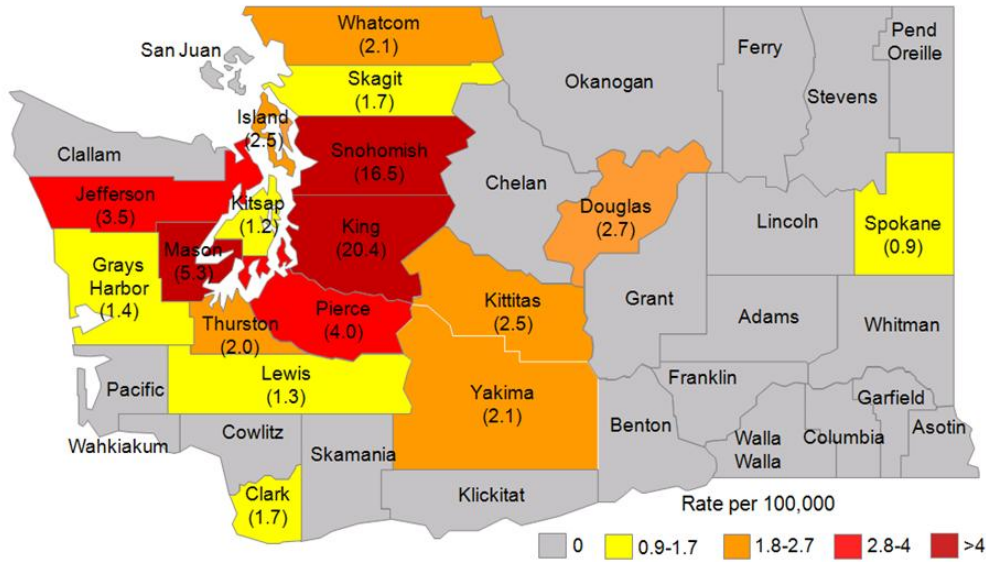

Figure 4. Number and rate of 2009 H1N1 illnesses by age group, April–May 2009 (n=576)
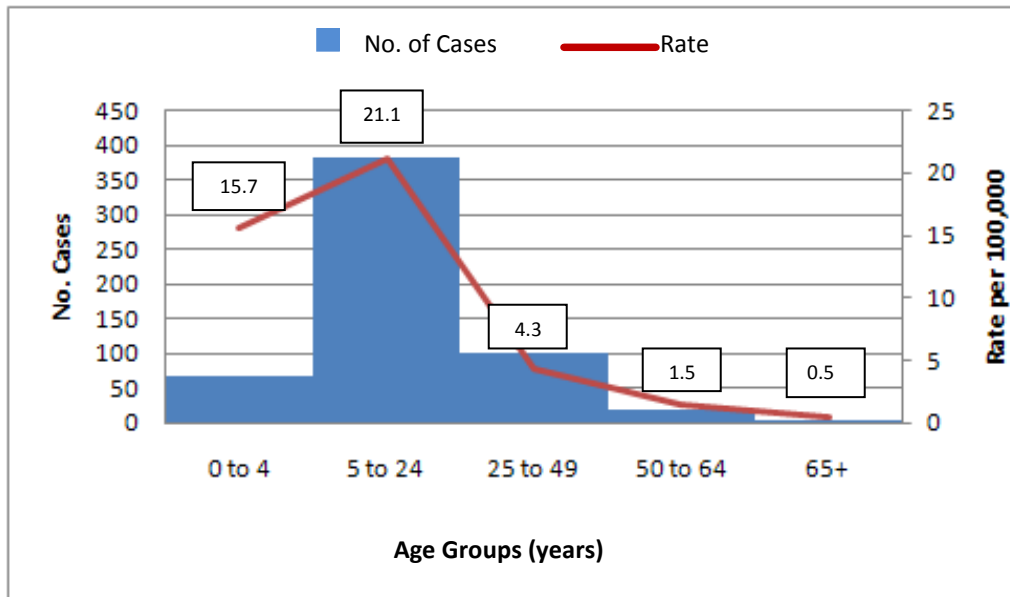
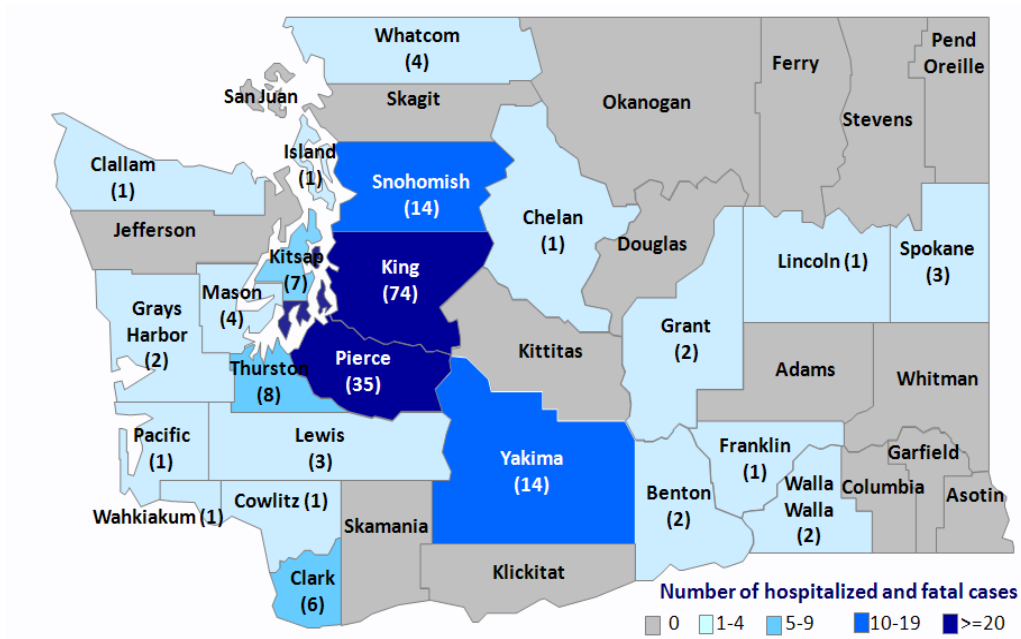Figure 5. Number of severe 2009 H1N1 influenza cases by county of residence, April–August 2009 (n=188)

Figure 6. Rate of severe 2009 H1N1 influenza cases by county of residence, April–August 2009 (n=188)
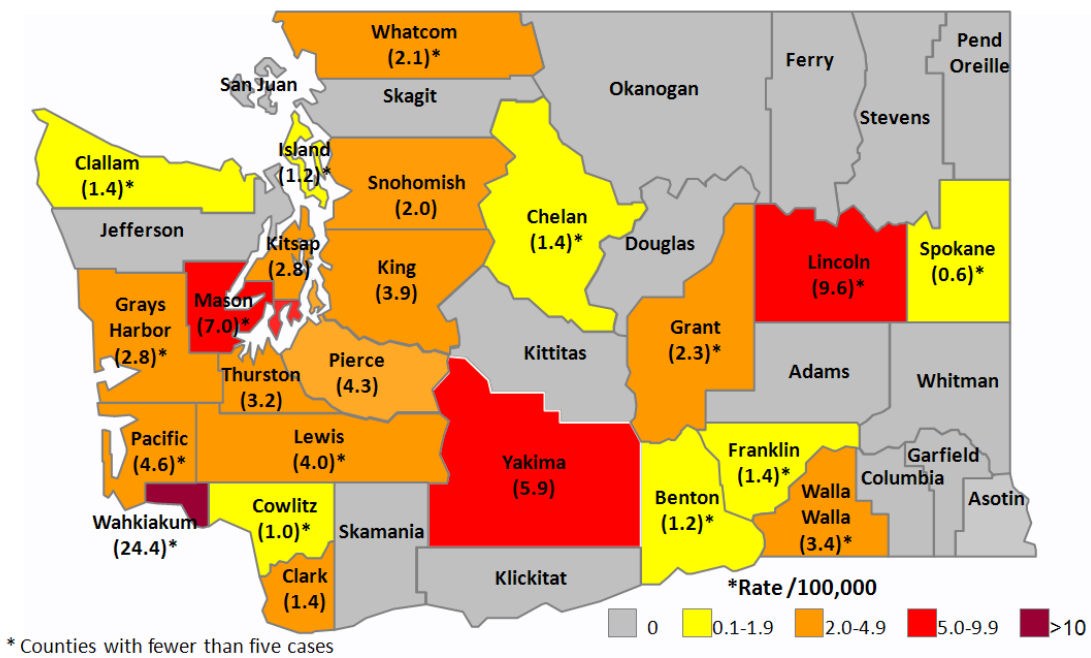
Figure 7. Number and rate of severe 2009 H1N1 influenza cases by age group, April–August 2009
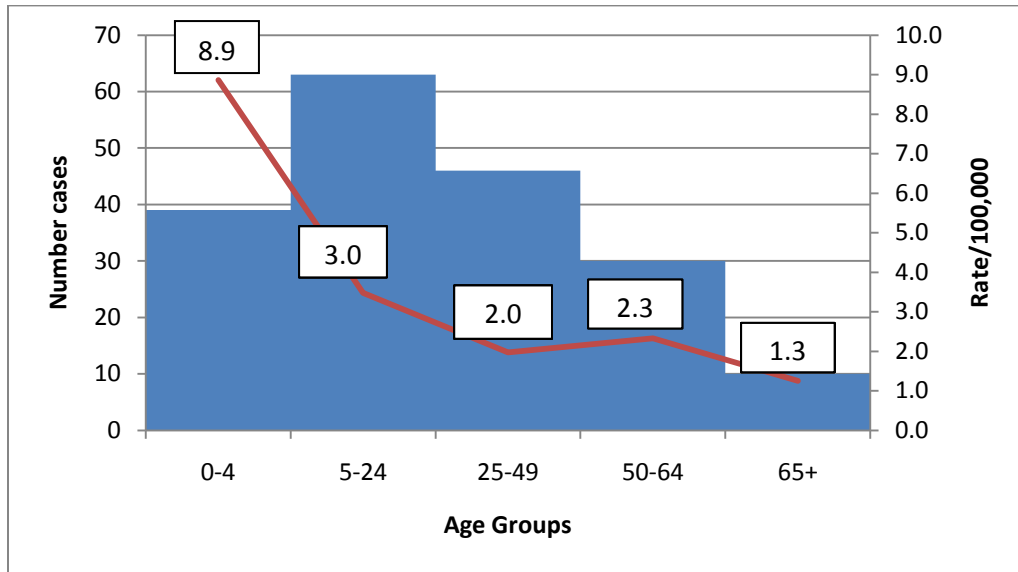(n=188)

Figure 8. Number and rate of critical 2009 H1N1 influenza cases by age group, April–August 2009 (n=63)
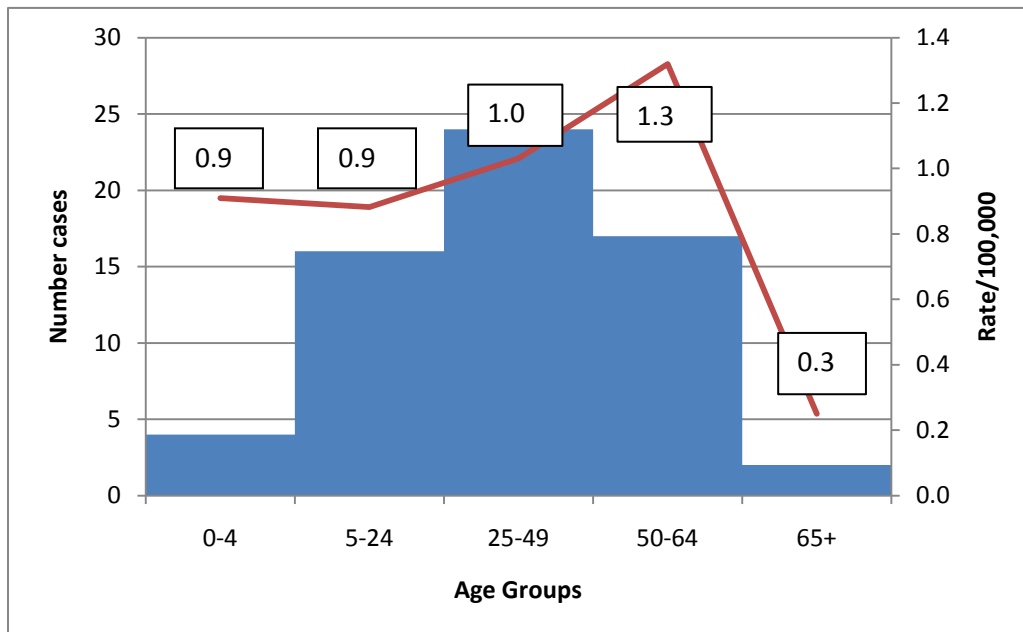
Table 2. Number of severe 2009 H1N1 influenza cases by sex, race and ethnicity, April–August 2009

Characteristic (Est. proportion of population*)	Number of Severe Cases (%)			
	Total (n=188)	Nonfatal, non-ICU** (n=119)	Critical** (n=63)	Fatal (n=17)
Sex				
Female (50.1%)	107 (57)	66 (55)	39 (62)	8 (47)
Male (49.9%)	81 (43)	53 (45)	24 (38)	9 (53)
Race & Ethnicity***				
Hispanic (10%)	37 (28)	25 (28)	10 (23)	4 (25)
Non-Hispanic White (75%)	43 (32)	22 (25)	21 (49)	8 (50)
Black (3%)	24 (18)	21 (24)	3 (7)	0 (0)
Asian or Pacific Islander (7%)	24 (18)	17 (19)	7 (16)	2 (13)
Native American (2%)	5 (4)	3 (3)	2 (5)	2 (13)
Other (3%)	1 (<1)	1 (1)	0 (0)	0 (0)

*From Office of Financial Management at: http://www.ofm.wa.gov/pop/race/projections/default.asp
**ICU status known for 182 of the 188 cases.
***Race and ethnicity unknown for 54 cases (29%).

Table 3. Underlying conditions for severe 2009 H1N1 influenza by disease severity, April–August 2009

Condition	Number of Severe Cases (%)			
	Total* (n= 186)	Nonfatal, non-ICU** (n=118)	Critical** (n=62)	Fatal (n=17)
Any risk factor	122 (66)	72 (61)	44 (71)	10 (59)
Asthma	42 (23)	28 (24)	12 (19)	2 (12)
Chronic lung disease	15 (8)	7 (6)	8 (13)	2 (12)
Diabetes	27 (15)	13 (11)	12 (19)	2 (12)
Heart Disease	19 (10)	12 (10)	5 (8)	1 (6)
Pregnancy	10 (5)	6 (5)	4 (6)	2 (12)
Immunocompromised	28 (15)	18 (15)	9 (15)	2 (12)
Neurologic condition	7 (4)	5 (4)	2 (3)	0 (0)
Chronic Liver	2 (1)	1 (1)	1 (2)	1 (6)
Chronic Kidney	7 (4)	5 (4)	2 (3)	0 (0)
Hemoglobinopathy	0 (0)	0 (0)	0 (0)	0 (0)
Metabolic	0 (0)	0 (0)	0 (0)	0 (0)

*Underlying condition data is unknown for 2 cases.
**ICU status is unknown for 6 cases.

Table 4. Underlying conditions among severe 2009 H1N1 influenza cases by age, April–August 2009

Condition	Number of Severe Cases (%)		
	All ages* (n= 186)	Age 0-17 years (n=80)	Age 18+ years (n=106)
Any ACIP-defined risk factor	122 (66)	47 (59)	75 (71)
Asthma	42 (23)	21 (26)	21 (20)
Chronic lung disease	15 (8)	6 (8)	9 (8)
Diabetes	27 (15)	1 (1)	26 (25)
Heart Disease	19 (10)	5 (6)	14 (13)
Pregnancy	10 (5)	2 (3)	8 (8)
Immunocompromised	28 (15)	8 (10)	20 (19)
Neurologic condition	7 (4)	3 (4)	4 (4)
Chronic Liver	2 (1)	1 (1)	1 (1)
Chronic Kidney	7 (4)	1 (1)	6 (6)
Hemoglobinopathy	0 (0)	0 (0)	0 (0)
Metabolic	0 (0)	0 (0)	0 (0)

*Underlying condition information is unknown for 2 cases.

Table 5. Outcome of severe 2009 H1N1 influenza cases by age group, April–August 2009

Clinical Condition	Number of Severe Cases (%)			
	All ages	Age 0-17 years	Age 18+ years	p
Admitted to ICU	61/182* (34)	13/78 (17)	48/104 (46)	<0.0001
Ventilated	47/180 (26)	6/77 (8)	41/103 (40)	<0.0001
ARDS	33/139 (24)	2/59 (3)	31/80 (39)	<0.0001
Fatal	17/188 (9)	1/81 (1)	16/107 (15)	0.0012

*Denominators vary for each clinical condition because of incomplete data.

Figure 9. Number of fatal 2009 H1N1 influenza cases by county of residence, April–August 2009 (n=17)

Table 6. Characteristics of fatal 2009 H1N1 influenza cases, April–August 2009 (n=17)

Age	Median (range)	No. cases (%)
Age Range (years)	39 (12–76)	NA
Age Group (years)		
0-4		0 (0)
5-24		3 (18)
25-49		8 (47)
50-64		4 (23)
65+		2 (12)
Had any ACIP condition		10 (59)
Acute Respiratory Distress Syndrome*		12 (100)
Pregnancy		2 (12)
Median days from illness onset to death	17 (0–54)	NA

*ARDS status known only for 12 of the fatal cases.

Table 7. Antiviral treatment among severe 2009 H1N1 influenza cases by severity, April–August 2009

	Number of Severe Cases (%)			
	Total* (n=174)	Nonfatal, non-ICU** (n=115)	Critical** (n=55)	Fatal (n=15)
Received treatment	137 (79)	90 (78)	43 (78)	10 (67)
Timing of treatment***				
≤2 days of onset	42/98 (43)	31/61 (51)	10/34 (29)	1/7 (14)
3-4 days of onset	23/98 (23)	16/61 (26)	7/34 (21)	0/7 (0)
>4 days of onset	33/98 (34)	14/61 (23)	17/34 (50)	6/7 (86)

* Receipt of treatment unknown for 14 of 188 severe cases.
**ICU status is not available on all cases.
***Antiviral treatment timing data known for 98 of 137 cases who received treatment.

Table 8. Antiviral treatment among severe 2009 H1N1 influenza cases by risk factor, April–August 2009

	Number of Severe Cases (%)				
	Pregnant (n=9)	Asthma (n=37)	Age < 2 years (n=22)	Underlying ACIP-Defined Condition	
				Age 0-17 years (n=43)	Age 18+ years (n=70)
Received treatment*	7 (78)	27 (73)	12 (55)	34 (79)	59 (84)
Timing of treatment*					
≤2 days of onset	1/4 (25)	10/20 (50)	5/9 (56)	11/22 (50)	16/41 (39)
3-4 days of onset	0/4 (0)	5/20 (25)	0/9 (0)	3/22 (14)	12/41 (29)
>4 days of onset	3/4 (75)	5/20 (25)	4/9 (44)	8/22 (36)	13/41 (32)

*Data on antiviral treatment and timing of treatment not available on all cases.

Table 9. Influenza subtypes among severe influenza cases with onset of illness September 2009–April 2010

Influenza Subtype	Number	Percent
A 2009 H1N1	965	65
A "seasonal" H1N1	1	<1
A, unknown subtype	512	34
B	12	1
Total	1492	100

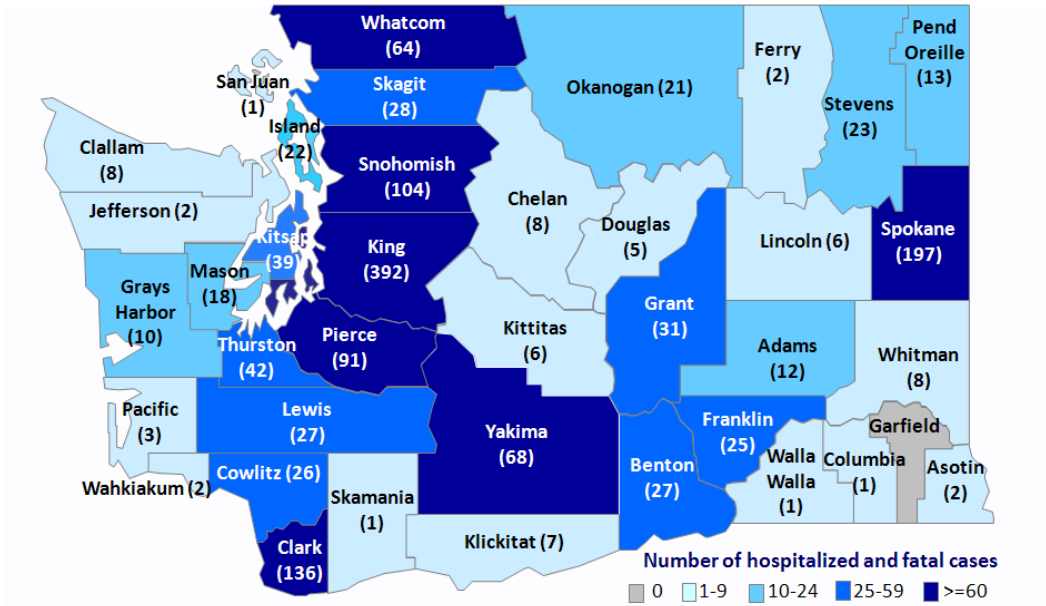Figure 10. Number of severe influenza A cases by county of residence, September 2009–April 2010 (n=1479)

Figure 11. Number of fatal influenza A cases by county of residence, September 2009–April 2010 (n=81)
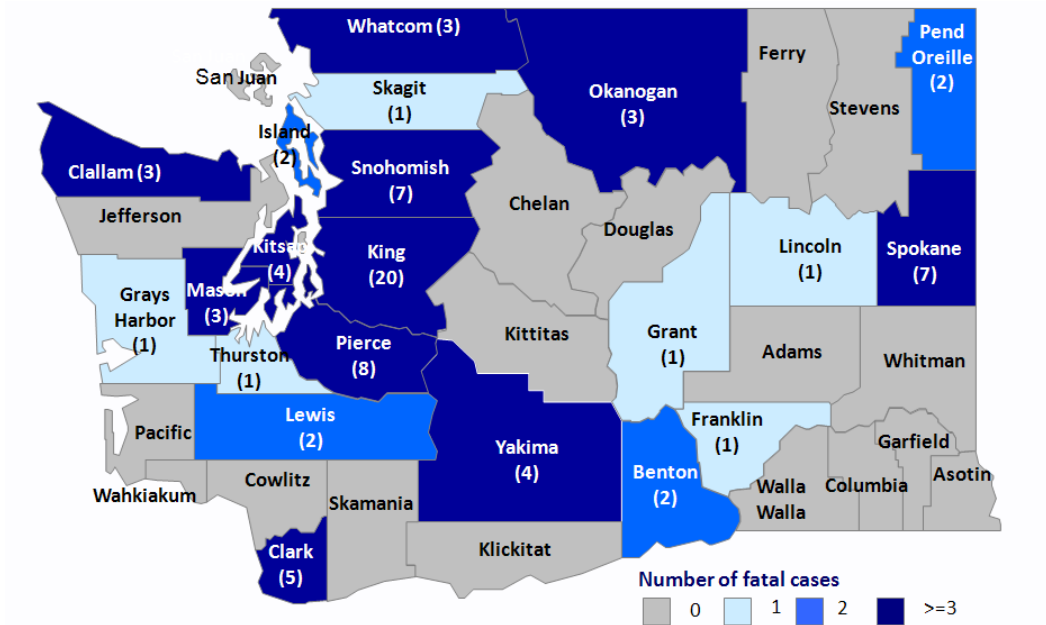
Figure 12. Rate of severe influenza A cases by county of residence, September 2009–April 2010 (n=1479)

San Juan (6.1)*
Whatcom (33.1)
Skagit (23.5)
Okanogan (51.9)
Ferry (25.6)*
Pend Oreille (100.8)
Stevens (52.3)
Clallam (11.5)
Island (27.4)
Snohomish (14.8)
Chelan (11.0)
Spokane (42.4)
Jefferson (6.9)*
Kitsap (15.8)
King (20.5)
Douglas (13.3)
Lincoln (57.4)
Grays Harbor (14.0)
Mason (31.7)
Thurston (16.8)
Pierce (11.2)
Kittitas (15.0)
Grant (36.0)
Adams (66.7)
Whitman (18.5*)
Pacific (13.8)*
Lewis (35.9)
Yakima (28.5)
Franklin (34.4)
Garfield
Wahkiakum (48.8)*
Cowlitz (26.1)
Skamania (9.3)*
Benton (15.9)
Walla Walla (1.7)*
Columbia (24.4)*
Asotin (9.3)*
Clark (31.5)
Klickitat (34.7)

*Rate per 100,000 people

| 0-4.9 | 5-9.9 | 10-19.9 | 20-39.9 | >40 |

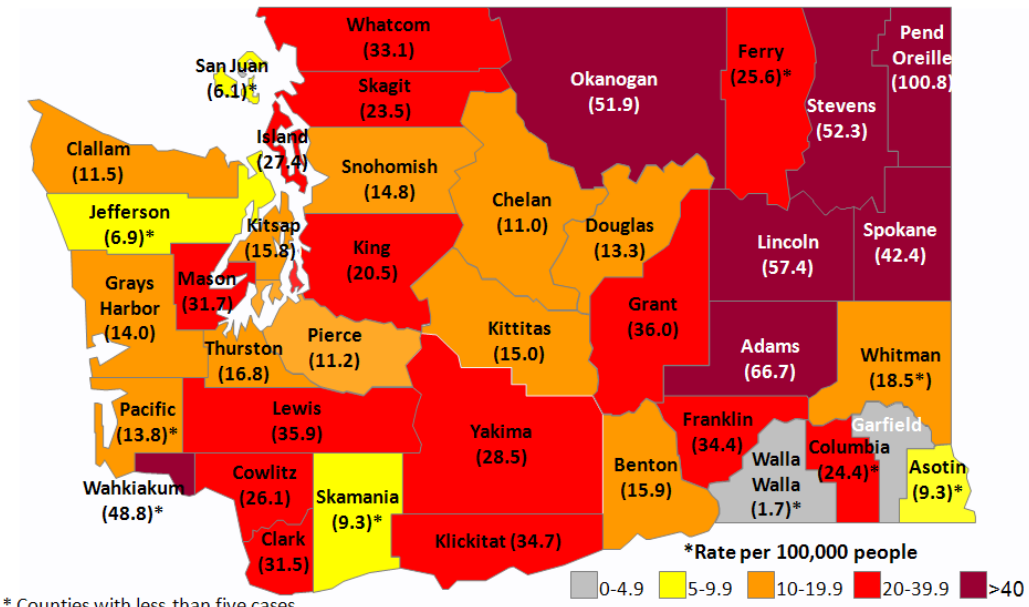* Counties with less than five cases

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Figure 13. Number and rate of severe influenza A cases by age group, September 2009–April 2010 (n=1479)
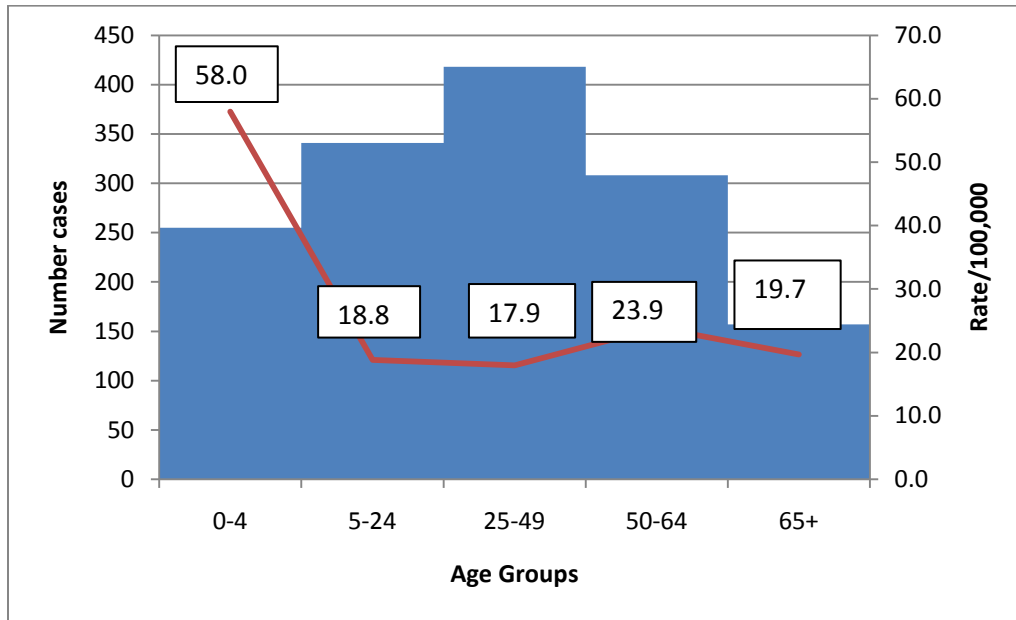

Figure 14. Number and rate of critical influenza A cases by age group, September 2009–April 2010 (n=360)
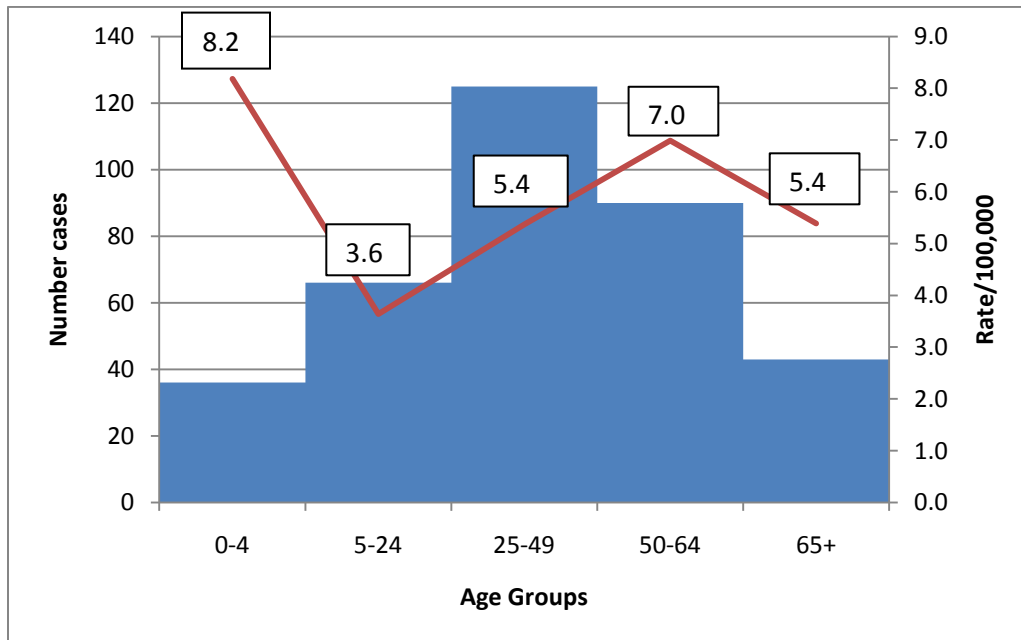
Figure 15. Number and rate of fatal influenza A cases by age group, September 2009–April 2010 (n=81)
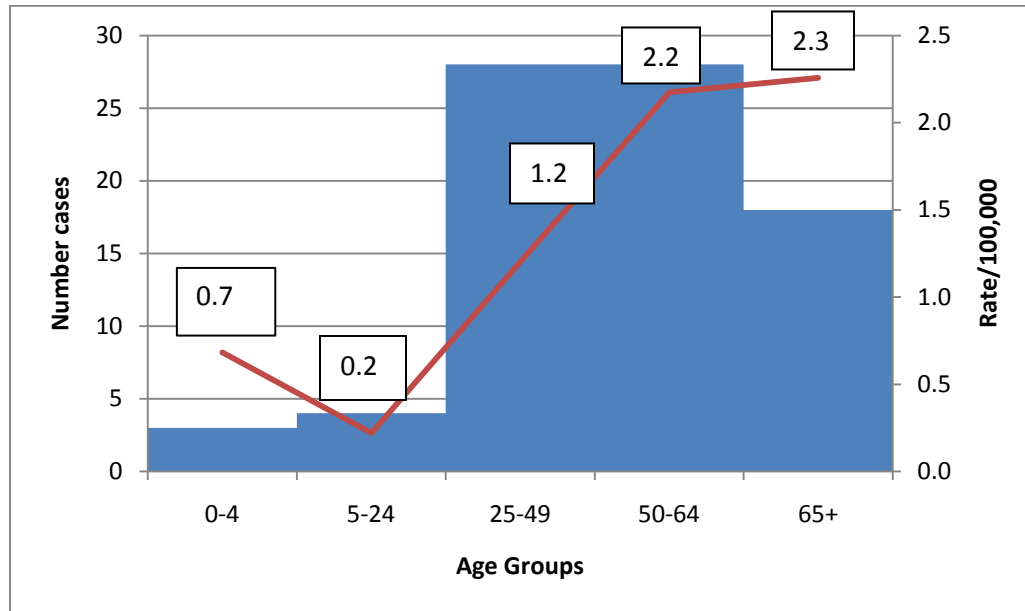

Table 10. Number of severe influenza A cases by sex, race and ethnicity, September 2009–April 2010 (n=1479)

Characteristic (Est. proportion of population*)	Total (n=1479)	Number of Severe Cases (%)		
		Nonfatal, non-ICU** (n=983)	Critical** (n=360)	Fatal (n=81)
Sex				
Female (50.1%)	827 (56)	571 (58)	171 (48)	29 (36)
Male (49.9%)	652 (44)	412 (42)	189 (52)	52 (64)
Race & Ethnicity***	n=974	n=672	n=253	n=66
Hispanic (10%)	167 (17)	126 (19)	33 (13)	6 (9)
Non-Hispanic White (75%)	616 (63)	404 (60)	181 (72)	53 (80)
Black (3%)	56 (6)	47 (7)	9 (4)	1 (1)
Asian or Pacific Islander (7%)	64 (7)	44 (6)	19 (7)	3 (5)
Native American (2%)	32 (3)	18 (3)	9 (4)	3 (5)
Other (3%)	39 (4)	33 (5)	2 (<1)	0 (0)

*From Office of Financial Management http://www.ofm.wa.gov/pop/race/10estimates/summary.asp.
**ICU status not known for 136 persons.
***Race and ethnicity is unknown for 505 persons (34%).

Table 11. Characteristics of fatal influenza A cases, September 2009–April 2010 (n=81)

Age	Median (range)	No. cases (%)
Age Range (years)	52 (0–87)	NA
Age Group (years)		
0-4		3 (4)
5-24		4 (5)
25-49		28 (35)
50-64		28 (35)
65+		18 (22)
Sex		
Female		29 (36)
Male		52 (64)
Had any ACIP condition*		61* (76)
ARDS**		58** (83)
Pregnancy		0 (0)
Median days from illness onset to death	16 (1–115)	NA

*Underlying condition information was missing for 1 fatal case.
**ARDS status not known for 11 of the fatal cases.

Table 12. Outcome of severe influenza A cases by age group, September 2009–April 2010

	Number of Severe Cases (%)			
Clinical Condition	All Ages	Age 0-17 years	Age 18+ years	p
Admitted to ICU	350/1343 (26)	79/426 (19)	271/917 (30)	<0.0001
Ventilated	199/1325 (15)	27/419 (6)	172/906 (19)	<0.0001
ARDS	227/1244 (18)	45/404 (11)	182/840 (22)	<0.0001
Fatal	81/1479 (5)	4/475 (<1)	77/1004 (8)	<0.0001

Table 13. Underlying conditions for severe influenza A cases by disease severity, September 2009–April 2010

	Number of Severe Cases (%)			
Condition	Total* (n= 1258)	Nonfatal, non-ICU** (n=855)	Critical** (n=338)	Fatal* (n=80)
Any ACIP-defined risk factor	883 (70)	601 (70)	233 (69)	61 (76)
Asthma	264 (21)	193 (23)	62 (18)	10 (13)
Chronic lung disease	209 (17)	128 (15)	71 (21)	26 (33)
Diabetes	202 (16)	128 (15)	64 (19)	24 (30)
Heart Disease	156 (12)	93 (11)	55 (16)	25 (31)
Pregnancy	107 (9)	92 (11)	7 (2)	0 (0)
Immunocompromised	143 (11)	100 (12)	33 (10)	20 (25)
Neurologic condition	122 (10)	78 (9)	37 (11)	8 (10)
Chronic Liver	30 (2)	15 (2)	10 (3)	4 (5)
Chronic Kidney	74 (6)	47 (5)	24 (7)	16 (20)
Hemoglobinopathy	13 (1)	11 (1)	1 (<1)	0 (0)
Metabolic	11 (1)	9 (1)	2 (1)	0 (0)
Other conditions***	(n=1231)	(n=833)	(n=337)	(n=80)
Smoking	222 (18)	130 (16)	84 (25)	16 (20)
Obesity	183 (15)	97 (12)	80 (24)	23 (29)
Alcohol or drug abuse	47 (4)	25 (3)	19 (6)	4 (5)

* Underlying condition status is unknown for 221 cases including 1 fatal case.
**ICU status is not known for all cases.
*** These three risk factor data are unknown for 248 cases.

Table 14. Underlying conditions among severe influenza A cases by age, September 2009–April 2010

	Number of Severe Cases (%)		
Condition	All Ages (n= 1258*)	Age 0-17 years (n=369)	Age 18+ years (n=889)
Any ACIP-defined risk factor	883 (70)	213 (58)	670 (75)
Asthma	264 (21)	75 (20)	189 (21)
Chronic lung disease	209 (17)	17 (5)	192 (22)
Diabetes	202 (16)	11 (3)	191 (21)
Heart Disease	156 (12)	15 (4)	141 (16)
Pregnancy	107 (9)	14 (4)	93 (10)
Immunocompromised	143 (11)	23 (6)	120 (13)
Neurologic condition	122 (10)	55 (15)	67 (8)
Chronic Liver	30 (2)	2 (<1)	28 (3)
Chronic Kidney	74 (6)	4 (1)	70 (8)
Hemoglobinopathy	13 (1)	5 (1)	8 (1)
Metabolic	11 (1)	8 (2)	3 (<1)

*Underlying condition data are unknown for 221 cases.

Table 15. Antiviral treatment among severe influenza A cases by severity, September 2009–April 2010

	Number of Severe Cases (%)			
	Total* (n=1204)	Nonfatal, non-ICU* (n=854)	Critical* (n=305)	Fatal (n=70)
Received treatment*	1062 (88)	754 (88)	268 (88)	58 (83)
Timing of treatment known*				
≤2 days of onset	521/955 (55)	414/683 (61)	85/237 (36)	17/57 (30)
3-4 days of onset	215/955 (23)	148/683 (22)	62/237 (26)	10/57 (18)
>4 days of onset	219/955 (23)	121/683 (18)	90/237 (38)	30/57 (53)

* ICU status, antiviral treatment, and timing of treatment not available on all cases.

Table 16. Antiviral treatment among severe influenza A cases by risk factor, September 2009–April 2010

	Pregnant (n=93)	Asthma (n=242)	Age < 2 years (n=125)	Underlying ACIP-Defined Condition	
				Age 0-17 years (n=184)	Age 18+ years (n=586)
Received treatment*	88 (95)	226 (93)	108 (86)	167 (91)	518 (88)
Timing of treatment *					
≤2 days of onset	60/83 (72)	96/199 (48)	67/90 (74)	100/142 (70)	229/474 (48)
3-4 days of onset	14/83 (17)	57/199 (29)	16/90 (18)	25/142 (18)	135/474 (28)
>4 days of onset	9/83(11)	46/199 (23)	7/90 (8)	17/142 (12)	110/474 (23)

*Antiviral treatment and timing of treatment not available on all cases.

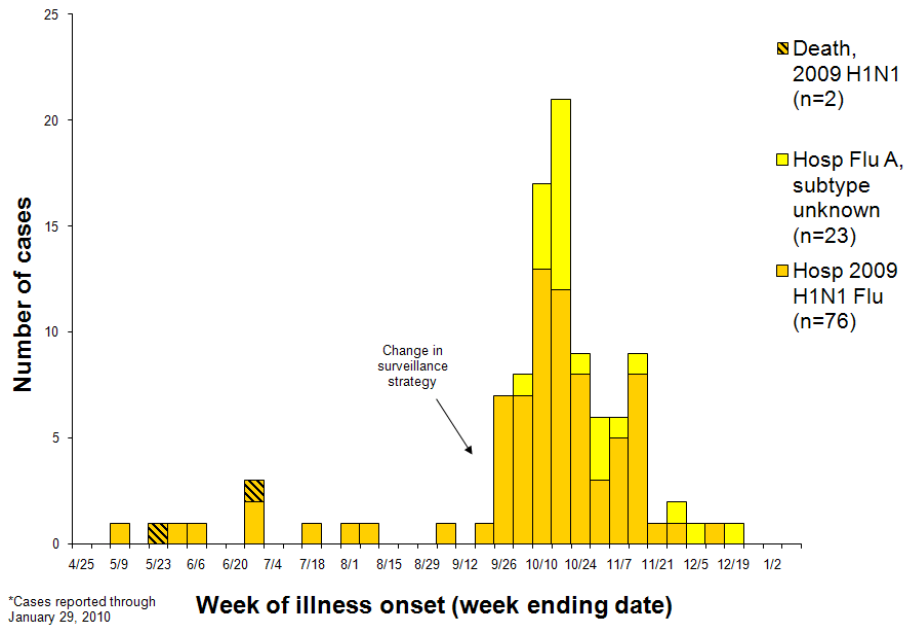Figure 16. Pregnant women with severe influenza A cases by week of illness onset, April 2009–January 2010

Table 17. Maternal age as risk factor for hospitalization for influenza A during pregnancy, April 2009–January 2010

Maternal Age	H1N1 Cases	2008 Livebirths	Rate Ratio	95% Confidence Interval
10–19 years	20	7,460	3.2	1.8,5.9
20–24 years	33	21,283	1.9	1.1,3.2
25–29 years	22	26,334	Ref.	
30–34 years	11	21,433	0.6	0.3,1.3
35–39 years	10	11,077	1.1	0.5,2.3
40–44 years	5	2,481	2.4	0.9,6.4

Table 18. Race and insurance status as a risk factor for hospitalization for influenza A during pregnancy, April 2009–January 2010

Risk Factor	H1N1 Cases	2008 Livebirths	Rate Ratio	95% Confidence Interval
Maternal Race				
Hispanic	20	17,340	3.5	1.8,6.5
NH* White	19	56,941	Reference	
NH Black/African American	7	3,942	5.3	2.2,12.7
NH Asian/Pacific Islander	3	8,549	1.0	0.3,3.6
NH American Indian	2	1,665	3.6	0.8,15.4
Don't know	50			
Insurance				
Non-Medicaid	26	47,171	Reference	
Medicaid	53	43,163	2.2	1.4,3.6
Don't know	22			

* Non-hispanic

Table 19. Clinical characteristics of pregnant women hospitalized with influenza A during pregnancy, April 2009–January 2010

Clinical Characteristic	No. Cases (%)
Gestational Age*	
First trimester ($\leq$14 weeks)	6 (6)
Second trimester (15–27 weeks)	27 (27)
Third trimester (28–42 weeks)	65 (65)
Postpartum	2 (2)
Any ACIP condition prior to pregnancy**	29 (29)
Any ACIP condition incl pregnancy conditions**	35 (35)
Asthma**	23 (23)
Smoking	11 (11)
Received antiviral treatment	99 (98)
Median Days to antiviral treatment (range)	2 days (0–20 days)
Median length of stay (range)	2 days (1–34 days)

*Gestational age unknown for one patient.
** ACIP high risk conditions at http://www.cdc.gov/h1n1flu/highrisk.htm

Table 20. Gender & pregnancy status-specific hospitalization rates by age group, April 2009–January 2010

Age	Hospitalization Rate			Critical Case Rate (ICU + Deaths)		
	Males	Non-Pregnant Females	Pregnant Females	Males	Non-Pregnant Females	Pregnant Females
10–24 Years	12.4	18.0	224.5	3.5	4.0	16.9
25–44 Years	12.6	18.5	100.1	4.4	5.7	14.6
Total	12.5	18.3	141.1	4.0	5.0	15.4