vaccination data collection survey and 46 from our survey), while the adherence of 103 nonresponsive students was unknown. Compared with the estimated 72% HCP influenza vaccination coverage in the United States during the 2012–2013 flu season,[5] the 79% compliance rate among our nursing students is commensurate with and likely influenced by UPMC vaccination recommendations for students with clinical assignments.

The results of our survey may not be generalizable to students in other schools of nursing. We suspect that the low response rate (36%) may reflect the overlap of the survey period with final exams and graduation. However, given that the average response rate to surveys of students' major concerns is 40%–50%, a response rate around 30% may be average for a topic about which the students are less concerned. To avoid conducting a theme-overlapping survey, we targeted noncompliant students from the UPMC survey results. However, because many of these students actually did receive vaccinations (79% of respondents), the UPMC survey structure (only 5 clinical assignment–related questions) might be inappropriate in selecting study subjects and perhaps contributed to the low response rate; vaccinated students likely ignored our survey requests. Additionally, we could not examine which factors induced more vaccinations among subject students during the gap period between the UPMC September–December 2013 survey and our April 2014 survey.

University policy on student vaccination governs every affiliated school; however, because of HCP-like clinical exposure, students in health science schools should be provided more support in obtaining influenza vaccination. As our students suggested, with their busy class and clinical practicum schedules, a more convenient time and location arrangement for free influenza vaccination would be helpful in improving student compliance. Concerning mandatory influenza vaccination for HCP as a condition of employment,[6] our nursing students showed an unwelcome opinion. Education to encourage influenza vaccination should be provided to nursing students because of their involvement in patient care. In addition to ongoing emphasis on influenza vaccination, addressing students' concerns related to convenience would increase their willingness to obtain vaccination and their compliance.

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Cost Implications of Duplicative Influenza Polymerase Chain Reaction Testing During the 2013–2014 Influenza Season: The Price of Certainty

To the Editor—During the recent influenza season (ie, October 2013–February 2014), 77 admitted adults with an influenza-like illness (ILI) were tested for influenza A or B by 1 or more methods in the emergency department.[1] During this influenza season, influenza A (H1N1 and H3N2) were the predominant circulating strains in our area. Within influenza B strains, we do not differentiate the Yamagata versus the Victoria lineages. The initial point of care test in our emergency department is a rapid influenza diagnostic test

(RIDT). A positive RIDT test is sufficient for the diagnosis of influenza A or B, but a negative RIDT test does not rule out either influenza A or B.[2-4] Admitted adults with an initial negative RIDT should be tested in a tiered fashion. If the polymerase chain reaction (PCR)-3 (Cepheid Xpert Flu PCR) was negative, then it was suggested that the patient could be tested with the PCR-20 (Respiratory FilmArray; BioFire Diagnostics FilmArray Respiratory Panel PCR). Therefore, in adults admitted with an ILI with negative RIDT results, subsequent testing with either PCR-3 (Cepheid Xpert Flu) or PCR-20 (Respiratory FilmArray) are used to confirm the diagnosis of influenza A or B.

In our experience this year with 77 adults admitted during this influenza season, 30/77 (39%) patients had a negative RIDT but did not have further influenza testing by PCR. A positive RIDT provided the diagnosis in 11/47 (23.4%) of patients. Of these, 8/47 (17%) adults admitted with an ILI thought to be influenza A or B had a definitive positive or negative PCR-3 (Cepheid Xpert Flu) for influenza A or B. Of the diagnosed cases of influenza, there were only 3 cases of influenza B in admitted adults with an ILI. The diagnosis of influenza A was made by a positive PCR-20 (Respiratory FilmArray) in 18/47 (38.3%) patients when other tests were not done or were negative. Only 1 patient had PCR-3 (Cepheid Xpert Flu) and PCR-20 (Respiratory FilmArray) negative for influenza A and B (Tables 1, 2).

TABLE 1. Diagnostic Testing in the Emergency Department in Admitted Adults with Influenza-Like Illnesses during the 2013–2014 Influenza Season

			Patients (n = 77)	
RIDT	PCR-3	PCR-20	No.	%
Negative	ND	ND	30	39.0
Negative	Negative	ND	4	5.2
Negative	A	ND	3	3.9
Negative	ND	A	2	2.6
Negative	A	A	2	2.6
A	ND	ND	10	13.0
B	ND	ND	1	1.3
ND	A	ND	1	1.3
ND	ND	A	13	16.9
ND	ND	B	3	3.9
ND	Negative	Negative	1	1.3
ND	A	A	7	9.1

NOTE. PCR-3: Cepheid Xpert Flu polymerase chain reaction (PCR) detects influenza A (A), 2009 influenza A (H1N1), influenza B (B). PCR-20: BioFire Diagnostics FilmArray Respiratory Panel PCR detects adenovirus, coronavirus 229E, coronavirus NL63, coronavirus OC43, coronavirus HKU1, human metapneumovirus, influenza A, influenza A subtype H1, influenza A subtype H3, influenza A subtype 2009 H1, influenza B, parainfluenza virus type 1, parainfluenza virus type 2, parainfluenza virus type 3, parainfluenza virus type 4, rhinovirus/enterovirus, respiratory syncytial virus, *Bordetella pertussis*, *Chlamydophila pneumoniae*, *Mycoplasma pneumoniae*. ND, not done; RIDT, rapid influenza diagnostic test.

TABLE 2. Duplicative Testing in the Emergency Department in Admitted Adults with Influenza-Like Illnesses (ILIs) during the 2013–2014 Influenza Season

	Patients (n = 77)	
Influenza test result	No.	%
Inadequately tested		
RIDT negative without follow-up PCR-3 or PCR-20	30	39.0
Diagnostic testing (n = 47)		
Nonduplicative		
Positive RIDT	11	23.4
Negative PCR-3 after negative RIDT	4	8.5
Positive PCR-3 after negative RIDT	3	6.4
Positive PCR-20 after negative RIDT	2	4.3
Positive PCR-3 after no RIDT	1	2.1
Positive PCR-20 after no RIDT	16	34.0
Total	37	78.7
Duplicative		
Positive PCR-20 after negative RIDT and positive PCR-3	2	4.3
Negative PCR-20 after no RIDT and negative PCR-3	1	2.1
Positive PCR-20 after no RIDT and positive PCR-3	7	14.9
Total	10	21.3

NOTE. PCR-3: Cepheid Xpert Flu polymerase chain reaction (PCR) detects influenza A, 2009 influenza A (H1N1), influenza B. PCR-20: BioFire Diagnostics FilmArray Respiratory Panel PCR detects adenovirus, coronavirus 229E, coronavirus NL63, coronavirus OC43, coronavirus HKU1, human metapneumovirus, influenza A, influenza A subtype H1, influenza A subtype H3, influenza A subtype 2009 H1, influenza B, parainfluenza virus type 1, parainfluenza virus type 2, parainfluenza virus type 3, parainfluenza virus type 4, rhinovirus/enterovirus, respiratory syncytial virus, *Bordetella pertussis*, *Chlamydophila pneumoniae*, *Mycoplasma pneumoniae*. RIDT, rapid influenza diagnostic test.

In this era of limited healthcare resources, we were particularly interested in needless duplicative testing for influenza in 77 admitted adults with ILIs. Nonduplicative testing was diagnostic in 26/47 (55.3%) patients. In 16/47 (34%) patients, testing was done with the PCR-20 (Respiratory FilmArray), bypassing RIDT and PCR-3 (Cepheid Xpert Flu) testing. Needless and expensive duplicative testing was done in nearly one-fifth of patients (ie, 10/47; 21.3%).

In contrast to our experience with pandemic influenza (H1N1) in 2009–2010, the influenza season here this year was relatively mild, with relatively few adults requiring hospitalization. Patients with negative RIDTs should have had additional diagnostic testing by PCR-3 (Cepheid Xpert Flu) but did not.[2-4] Of concern from a cost perspective was unnecessary duplicative PCR-20 (Respiratory FilmArray) testing when the initial PCR-3 (Cepheid Xpert Flu) was diagnostic (Tables 1, 2).

The cost of the PCR-3 (Cepheid Xpert Flu) test is $50, and it takes approximately 2 hours to perform. In contrast, the PCR-20 (Respiratory FilmArray) costs $120 and takes 1 hour to perform (in addition to instrument analysis setup time).[5-8] Obviously, if positive, the laboratory diagnosis of influenza A or B by nasal swab RIDT is the most cost-effective way to diagnose influenza A or B in hospitalized adults. In cases of adults admitted with an ILI and negative RIDTs, the

PCR-3 (Cepheid Xpert Flu) is diagnostically accurate and cost-effective. The PCR-20 (Respiratory FilmArray) test is the more expensive test and is not usually used as the sole influenza test; ideally, it should be used in patients with negative RIDT and PCR-3 (Cepheid Xpert Flu) tests. Duplicative PCR testing is unnecessary and expensive. The money saved from not doing the PCR-20 (Respiratory FilmArray) for patients that were already PCR-3 (Cepheid Xpert Flu) positive could have been used for further PCR-3 (Cepheid Xpert Flu) testing in patients with negative RIDTs.

We conclude that RIDT should have been done in 25 cases and that PCR-3 should have been done in 30 cases inadequately tested and 18 other cases, for a total of 48 cases. PCR-20 was not necessary in 28 cases ($150 × 29 = $4,200). These resources could have been used for 25 RIDTs and 48 PCR-3 tests. In hospitals experiencing higher testing volumes, our findings have greater cost implications.

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Acupuncture Needles Can Carry Hepatitis C Virus

To the Editor—It has been suggested but not definitively proven that acupuncture can be a possible source of hepatitis C virus (HCV) infection[1,2] because it uses large needles that penetrate the skin and muscles, often with residual blood.[3] Our study was designed to assess the potential of acupuncture needle contamination.

After approval of the protocol by the Ethics Committee, we offered acupuncture treatment to outpatients in the Viral Hepatitis Clinic at Rio Preto Medical School, Brazil, who had primarily musculoskeletal pain and wanted to undergo therapy. All patients were infected with HCV, as confirmed by liver biopsy or polymerase chain reaction (PCR). All had quantitative viremia measured in blood. Eight patients were selected for this study and signed a consent form. Four patients had not been treated for hepatitis, and the other 4 were treated but had persistent HCV viremia. Another 3 patients, 2 men (aged 62 and 55 years) and 1 woman (aged 51 years), were known to be HCV serology negative, and they were used as negative controls.

Three acupuncture sessions were performed in all 11 patients, with a total of 10 needles for each patient. Preference was given for deep muscle insertion, as this had resulted in traces of blood on needles in previous work.[3] Needles used for each patient treatment were submerged immediately in 100 μL of TRIzol reagent (Life Technologies) after removal and then sent to the Genomic Study Laboratory of the State University of São Paulo, Brazil.

A total of 23 samples from the 8 infected patients and the 3 controls were analyzed by real-time PCR. Total RNA was extracted using standard methods, and 2 μg of the RNA was used for synthesis of complementary DNA by reverse transcription (Thermo Scientific). cDNA amplification and analysis of gene expression were performed with 300 nM forward primer, 900 nM reverse primer, and 200 nM probe to evaluate HCV and glyceraldehyde-3-phosphate dehydrogenase (GAPDH) expression.

In 4 (50%) of the 8 HCV-positive patient samples, HCV RNA was detected. However, the cycle threshold for these samples was high—close to 40 cycles—indicating that RNA was present at low levels. In the other 4 patients' samples, the viral genome could not be detected, despite amplification