

MS1 Medical Instrument Choice Guide

Dear Incoming Medical Student,

Now that you are a medical student, you will be learning many new facts, concepts, and skills. Some of the skills will require equipment; like when you are examining hearts, lungs, ears, eyes, and the nervous system. To adequately learn these skills, medical students **must** have their own equipment. Because we feel so strongly about having your own equipment, it's automatically included in the financial aid package for which you are eligible. I and many of your other teachers believe having your own equipment will help you take better care of your patients and increase your enjoyment of your career.

In this document, I offer some explanation of the choices and recommendations. I offer these recommendations as a synthesis of personal experience, opinions of specialists, and data from vendors. I have no financial or other interest in any of these products.

It would be best if these instruments were in your possession by the beginning of school, since they will be needed in one of the first Colleges sessions (you will be practicing the exam of the head, eyes, ears, nose, and mouth with guidance from your mentor).

You have many options for ordering your medical instruments; I'll outline two here: ordering from the University Store or through the class of 2022's class presidents. Of course, you are welcome to order your instruments on your own. The benefit of ordering through the University Store is that they will work with you to coordinate payment using the financial aid you may receive to pay for this purchase. Other options will require you pay when you purchase. To see the package offered by the University Store, [click here](#).

The second year medical student class presidents are organizing instrument packages and a class discount for you; stay tuned for more information from them shortly via email.

Please feel free to contact me with questions.

Best wishes,

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In short, we'll discuss five types of equipment:

MUST HAVES

1. Stethoscope
2. Diagnostic Kit (ophthalmoscope, otoscope)
3. Reflex hammer
4. Tuning forks (128 and 256 Hz.)

OPTIONAL

5. Sphygmomanometer (blood pressure cuff)

If you'd rather someone just tell you what to order, rather than reviewing the options and making a decision yourself, here is a suggestion vetted through several Colleges mentors:

1. **Stethoscope: Littmann Cardiology IV**
2. **Diagnostic Kit: Welch Allyn Classic Smart Set**
3. **Reflex hammer: Prestige Telescoping Babinski**
4. **Tuning forks: both 128 and 256 Hz.**

For those who want to know the options and make their own choice, the stethoscope and diagnostic kits are the most expensive and involve the most choices. General price ranges and recommendations are offered in table 1.

Table 1: General Information

Instrument	Approx. \$	Comments
Stethoscopes	\$80 - \$500	Get a good one
Diagnostic kits	\$350 - \$1000	For practice & hospital
Reflex Hammer	\$3 - \$12	Cheap/handy
Tuning Fork(s)	\$7 - \$12	Cheap/handy
Sphygmomanometer	\$50 - \$250	May not need

Stethoscopes

This is the most important piece of equipment you will acquire. Although high quality ones are expensive, they are quite durable. Because many of the sounds you will learn to hear are subtle, you will want to learn on the highest quality stethoscope you can afford.

The best stethoscopes have two-tube lumens, “tunable” technology, short tubing, and comfortable earpieces. For reasons I do not understand, the best acoustics require that the sound transmitted from the headpiece to the ears be separated. Some stethoscopes have completely separate tubes going to the ears, but this design can introduce extraneous noise by allowing the tubes to collide. Better stethoscope designs have a single tube with two lumens. This design can be recognized by rolling the single tube between your fingers: the two lumens can be palpated.

Some heart sounds are high-pitched, and some are low. For this reason, it is important to have “tunable” technology that allows you to focus on these different frequencies. There are generally two types of “tunable” technology: pressure and bell/diaphragm systems.

The Littmann stethoscopes have a patented design that allows the high pitched sounds to be best heard by placing firm pressure on the headpiece when it is on the skin; low pitched sounds require light pressure. Alternatively, other stethoscopes have a bell for low pitch sounds and a diaphragm for high pitched sounds. One simply rotates the headpiece on the tubing connector to the desired tuning.

There are many brands of stethoscopes; I have experience with Littmann, DRG (Doctor's Research Group), Welch Allyn, Prestige, and MDF. All of these brands feature high-quality stethoscope options. Many also have **electronic stethoscope** options. These are ideal for hearing impaired students and physicians, as the volume can be adjusted. In addition, many can record and playback sounds and/or come equipped with software and adapters so the sounds can be downloaded and analyzed on your computer. Of course, electronic stethoscopes are the most expensive, and in my opinion, the quality of sounds produced by the electronic stethoscopes does not yet equal the acoustic stethoscopes for those with normal hearing.

Recommendations: Unless a student is hearing impaired and would benefit from the electronic stethoscope, I recommend the highest quality stethoscope a student can afford.

Littmann Stethoscopes





Diagnostic Kits

Although diagnostic kits are attached to almost any clinic room wall, medical students need to have their own set for several reasons. First, you will need to be an expert in this skill. For example, only by looking at your patient's retina can you recognize the findings of a hypertensive emergency, requiring immediate ICU admission. Second, you can practice using this difficult-to-use equipment in the comfort of one's own home. Third, medical students will spend much time on the hospital wards, where finding diagnostic kits is much more difficult than in the clinics.

The options available in diagnostic kits can be confusing. Luckily, there is only one manufacturer: Welch Allyn.

What's in a Diagnostic Set?

Common Components



The decisions to make regarding diagnostic kits boil down to three choices: What size kit do you want? What kind of oto/ophthalmoscope heads do you want? And what kind of battery handle do you want?

Diagnostic Kit Options

- Full Size Sets
 - Ophthalmoscope head options:
 - PanOptic system:
 - Coaxial system:
 - Otoscope head options:
 - with and without throat illuminator
 - Standard and "Macroview" head
 - 3.5 V Power handle options
 - "C" series for "classic": Ni Cd rechargeable or C-cell batteries
 - "SM" series for "smart": Li ion rechargeable
- PocketScope 2.5 V power handle
- CompacSet

What Size Do You Want?

The choices of sizes of kits are, from smallest to largest, the "CompacSet", the "PocketScope", the full sized set (aka "Coaxial", for the lighting technology), and the kit that comes with the "PanOptic Ophthalmoscope". In America, the most commonly used one is the coaxial full sized set.

Ophthalmoscope Head Options



On the other hand, some students are opting for the “PanOptic” kit (the largest). This will be discussed further in the next section.

Recommendation: the full sized kit with a lithium handle, coaxial ophthalmoscope, and macroview otoscope offers the best combination of cost, accessibility and performance. If cost is not a factor and you are willing to cart around more equipment, I recommend a full sized kit with both a coaxial and panoptic. That is what I use.

What Type of Head Do You Want for Your ‘Scopes?

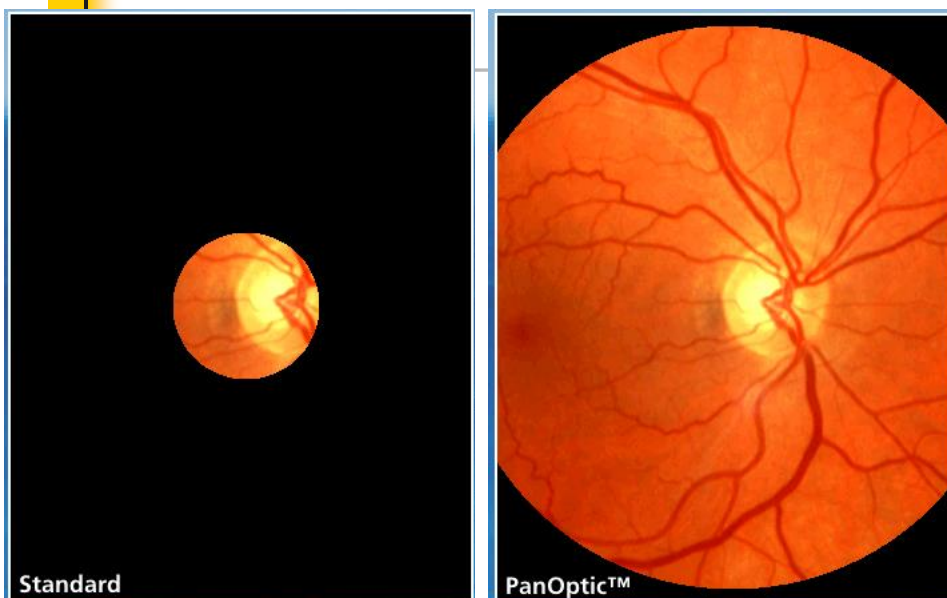
There are two options for ophthalmoscopes (Coaxial and PanOptic) and two for otoscopes (standard and MacroView). As mentioned above, some students are choosing the PanOptic ophthalmoscope head because of the technology that has greatly enhanced the ability to see the retina inside the eye globe. Visualizing the retina is essential in many common diseases (e.g. diabetes and hypertension).

PanOptic Ophthalmoscope



- Provides a **5x larger view** of the fundus
- **25° field-of-view** vs. the standard scope 5° field-of-view
- **More difficult to carry around**

Comparing Coaxial and Panoptic Fields of Vision



Recommendation: if one chooses a larger set, one might as well go all the way with a PanOptic (assuming one can afford it).

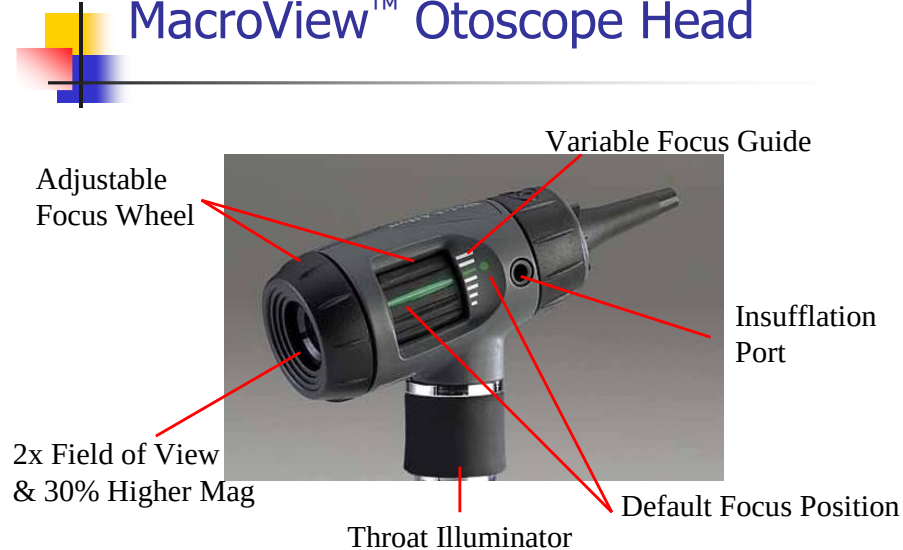
The two choices for the otoscope head are simple. If one chooses a PocketScope or smaller, it will automatically come with the standard head. If one chooses the Full Size/Coaxial size or larger, one should definitely go with the MacroView head. It offers

a larger field of view at a higher magnification, is focusable, and generally represents a leap ahead in technology.

Standard Otoscope Head



MacroView™ Otoscope Head



What Kind of Power Handle Do You Want?

There is no choice of power handle for the CompacSet model, but for PocketScope or above, there are. For the PocketScope, one may choose either rechargeable or AA battery handles. For the Coaxial or above, one may choose between Lithium or NiCad

handles. Although the Lithium handles are a little more expensive, they are worth it. They last longer and are lighter.

Power Handles



Lithium Ion "Smart" Handle

- Lasts 110 minutes
- Half the weight of NiCad
- No memory effect
- \$100-150 more

Low battery indicator



Traditional NiCad Handle

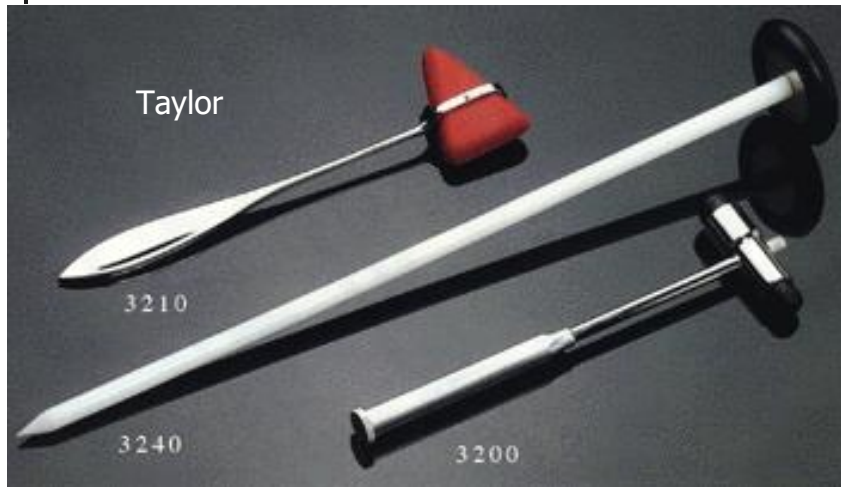
- Plug in recharge **or**
- takes C-cell batteries
- Lasts 55 minutes

Reflex Hammers and Tuning Forks

There are several choices in reflex hammers, and all work well. However there are a few caveats to keep in mind. Neurologists seem to prefer the Queen's or Babinski model (model 3240 in the figure), but they are cumbersome to carry around. The other two models more easily fit in a white coat pocket. Model 3200 in the figure comes equipped with a screw-in brush (for testing fine sensation) and pin (for testing pain). In this day and age of blood-borne diseases, one should never use the pin on sequential patients. Recommendation: there is a nice collapsible Babinski model offered by Prestige (see below).

Tuning forks are used during the neurologic examination to test hearing (256 or 512 Hz. models) and vibration sensation (128 Hz. model). Recommendation: One should pick up one for each purpose.

Reflex Hammers



The “Hummer”



Babinski Telescoping Reflex hammer

Recommendation for hammers: either a Taylor or the Babinski Telescoping hammers.

Sphygmomanometers

Blood pressure cuffs (sphygmomanometers) are truly ubiquitous in hospitals and clinics, so each student may not need to purchase one. However, there are circumstances in which one may wish to do so. First, practicing this very important skill is probably the best, most universal reason. Second, one may choose to participate in health care delivery to underserved populations outside of the normal health care infrastructure. For example, students each year go on a medical mission trips to render care in churches and dirt-floor huts; sphygs are essential in this setting. Further, many UT Southwestern students participate in health fairs, volunteer events, and free clinics, where there might

not be a sphygmomanometer available. In addition, one may be asked to measure BP when one goes home for the holidays!



Sphygmomanometers

Why Own a Blood Pressure Gauge?

- Practice
- Philanthropy – e.g. medical mission trip, or measuring Aunt Bessie's BP at Thanksgiving

Recommendation: don't get one unless you plan to provide care in an environment where they will not be readily available: e.g. home, free clinics, third-world countries.

Good luck, and feel free to contact me if you have any questions!

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