The most surprising thing I (Bowne) learned at HAPS 2008 was that some of us are teaching nursing students who do not think they need to take an A&P course – who think they will pick up enough physiology in their nursing classes. I was astonished and so were all the nurses I asked about this when I got back. Yet, when you think about it, you can see how a first-year nursing student might feel that way. Beginning nurses do not always know much about what a nurse does.

In spring 2008, I surveyed nursing students in my sophomore A&P course to find out how they used the course content (Table 1). Most students identified several ways in which they had used the material, but few of those were directly related to nursing. At this level, before they had begun clinical courses, most of them used A&P in a social context to explain, diagnose, and interpret their friends’ or family’s medical issues. One use, to ‘understand medical professionals,’ sounded more work-related than it was; among the ‘medical professionals’ identified were those on prime-time television.

### Used A&P for:

<table>
<thead>
<tr>
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<th>n=39</th>
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<tbody>
<tr>
<td>Interpret patient conditions</td>
<td>9</td>
</tr>
<tr>
<td>Understand medical professionals</td>
<td>12</td>
</tr>
<tr>
<td>Communicate with professionals</td>
<td>3</td>
</tr>
<tr>
<td>Interpret medical treatments/lab values</td>
<td>10</td>
</tr>
<tr>
<td>Diagnose self/family</td>
<td>10</td>
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<tr>
<td>Explain to acquaintances/family</td>
<td>11</td>
</tr>
<tr>
<td>Impress others/sound professional</td>
<td>4</td>
</tr>
<tr>
<td>Understand material in other classes</td>
<td>4</td>
</tr>
<tr>
<td>Practice teaching</td>
<td>1</td>
</tr>
<tr>
<td>Haven’t used it yet</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 1: Sophomore nursing students’ end-of-semester summary of how they used the content of a one-semester integrated Anatomy and Physiology course outside the class.

With students unclear on the concept, it is sad but true that they may not see the vital role A&P plays in their nursing career goals. If their A&P instructor also lacks nursing experience, he or she may be at a loss for convincing examples.

This is the first of a series of reports on my sabbatical research, ‘How Nurses Use Physiology.’ Over the course of this academic year I will be interviewing and shadowing nurses, gathering examples we can use to show our nursing students how A&P is linked to the important tasks and issues they will face when they are at the bedside.

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**Nurses Need Anatomy and Physiology for… Assessment**

Not class assessments (if your school uses that terminology), but patient assessment. If your class gives ‘assessments,’ though, students will understand the difference between a cookbook evaluation of their work and an informed evaluation. They want you to ask questions that focus on the important material, not on trivia. When they write a paper, they do not want you to just score them on their conclusions, but to evaluate the quality of their reasoning, based on what you know about learning and about them, and give them useful feedback. How much more important is it for them to do this same kind of careful assessment with their patients?

Most nursing students will be taught patient assessment using the SOAP (or SOAPE) model – they assess Subjective and Objective evidence, Analyze it, Plan care, and, in some forms of the model, Evaluate the patient’s response. They may learn a systems-based assessment protocol (nervous, cardiovascular, respiratory) or a head-to-toe protocol.

One of my nurse interviewees, Mary Kay Feeley, chose to use the example of the radial pulse, the most basic of vital signs, to discuss how she uses physiology. Taking vital signs is among the activities that can be delegated to nursing assistants in the hospital. That means that you, as the patient, might have your pulse taken by someone who has never had A&P. Would it matter? Do your students think it would matter? While vital signs can be delegated legally, whether they should be is a topic of debate among nurses and within nursing organizations. “There’s a reason they’re called vital signs,” Kathleen Vollman said in a June 2008 presentation for the Greater Milwaukee Area chapter of the American Association of Critical-Care Nurses (AACN) (Vollmann, 2008).

When they graduate, your students will be on the front lines of this debate. They will have to decide when, and for which patients, the task of taking vitals should be delegated; so they need to know what a trained nurse can observe from it, as opposed to what a nursing assistant can be trusted to report. Sometimes delegating this procedure makes sense, and other times it deprives the nurse of important information.

How many things can your nursing students imagine themselves finding out just from taking a pulse? Here are some examples, with questions my interviewee suggested that nursing students ask themselves and her answers.

1. A patient’s heart rate seems steady, but then you notice a beat coming just before or just after you expect it to. The pattern is repeated. What chamber of the heart is responsible for the pressure waves you feel in the pulse?

In this example, the nurse may be detecting premature ventricular contractions. Often the early beat is not as obvious as the pause following it before the next normal beat, which is stronger than the rest due to the longer filling time of the ventricles.
2. A patient’s heartbeat is seriously irregular; you cannot predict when the next beat will occur. Yet the patient does not appear to be having a heart attack. What part of the heart controls the rate and rhythm of contraction?

In this example, the nurse may be detecting atrial fibrillation, which is often described as causing an ‘irregularly irregular’ heartbeat.

3. A patient has pre-existing atrial fibrillation. The nurse goes in to give prescribed digitalis and finds the pulse regular and below 60. Is she observing a normal consequence of atrial fibrillation, or a normal consequence of digitalis?

In this case, my interviewee was detecting possible digitalis toxicity. She notified the physician, who ordered an EKG.

A good nurse can also estimate blood pressure from the pulse, by how strong it is.

4. A patient is dozy, pale, and has a slow, weak pulse. His blood pressure is low. What could have caused the low BP?

The low heart rate in this case suggested that the patient was going into cardiogenic shock. His blood pressure was dropping due to decreased cardiac output because of the low heart rate.

5. A patient is nervous, disoriented, and has a fast heart rate and weak pulse. Her skin is cold and damp. She also has low blood pressure. What is causing her signs and symptoms?

The sympathetic system is active as this patient attempts to compensate for her low BP. Possible causes the nurse might investigate include dehydration, which she can check by observing skin turgor as she takes the pulse. She might also suspect internal bleeding in a postsurgical patient.

6. The patient has a fast heart rate but his pulse is weak. His skin is flushed and warm. But his blood pressure is also low. What could be decreasing it?

The warm, flushed skin should make the nurse think about vasodilation and decreased peripheral resistance. Fever could be causing vasodilation, but what could be causing a fever? This patient could be developing sepsis, a serious medical emergency.

While taking the pulse the nurse can notice more about the skin than turgor and temperature. Is the skin fragile with lots of bruises? That could indicate abuse, bumping into things from dizziness or from gait disturbances, or bleeding disorders. Is the skin pale (shock? anemia?) or very flushed (sunburn? fever? allergic reaction?)

An experienced nurse may catch alterations in muscle tone. Is the wrist flaccid? Is it rigid, as in spastic cerebral palsy? Is there a tremor, as in Parkinson’s Disease?

Are the joints of the hand bent and knobby, as in arthritis? Do the nail beds have good blood return after being pressed, indicating adequate circulation in the hand? Are nail beds blue with cyanosis? Are the fingers clubbed, as in congenital heart disease or longstanding chronic obstructive pulmonary disease (COPD)?

7. The patient has blue nail beds. She says “I have trouble walking up the stairs; I get short of breath when walking up the stairs.” What is the next question your students would ask and why?

This situation made my interviewee think of congestive heart failure, respiratory infection, or COPD. She asked, “Can you go up part of the stairs; has it always been that way?” and determined how quickly the problem had developed, to distinguish between an acute condition and COPD.

Your students might ask themselves why she suspected congestive heart failure, when the complaint was about breathing. They also might discuss why one of her next questions was about unexpected weight gain.

Taking the pulse seems so basic, but a nurse who is thinking about the body systems and their interrelation can catch a wide variety of dangerous situations with this simple action. A nurse who has delegated this task or is not thinking about those interrelations, on the other hand, can miss important information. And a nurse may have 5 or 6 patients. Which ones can the nursing assistant take vitals on? No wonder the American Association of Critical-Care Nurses has published a delegation handbook! To give a critical-care nurse the last word: “Although nursing tasks may be delegated, the nursing process functions of assessment, evaluation, and judgment must not be delegated.” (Currie 2008)

References