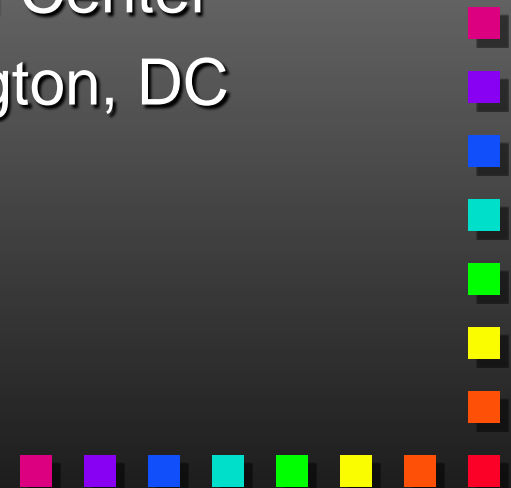


# Heart Murmurs in Kids: Innocent or Guilty?



Robin W. Doroshow, MD  
Children's National  
Medical Center  
Washington, DC

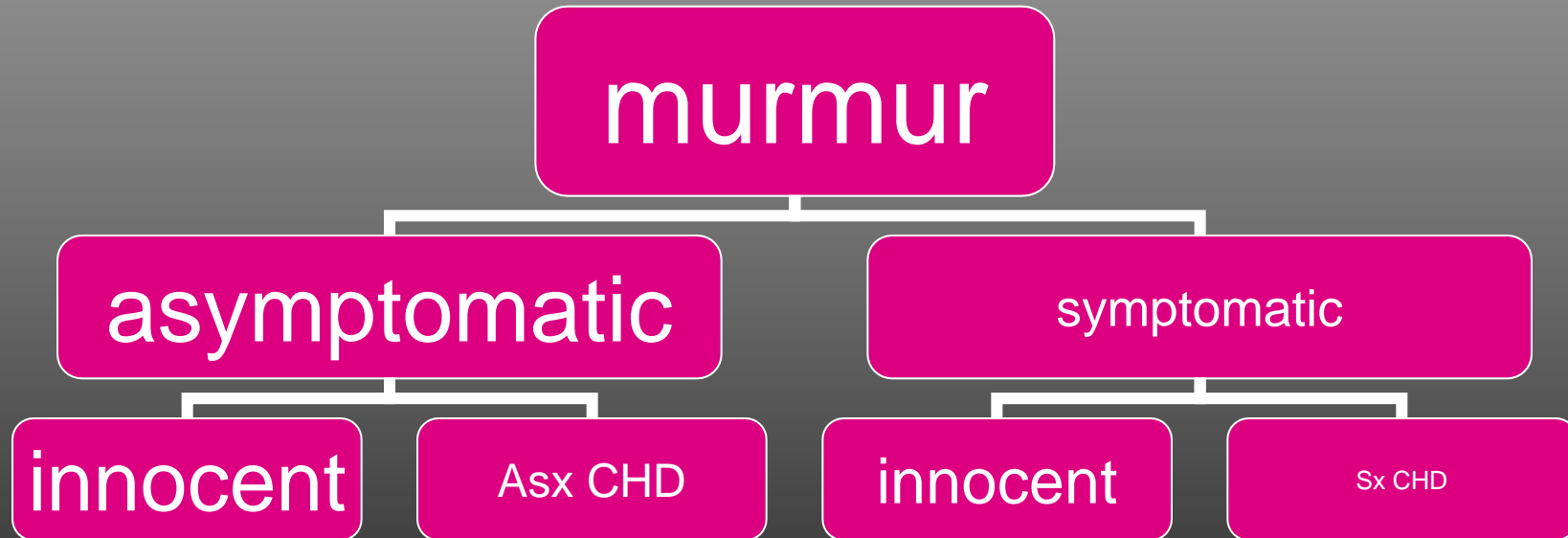


# Distinguishing Innocent from Guilty

- The nature of the problem
- How good are doctors at this?
- Why don't we learn this well?
- What to focus on
- Common innocent murmurs in kids
- Am I done now?



# Subsets of Kids with Murmurs



# Common Heart Defects in Asymptomatic Children

- ventricular septal defect (small-mod.)
- atrial septal defect (even large)
- patent ductus arteriosus (small-mod.)
- pulmonic stenosis
- aortic stenosis
- coarctation of the aorta





# Innocent or Guilty?



## INNOCENT

asymptomatic?

softer?

lower pitched?

systolic?

**sounds like a**

**Still's murmur**

**venous hum**

**etc.**

## ORGANIC

symptomatic?

louder?

higher pitched?

diastolic?

**sounds like**

**AS**

**VSD**

**etc.**

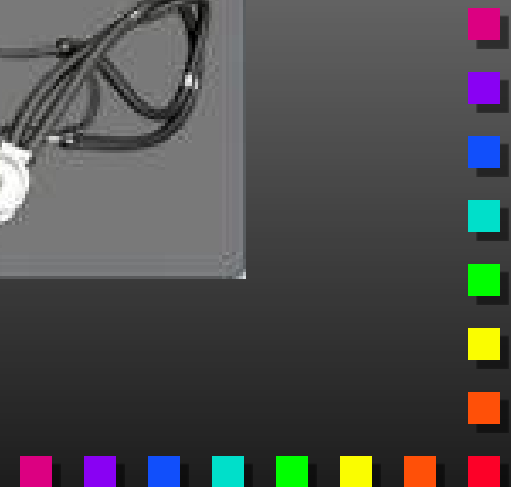




“Hey, I can hear the traffic!”

# Innocent Pediatric Murmurs

- 50-60% of infants;  
90% of school-age children.
- Usually differentiated from organic murmurs by **exam only**.





# False Negative Murmurs



- delay of medical Rx
  - morbidity (FTT, infex, CHF)
  - mortality (exp. sudden death)
  - pursuing other diagnoses
- delay of surgical Rx
  - poorer result
  - higher risk
- inappropriately *unrestricted* activity
- poor preparation for surgery & lifestyle
- endocarditis





# A Cardiologist's Nightmare: “H.S. Athlete Dies in Game”

“Basketball Star  
Collapses on  
Court

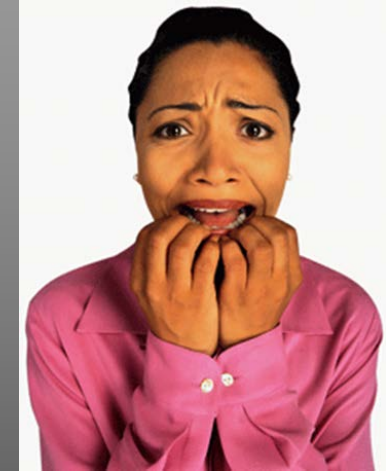
Cleared for Sports by  
Local Physician”



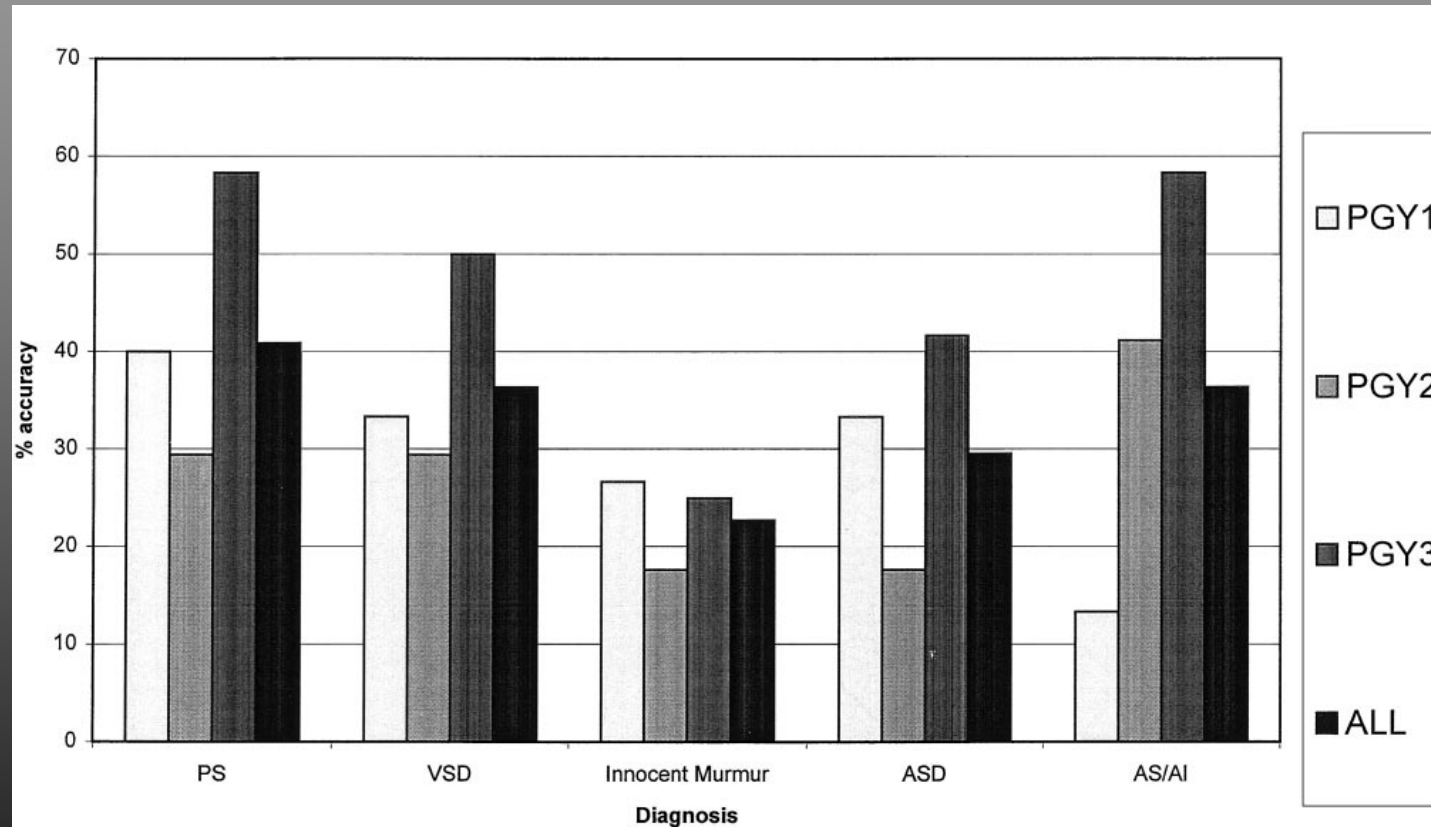
# False Positive Murmurs

- parental concern
- patient anxiety
- unnecessarily restricted activity
- school/social problems
- poor self-image
- economic stress
  - insurability
  - employability
  - cost of evaluation

\$

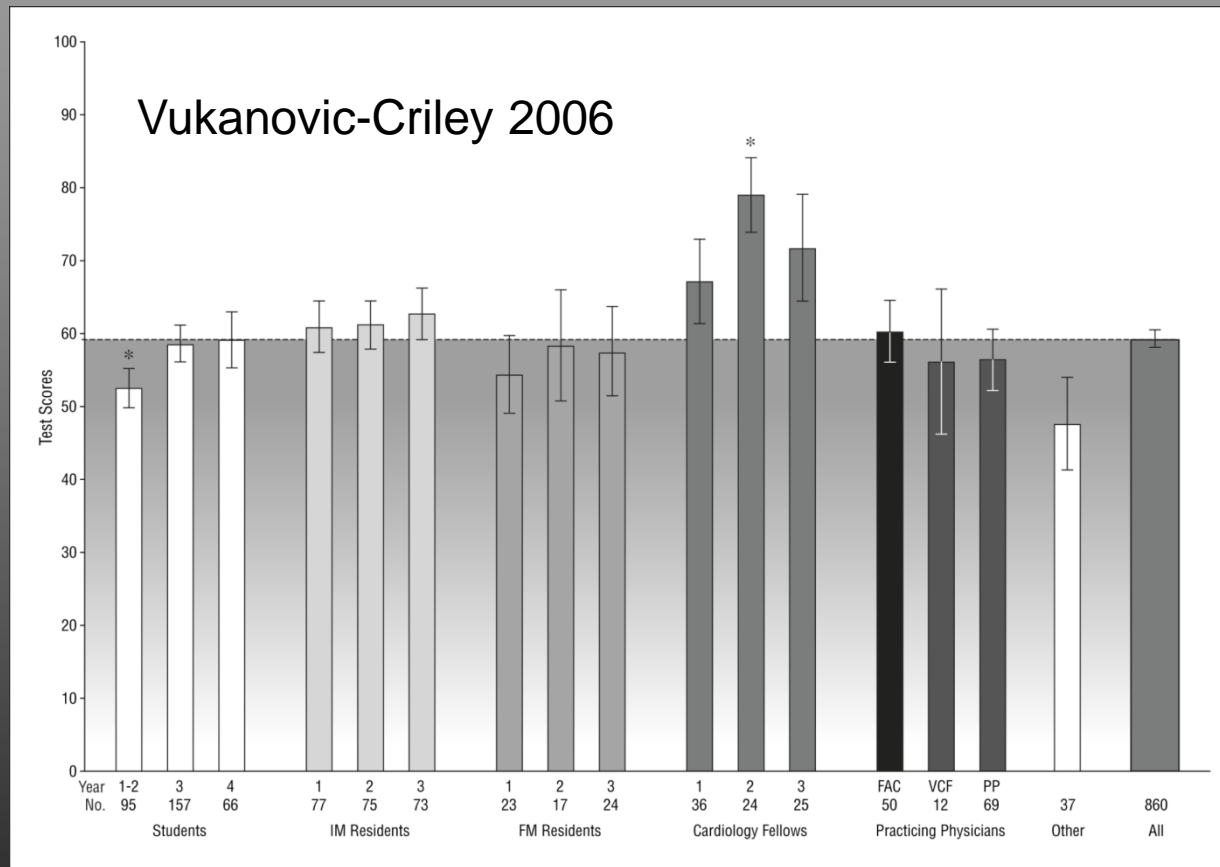


# Accuracy of Murmur Recognition in Pediatric Residents



Gaskin 2000

# Skills Don't Improve after Med School...



...unless you're a cardiologist

# Traditional Teaching of Cardiac Auscultation

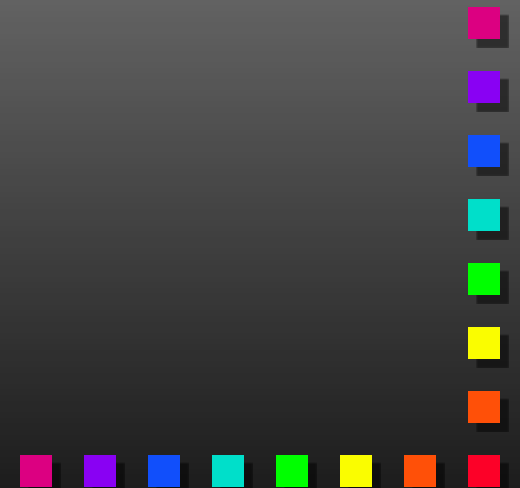


- Bedside
  - Random exposure
  - No time
  - Limited cooperation
  - Distractions
  - No way to compare



# Traditional Teaching of Cardiac Auscultation

- Books, articles, standard lectures
  - It's a *sound*!
  - Verbal descriptors are a barrier



# Auscultation of Murmurs

- SCRIPTS:
  - Site
  - Character
  - Radiation
  - Intensity
  - Pitch
  - Timing
  - Shape





# Murmur Intensity

- Grade 1 Barely audible
- Grade 2 Soft, but easily audible
- Grade 3 Moderately loud, but no thrill
- Grade 4 Louder, associated with a thrill
- Grade 5 Heard with stethoscope barely on chest
- Grade 6 Heard with stethoscope off chest

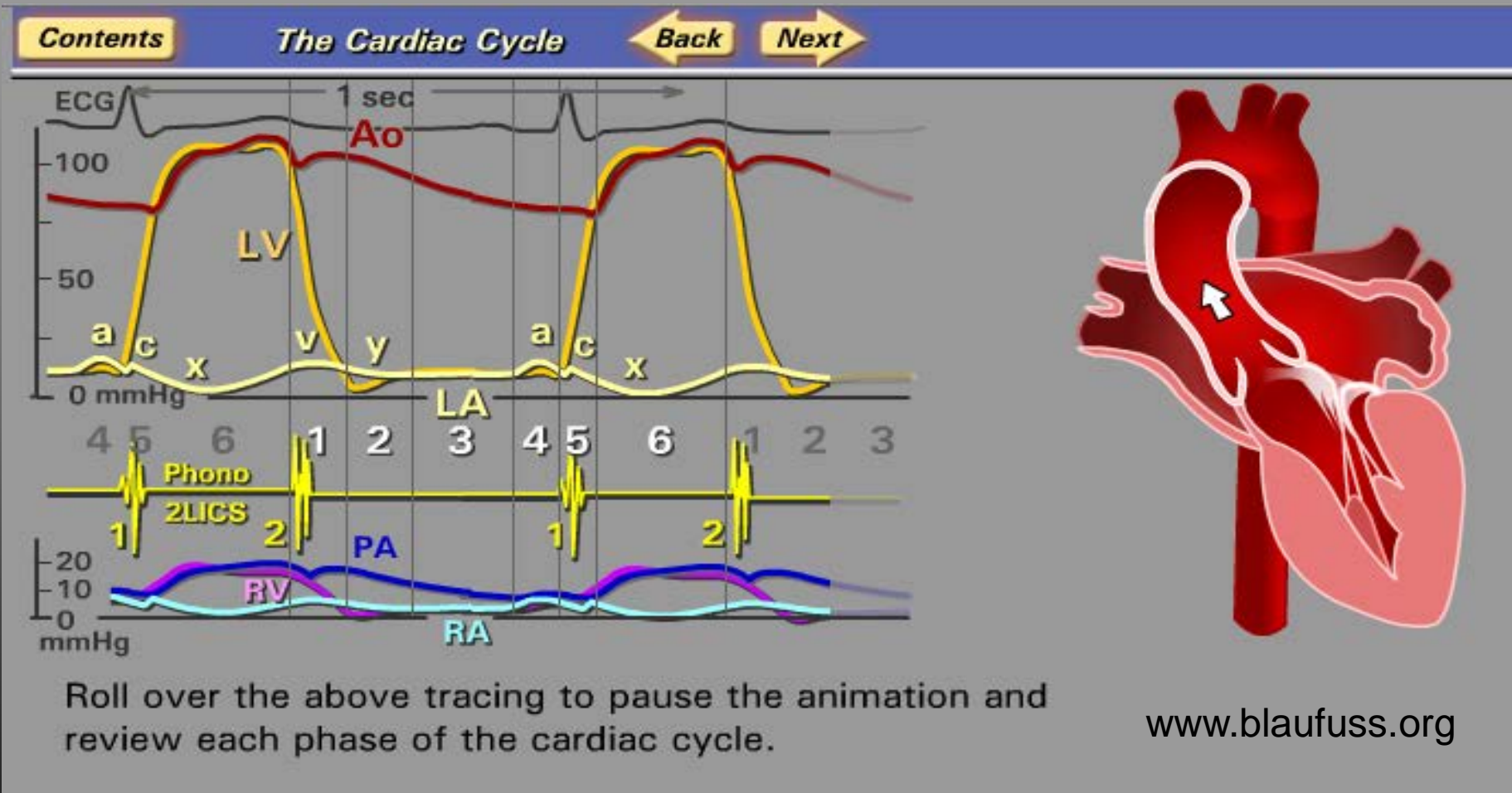


# Traditional Teaching of Cardiac Auscultation

- Connecting with concepts
  - Physiology/cause of sound
  - Correlating with other timed events
  - Relating to anatomy
  - Depends on learner



# Too Much Information!

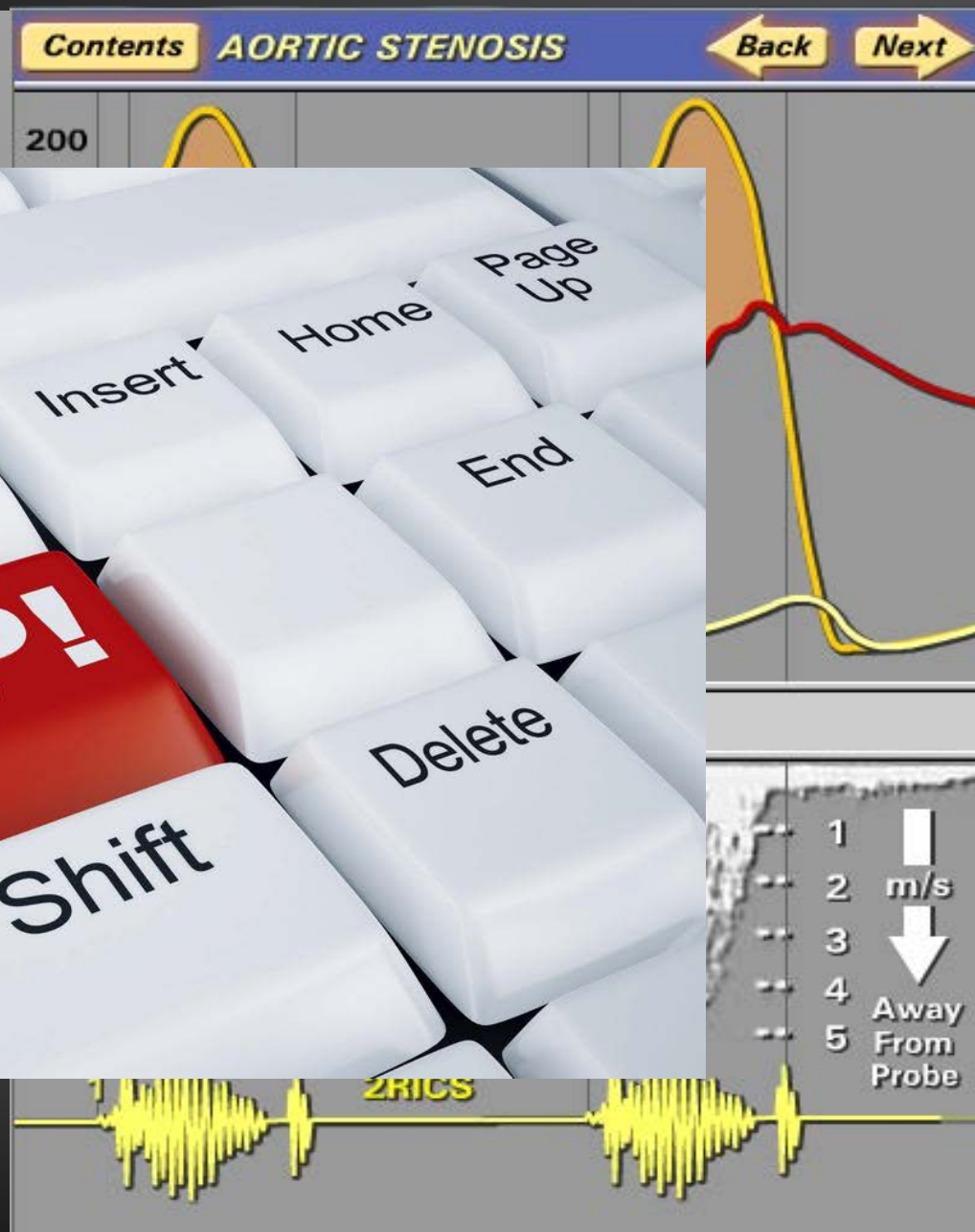
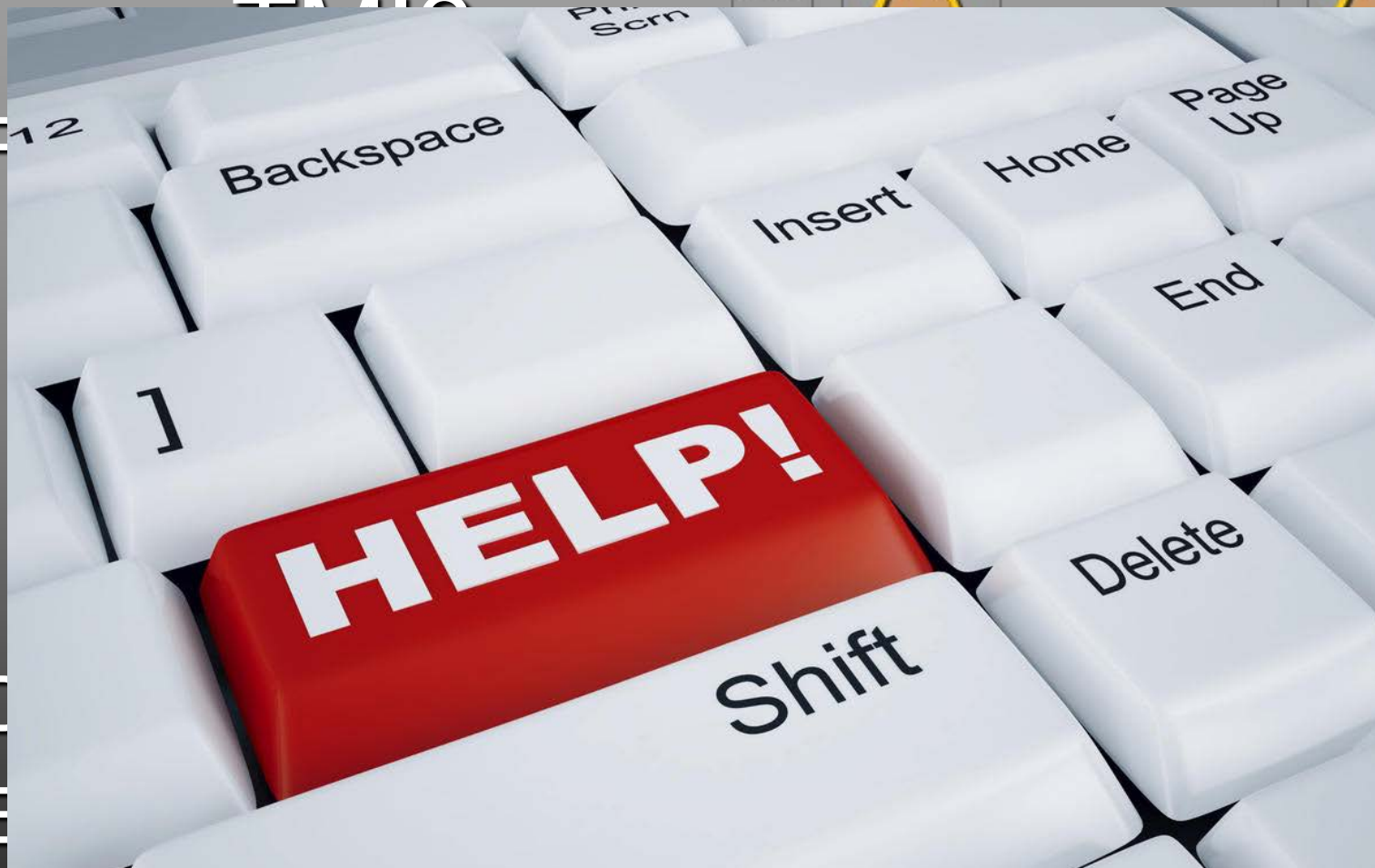


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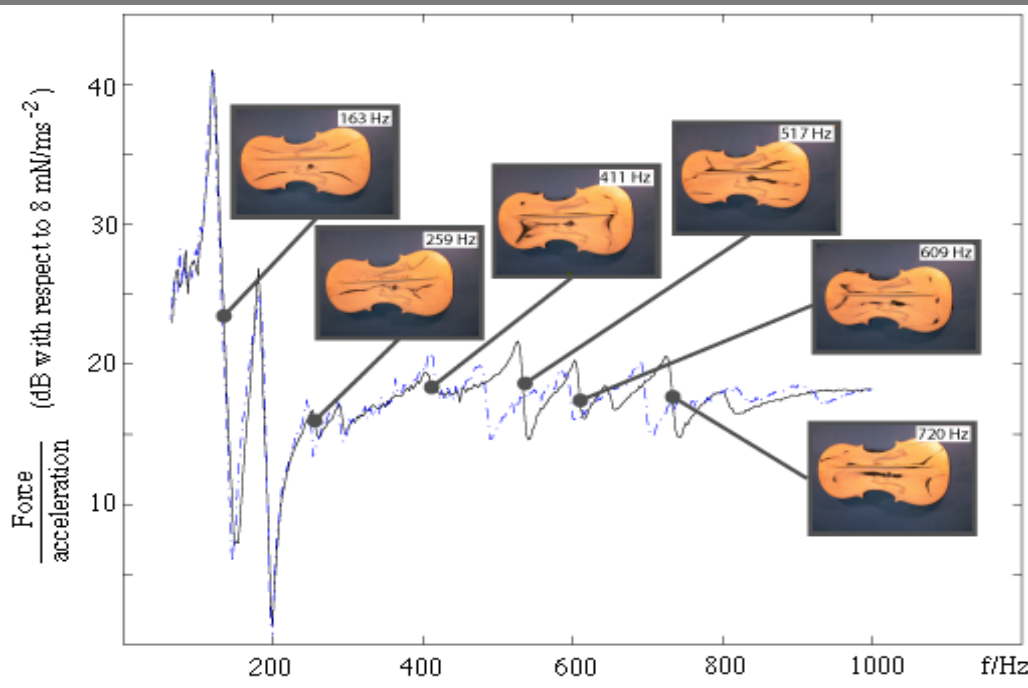
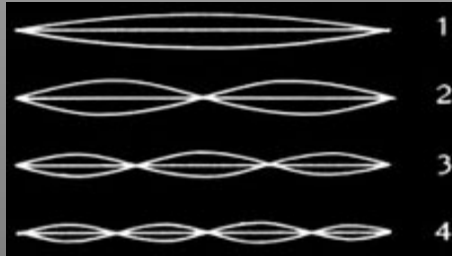
■ Phonocardiogram→



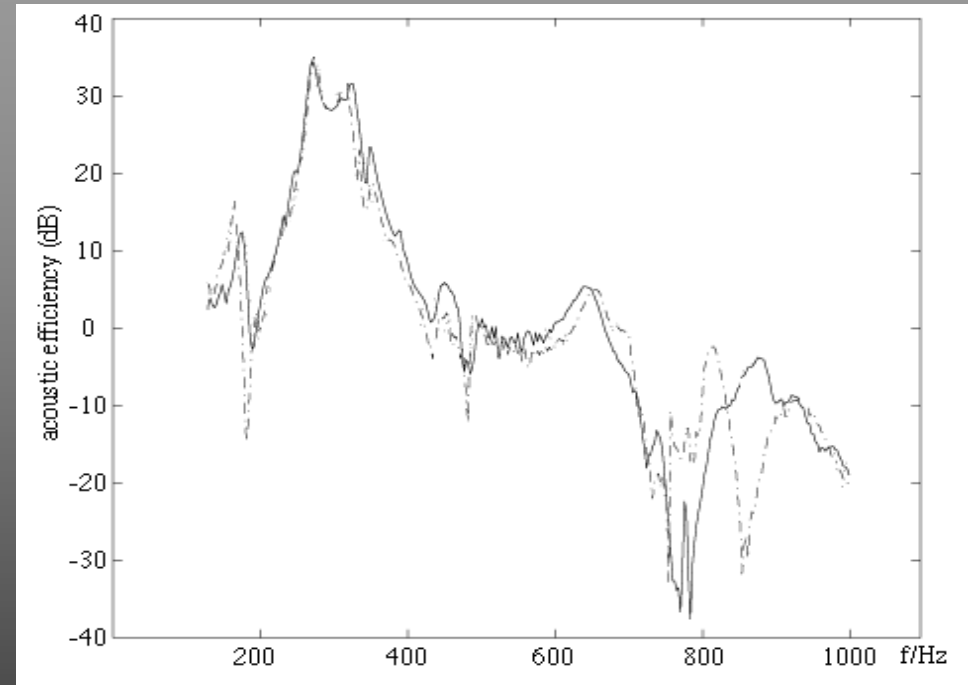
# Violin or Flute?



# How Does a Violin Make Sound?



R. Doroshov, MD

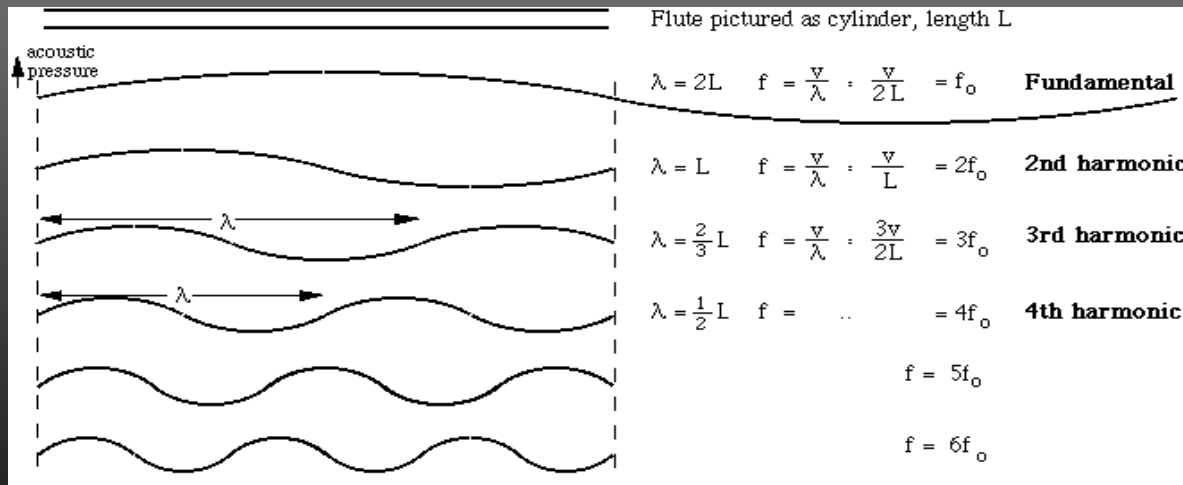
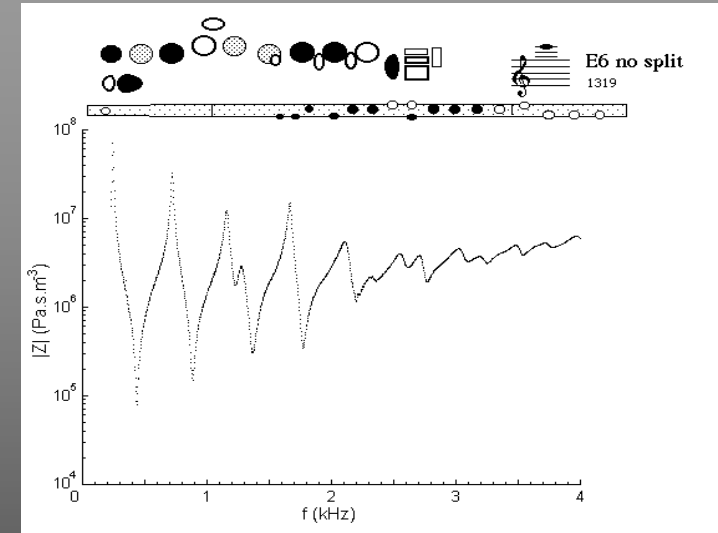
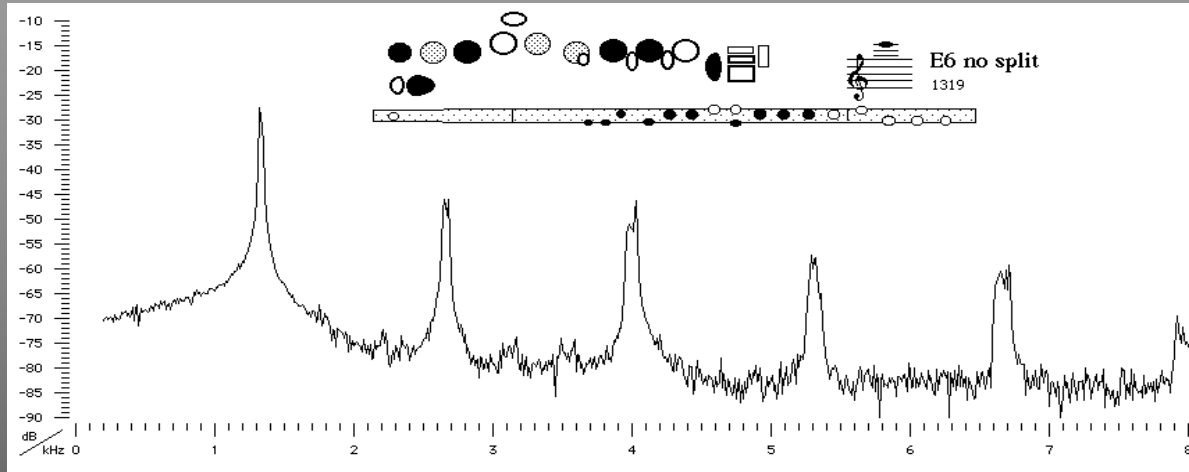


[phys.unsw.edu](http://phys.unsw.edu)

[thinkquest.org](http://thinkquest.org)



# How Does a Flute Make Sound?





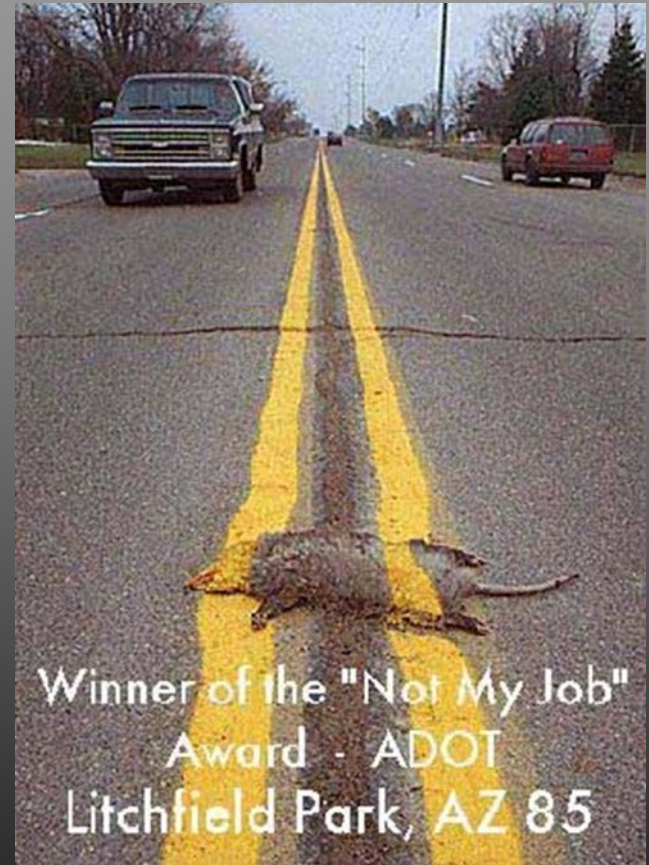
phys.unsw.edu





# What is the Pediatrician's Job Here?

- To make a diagnosis?  
Pulmonic stenosis?   
or small VSD? 
- That's **my** job!



# What is the Pediatrician's Job Here?

...to distinguish the innocent murmur from the pathological one.



# How to Improve This Skill

- Get feedback
  - Not practical if you don't have a cardiologist nearby
- Get lots of practice
  - It doesn't take real kids
- Learn the innocent murmurs
  - Everything else is guilty





# Still's (Vibratory) Murmur

- age 2-16 yrs but also heard in infants
- about 90% of school-age children!
- early to mid-systolic
- **vibratory, musical, or groaning**
- LLSB to apex ("hockey stick")
- louder supine, softer w/ Valsalva
- DDX: VSD, MR



# Venous Hum

- age 2-12
- 30-50% of school children
- humming or roaring (“seashell”)
- **RUSB** > LUSB, neck
- sensitive to head position & venous compression; **disappears supine**
- DDx: PDA, AV malformation







NEXT TIME I PICK UP  
A SHELL TO LISTEN  
TO THE OCEAN,  
STOP ME.

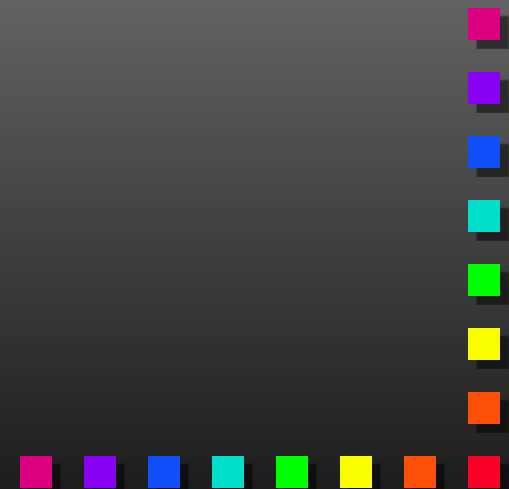


# How to Get Experience



# How to Get Experience

- Find a website or an app you like
  - Real murmurs
  - Pediatric murmurs
  - Use earbuds
  - Don't focus on specific diagnosis
- Listen a lot!



# Management of the Innocent Murmur

- EXPLAIN to patient & parents and **name the murmur.**
- RECORD in chart: description and dx.
- Lab tests usually NOT INDICATED.
- Referral NOT INDICATED.  
exceptions:
  - dx unclear
  - high risk cases
  - intractable anxiety

