PEDIATRICS BOARD REVIEW

Your Certification SYSTEM for Passing the Pediatric Boards

• 100% Money Back Pass Guarantee •
• MASSIVE Online Community •
• Board-Focused, Manageable Content •
• Powerful Mnemonics •

EFFICIENT LEARNING So You Can Enjoy Life & Have More Fun!

Written By Ashish Goyal, MD

Edited By Dr. John Cole (A PBR Alum)

www.PediatricsBoardReview.com
INTRODUCTION TO THE PBR EXPERIENCE! (Please Read This!!!)

Hi! My name is Ashish Goyal. I’ve been fortunate enough help thousands of pediatricians with their board review experience through the “PBR.” I’m a double-boarded physician living on the most isolated landmass in the world, yet some of my greatest success stories come for pediatricians across the United States.

My favorite stories are those from pediatricians who had previously failed 4–6 times before they found the PBR, but then passed by using the PBR Certification System. Those wonderful success stories clearly show that the PBR system is perfect for first-time AND repeat test takers. While there are PBR digital, audio and video resources available to streamline and cement the core material, the Core Study Guide and the Q&A book are at the center of the PBR system and they are essential towards helping you pass your exam.

PBR is great for residents looking to boost their In-Training Exams (ITE), for new pediatricians taking their American Board of Pediatrics (ABP) initial certification exam for the first time, for pediatricians who have failed the initial certification exam, and for busy pediatricians studying for their ABP Maintenance of Certification (MOC) exam.

PBR is much more than a collection of study resources. It’s a group experience and a system that provides you with ALL of the CONTENT, test-taking TECHNIQUE, GUIDANCE, and COMMUNITY SUPPORT that you need to pass your exam. You truly do NOT need any other board review book to pass your exam.

The national first-time pass rate is usually in the 75%–85% range for the (ABP) initial certification exam. By analyzing surveys, PBR’s Money Back First-Time Pass Guarantee requests, and emails, we estimate that PBR’s first-time pass rate for the initial certification exams is at least 97%!

For the ABP MOC recertification exam, the pass rate with PBR has been 100% for practicing general pediatricians (2011 – 2014, 2016), and very similar for pediatric subspecialists. In 2015, only ONE pediatrician failed on his first attempt at the MOC, and he admitted that he barely looked at the PBR resources.
WHY DOES THE PBR CERTIFICATION SYSTEM WORK?

EFFICIENCY THROUGH SYSTEMS AND INNOVATION

Most board review books and courses simply hand you a book and say, “good luck.” That’s how I studied for the USMLE exams, the pediatric board exam (twice) and the Internal Medicine board exam. I was completely isolated! After purchasing thousands of dollars of board materials, I was left to go through the books and video courses with no real guidance, no feedback from my peers, and absolutely no advice from the authors (besides a one-page preface).

Because of how excruciatingly painful that was, I’ve create a community of pediatricians for you to study with and a blueprint of what to study, how to study it and how to do so EFFICIENTLY!

In fact, ALL of the PBR resources are created with your time in mind.

* Will the resource be easy to use?
* Will it provide more value than existing resources AND provide that value in a more streamlined fashion?
* Can we make the resource digital for easy access via smart phones and tablets?
* Will the resource reinforce the core concepts laid out in the PBR and in the Q&A book instead of overwhelming with new concepts?
* Can we make the resource portable (e.g., audio or video?) so that it can be used at times when a physician, or a mom, or a dad, or a gym-enthusiast, would not normally be able to study?

PBR is a system unlike anything you have ever experience before in your medical career. The Core Study Guide is written in easy-to-understand language and provides you with hundreds of time-saving memory aids. The online systems allow for one-click access to hundreds of high-yield images across the web. The Q&A book has some of the highest yield and most board-relevant questions available.

You also have a ready-made study group of hundreds of pediatricians. It’s called the PBR Facebook CREW, and it will help you EFFICIENTLY blow past trouble spots in your studying. Plus, if you see an error in the book, or if you would like to submit an official request for content clarification, you can simply submit the info to me through PBR’s error submission portal (www.pediatricsboardreview.com/error). Your submissions will likely be used to create a PDF response that is made available to ALL PBR members in order to enhance the PBR experience for the entire PBR community.

All of these efficiency-focused systems SAVE YOU OVER 100 HOURS OF TIME and give you flexibility in your life to enjoy your family, your friends, or to reinvest that time into repetition of the PBR material.

A critical component of ANY individualized board review plan is to go through the study material MULTIPLE times. PBR is concise, makes the learning manageable, and will allow you to feel confident on your test day because of well-prepared you are for your exam.
WHAT ARE THE 7+ RESOURCES THAT YOU HAVE ACCESS TO?

The **PBR Ultimate Bundle Pack** and the **ALL ACCESS PASS** packages have become our two most popular memberships. If you have one of these memberships, please make sure you take advantage of all of these resources!

1. **PBR’S COMMUNITY!** This includes the **MEMBERS-ONLY FACEBOOK CREW**, Ashish Goyal, “Team PBR” and PBR’s summertime webinar content experts. **JOIN THE CREW!** Do not study in isolation! You have a community of pediatricians to support you. MANY members say this is one of the most valuable components of the PBR system. Studying for a board exam can be GRUELING, but having others to lean on for clarification, advice or just some moral support can make all the difference in your studying experience.

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Made it!!! Thank you Ashish, PBR staff and Facebook crew for your help and support with the Boards!!!

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Passed! Thank you Ashish and PBR crew!

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God is so GREAT!!! After 4 failures I HAVE PASSED. Ashish Goyal i used your material for the first time this year and it was God sent. Thank you so much for your test taking strategies, your videos, your mp3s and for restoring the faith that after failure there can be success. Im here for any referrals you need or if any one who has failed wants help please feel free to msg me. **THANK YOU THANK YOU THANK YOU**
2. **HARDCOPY PBR CORE STUDY GUIDE**: YOU WILL LEARN TO LOVE YOUR “PBR!” It is at the center of your success blueprint. Carry it everywhere, highlight it, draw pictures, create mnemonics and add notes to help you cement the 2000 MUST-KNOW topics in this book. After your exam, I promise you that you will MISS IT!

3. **HARDCOPY PBR Q&A BOOK**: KNOW this book! It is NOT a random collection of questions. The material should be considered CORE material for you to study over and over again. Carry it around and mark it up! Make sure you review this book as many times as you review the Core Study Guide.

4. **ONLINE VERSIONS OF THE PBR CORE STUDY GUIDE**: All 2000 topics are available in a scrolling PDF style format and in a topic-by-topic, searchable format. Keep this open and use the **one-click**
5. **ONLINE VERSION OF THE PBR Q&A BOOK**: Have a few minutes while at work? Open the scrolling PDF version of the Q&A book and go through one or two questions.

6. **PBR WEBSITE**: The website has a TREMENDOUS amount of valuable content. Each article was written to help address a need expressed by pediatricians. Read as many of the articles as you can! There is also a TOOLS section where you can find links to discounted pediatric board review question banks.

7. **PBR’s TEST-TAKING STRATEGIES & COACHING COURSES**: Physicians are not taught HOW to take tests. **GOOD pediatricians with sound clinical reasoning WRONGLY believe that** a board exam is a measure of one’s knowledge base, and thus a measure of one’s abilities as a clinician. That is completely false.

Exams require mastery of the English language, mastery of pacing, mastery of your emotional state during an exam, and an understanding of the **deceptive tactics** employed by question-writers to create seemingly possible yet blatantly WRONG answer choices.

The **PBR TEST-TAKING STRATEGIES & COACHING COURSE** (a paid resource for PBR members - [www.pediatricsboardreview.com/strategies](http://www.pediatricsboardreview.com/strategies)) offers insights into this “board game” so that you stop viewing question as miniature patients, and start viewing them as miniature riddles. Riddles with concrete rules and strategies to help you reach the correct answer quickly (**even if you do not have the clinical knowledge to answer it**)! Understanding the rules of the game will completely change your outlook on how to prepare for the exam and how to use board review questions for PRACTICE instead of content.

**I HIGHLY recommend the PBR Test-Taking Strategies & Coaching Course for anyone who is “at risk.” This includes you if:**

- You have failed this exam at least once
- You typically score below the national average on your board exam scores
- You have failed ANY USMLE Step exam
- You were classified as “at risk” during residency based on your in-training exam scores
- You are more than 1 year out of residency

The course helps you understand the **techniques and skills** associated with answering board-style questions correctly. We’ve **helped pediatricians finally pass the boards after failing SIX times**, so helping you should be easy.

To get just a taste of how you can increase your board scores immediately, and to learn a few of the rules to the “board game,” click here and read a PBR article I wrote titled, “**3 Strategies To Skyrocket Your Score!**” - [www.pediatricsboardreview.com/techniques](http://www.pediatricsboardreview.com/techniques)

Also, visit [www.pediatricsboardreview.com/strategy](http://www.pediatricsboardreview.com/strategy) and watch a FREE test-taking strategies session right now.
TEST-TAKING STRATEGY COURSE TESTIMONIALS

(FROM MEMBERS OF OUR ONLINE COURSE AND/OR OUR LIVE COURSE)

Ashish, I did it. I can't thank you enough for creating an amazing system to keep me on track with my studying. And the $2000 for the live weekend test taking course was well worth it. Doing the technique during the test kept me focused and allowed me to eliminate wrong answers. Thank you for all the great advice, sticking to the material, memorize, memorize, memorize then practice practice practice. After 4 failed attempts, it was exhilarating to finally read the words, "we are PLEASED to announce you PASSED!" I will definitely recommend your program.

God Bless

- Dr. Yessenia Castro-Caballero, Board Certified Pediatrician

I found myself stuck many times, failing to pick the best answer even though the correct answer was always between my best 2 options. Everything was more clear when Ashish recommended to always pick the answer that addresses the "most important clinical issue" of the question. I started to use this technique this past week, and my test scores have improved remarkably. Thanks so much!! I am ready for the next webinar!!

- Dr. HL, Now A Board Certified Pediatrician

I PASSED finally!!!!!!!!!!!! So relieved and it's all because of you!! I would not have done it without the live courses... Thank you Ashish!!! You are the best!!

Frannie
Your devoted PBR fan :)

- Dr. Frances Liu, Board Certified Pediatrician who increased her score by 18 points after failing 3 times

Definitely helped to get a better understanding of the "board game" that Ashish mentions. I'm sure I've fallen prey to those traps in the past.

Also, knowing the types of questions and the algorithm to figuring out how to spend my time answering the questions-- never would have thought about the Hybrid approach to just reading the last line of the vignette for "this/these" questions.

Really didn't know that I shouldn't be spending time reading through the whole vignette... or doing the "top to bottom" approach!

Overall it was great and I really appreciate you taking the time and effort putting this together and making sure that we can succeed our first time around.

Helped immensely with reading/understanding the "English" of the questions - I actually would've gotten one example question wrong in the past had I not used the AaCNI mnemonic

I had very little time to prepare for the boards... The core study guide helped me focus on topics that were high yield on the exam. In addition, the strategies taught by Ashish were very helpful and is what I believe helped me PASS. I would highly recommend the PBR for anyone needed to review in a short period of time. It is worth every penny!

- Dr. Darlene Melk, Board Certified Pediatrician
The time that you spend learning how to use test-taking strategies to increase your scores will be the HIGHEST yield time of your board prep. The overall time investment is as little as 8-16 hours, but the skills you learn will be used on EVERY single question that you come across. Is there a single chapter in this book that can guarantee you the same benefit? NO!

Signup For Your FREE Strategy Session Now

www.pediatricsboardreview.com/strategy

FULL ONLINE Test-Taking Strategies Course

www.pediatricsboardreview.com/strategy

LIVE Test-Taking Strategies Course

www.pediatricsboardreview.com/live-tts
DID YOU KNOW THAT I FAILED THE BOARDS?

I took the ABP initial certification exam the year that I graduated from residency. I used multiple study guides to prepare. Because there was so much information in front of me (print and video), I only got through everything once.

I felt okay going into the exam. I thought, “I’ve been through the MCAT, three USMLE exams and an Internal Medicine board exam. I did fine in residency and I studied really hard for two months. I’m sure I’ll be fine.”

Coming out of that exam room on test-day, I felt nauseous. I realized that I might have just failed my first medical board exam, ever! I was upset with myself for getting so scattered with all of those different study materials, but I was also annoyed because I still couldn’t think of a single resource that I could use as a primary study guide the next time around.

I went home and made notes about how I would study differently if I had failed. What topics would I concentrate on? What topics just don’t seem to be “testable”? What information is a waste of time to study?

When the results came, I estimated that I failed by seven to nine questions. I made key strategy changes based on my previous experience. I studied for hundreds of hours while still working a full-time job. I focused on efficiency, solid mnemonics for memorization and I stopped trying to learn “all of pediatrics.”

You never feel “great” coming out of a board exam, but the following year I felt like I had a fighting chance. My score increased by 160 points, and I estimated a pass by about 37–39 questions! Pretty soon, I even received a letter from the ABP. The American Board of Pediatrics asked ME to write questions for the boards!!!

I was really just happy to pass. Failing the first time had cost me extra time, money and energy that I would have preferred to spend with my loved ones.

Prior to creating the Pediatrics Board Review experience, I was ashamed that I had failed. Now, I’ve taken a horrible experience and I’ve created something that is helping residents and pediatrician across the country. I’ve also realized that failing the boards did not mean that I was a bad pediatrician. Nor did passing by such a wide margin mean that I am a great pediatrician.

I’M JUST AN AVERAGE PERSON WHO DID EXTREMELY WELL ON THE EXAM… AND THEN TOOK MY NOTES AND SYSTEMS AND TURNED THEM INTO THE PBR. No matter who you are, I know that you can pass your exam, too. That’s why the PBR materials come with a 100% money-back first-time pass guarantee.

It’s the most EFFICIENT and well-integrated Certification SYSTEM to help you PASS the pediatric boards. So rest assured that by joining the PBR family, you’re already on the right track to success.

JUST FOLLOW THE EFFICIENCY BLUEPRINT!
THE PBR EFFICIENCY BLUEPRINT

The pediatric initial certification exam has one of the highest failure rates of any medical board exam. I URGE you to follow just a few of my simple but CRITICAL recommendations as you go through your board review experience. ESPECIALLY #1!

1. **PLEASE STICK TO ONE PRIMARY STUDY GUIDE - the PBR!** Spreading yourself too thin by reviewing multiple resources is the **BIGGEST MISTAKE** you can make. I've gone through thousands of emails, interviews and surveys. It's clear that this one, single recommendation that will increase your chances of board success more than anything else I can say.

This is a key similarity amongst pediatricians who failed the boards, but then went on to pass using the PBR system. So please **do not spend your time going through other books, DVDs or expensive live board review courses. Go through the PBR books (Core Study Guide + Q&A Book) and the PBR companion products (videos, MP3s, digital picture atlas, webinars) exclusively.**

2. Approach your PBR material by first simply **SEEING** all of the PBR content in the Core Study Guide and Q&A Book. Spend about 60–90 seconds per page to simply **SEE** everything that you will need to learn so that you have an idea about the type of knowledge you’ll need to acquire in order to pass this exam. This should take you a full day. **DO NOT** spend time writing notes of any kind during this process. Do NOT treat the Q&A Book like other questions. This is CORE content.

During your first official read through, leave no stone unturned. Crosscheck anything that confuses you. Create mnemonics, notes and drawings in the margins so that you understand EVERYTHING. Make sure that you will NEVER have to go outside of the PBR for additional knowledge or clarifications again. If you get stuck on a concept, reach out to your peers on the PBR Facebook CREW ([www.pediatricsboardreview.com/facebook](http://www.pediatricsboardreview.com/facebook))! If you think you’ve found an error, notify us through our special error submission link ([www.pediatricsboardreview.com/error](http://www.pediatricsboardreview.com/error)). This will help you maintain your PACE and promote EFFICIENCY! When crosschecking, **ONLY** go outside of PBR for possible errors or confusion. That's it! **Do NOT go down the black hole of GOOGLE!**

Your second time should be MUCH faster. Do NOT let your curiosity of non-PBR topics distract you. As you break up your studying time with questions, you WILL want to look up new topics and crosscheck facts between the PBR and PREP®. **DO NOT DO IT!** It's a guaranteed waste of precious time that could be spent on PBR, the HIGHEST YIELD resource that you will have at your disposal to pass the board exam.

Your third, fourth and fifth times through the PBR content should strictly focus on adding more information into your long-term memory through repetition, through the use of mnemonics, and through the use of MULTI-MODALITY studying. Use audio, video, webinars, study buddy sessions, flash cards, etc. Just use something to mix things up because it’s been **proven to increase learning**!

Again, you must resist that urge to look up extraneous information and you must **focus on QUALITY study time.** Ensure that your reading is focused on LEARNING and REMEMBERING the concepts. Do not simply read for the sake of reading, and do not study when you’re exhausted or irritable.

Your primary goal is to **pass the exam.** As long as you KNOW everything from the Core Study Guide + Q&A Book, **you will have enough information in your brain to easily pass. However, if you try to learn “all of pediatrics” you will get overwhelmed and probably fail the exam.** Map out at least **300 hours of studying** for the initial certification exam (I studied 400+ hours.)
3. **Use PBR’s Q&A book as more CORE material. Also use it to get familiar with very high-yield topics and questions.** The format is short and to the point without too much extra information. The questions will help you understand what types of key findings you need to identify on your practice questions and on your exam. Please remember that the Q&A book is considered CORE CONTENT. You need to KNOW IT COLD! Do NOT treat the PBR questions like PREP® questions.

4. **Go through at least 1000 practice questions.** Don’t go through them all at once (much more on this in the schedule outlines below). As you go through the questions, **work on your timing.** If you can average about 1 minute and 15 seconds per question, you will be fine for the boards. Do not try to understand why every single incorrect answer is wrong. **Just focus on the correct answer, and if your answer is wrong, figure out WHY it’s wrong.** Skip explanations about all of the other answer choices.

When evaluating WHY you answered a question wrong, figure out if it was because of a **CONTENT problem** or if it was due to a **TECHNIQUE problem.** If you’re not sure, then it’s a TECHNIQUE problem and you must get help – [www.pediatricsboardreview.com/strategies](http://www.pediatricsboardreview.com/strategies).

**Did you answer a question incorrectly because of a CONTENT issue?** Meaning, you had a knowledge deficiency? If so, was the content in the PBR? If the answer is “yes” then you MUST know that information. If the answer is “no” then do NOT worry about it! Do NOT start looking at Nelson’s, Harriet Lane, Google, etc. **It’s a black hole that you must avoid** because it will only overwhelm you, and it will keep you from the two main goals of **knowing the PBR CONTENT COLD** and **PRACTICING tons of questions** to master your test-taking technique!

**Remember, the AAP writes PREP®, the ABP writes the boards.** Going through three to four years of PREP® is great, but keep in mind that the resource is great for **CME.** Any single year of PREP® questions is **not** designed to be a stand-alone study guide for the ABP. The questions are **EXCELLENT** for practicing and mastering your test-taking technique, but your highest-yield information will come from the PBR study guides and systems. If you need MORE questions, you can get discounted practice questions by visiting [www.pediatricsboardreview.com/tools](http://www.pediatricsboardreview.com/tools).

**Did you answer a question incorrectly because of a TECHNIQUE issue?** Did you add extra information and assumptions to the question or the answers that led you to the wrong answer? Did you spend too much time on a question even though it was clear that you didn’t have the knowledge to answer it? **Did the question-writer trick you with a distractor?** Did the question writer trick you with an English question instead of a clinical question? Did you get anxious or nervous under a timed mock exam? **Did you often get stuck between seemingly similar answer choices?** Are you still confused about why the answer you chose is wrong?

Make notes about the kinds of issues you’re having and try to figure out solution and strategies to avoid similar pitfalls in the future. If you notice that TECHNIQUES-BASED PROBLEMS creeping in over and over again, you need to **seek out help through the PBR Test-Taking Strategies & Coaching course – [www.pediatricsboardreview.com/strategies](http://www.pediatricsboardreview.com/strategies).**

5. **EXTREMELY Important Test Day Tips:** PLAN to be successful. You will find two links below. The first breaks down the number of questions, time per block, etc. The second is a **list of excellent PBR articles.**

[www.pediatricsboardreview.com/examday](http://www.pediatricsboardreview.com/examday)

[www.pediatricsboardreview.com/category/test-day-tips](http://www.pediatricsboardreview.com/category/test-day-tips)

I have a TON of guidance on how you can schedule your study time. Since PBR is of benefit to pediatricians at all different levels, I’ve tailored my recommendations accordingly below.

EVERYONE MUST recognize the difference between clinical practice and what the ABP would want you to do on the exam. The exam is filled with answer choices that sound like they would be great options in practice, but unless you know what “the book” says, you will have to simply roll the dice.

For anyone taking the Initial Certification exam, recognize that the pass rates are DRAMATICALLY LOWER than the USMLE Step Exams. In the 2008–2009 timeframe the pass rate for the USMLE exams was in the 90s while the pass rate for the ABP initial certification exam was in the 70s! Our members’ pass rate for first-time test takers of the ABP exams is estimated to be > 95%! So, stay focused on your PBR!

For anyone taking the pediatric Maintenance of Certification (MOC) exam, you’re in luck! The national pass rate is in the mid-90s for first-time test takers, but the PBR has had multiple years of pass rates that have been 100% for practicing general pediatricians!

* ARE YOU A RESIDENT? Simply familiarizing yourself with everything in the PBR content before you graduate will dramatically increase your chances of passing the boards.

While on subspecialty rotations, READ and KNOW the associated PBR chapter. While on general inpatient or outpatient rotations, focus on the rest of the book, and take just 15 minutes per day to read the QUICK and high-yield topics about your patients. Pace yourself so that you can get through the material at least once per year. That’s it! If you do that, your in-training scores will skyrocket and you will DESTROY the boards.

* ARE YOU TAKING THE INITIAL EXAM FOR THE FIRST TIME? If you have never taken the pediatric boards before and you have never come close to failing a medical board exam (average or above average board scores), visit the following PBR article for a detailed study schedule:

www.pediatricsboardreview.com/schedule

* HAVE YOU EVER FAILED A MEDICAL BOARD EXAM (OR COME CLOSE)? If you were categorized as being “at risk” of failing based on your in-training exam scores, or if you have ever failed ANY medical board exam, or if you scored below the national average on your USMLE exams, visit the following PBR article for detailed instructions on how you can avoid failing your next attempt at the pediatric boards:

www.pediatricsboardreview.com/schedule-failed

* ARE YOU STUDYING FOR THE MOC? If you are taking the pediatric recertification exam then your goal should be to get through the PBR materials at least twice and to do at least 550 practice questions. For a video on how to get 200 FREE ABP questions scroll to the bottom of this article (for board-certified pediatricians only after logging into the ABP website):

www.pediatricsboardreview.com/abp
**PBR MEMORY AIDS - USING MNEMONICS AND PEGS**

**MNEMONICS:** Mnemonics are memory aids that assist in helping you recall something. They are used throughout this study guide to help you study in a more focused and **EFFICIENT** manner. Not all of them will work for you, but many will. At the time of the exam you WILL use many of the mnemonics in this book to help you answer questions. If you’re lucky, you might even get a smile on your face as you think about me acting like a bit of a fool in some of the videos from the **PBR Online Video Course** (www.pediatricsboardreview.com/videos).

**PEGS:** Memory "pegs" are typically used to help you remember a list of items. By having 20 pre-memorized pegs that represent the numbers 1–20, you can easily “peg” items to those numbers. For example, in the PEG system outlined in this guide, a CAT symbolizes the number 9 (since cats are said to have “nine lives”).

So, if you are trying to memorize a grocery list of 10 items and one of those items is a gallon of milk, then the 9th item could be tied to an image, or a story, about a cat. It could be as simple as visualizing a funky looking **BLACK CAT** that has white legs drinking from an orange bowl of **MILK**. The white legs and orange bowl are simply thrown in to add color and imagination. Other strategies would include the use of disproportional size, the use of action, or the use of sound. The crazier the image, or story, the better!

Please note that some of the pegs in this guide will be used in the high-yield mnemonics in this book. Please look through them a few times to see if you can get the hang of it. If you can, then you might even be able to start creating some of your OWN fun and interesting mnemonics. If you cannot, it’s okay. Move on since there are only a handful of mnemonics that use one of the pegs listed here. Plus, if I do use a peg, I usually try to remind you of the peg association in the book.

Do you have ideas on how to make the pegs or mnemonics in this book more useful?

Please consider sharing your thoughts in the private, members’ only community called the **PBR Facebook CREW!** You can also submit them directly to us for consideration through our errors and clarifications portal:

www.pediatricsboardreview.com/ERROR
## TWENTY PEGS

<table>
<thead>
<tr>
<th>#</th>
<th>USE THIS PEG</th>
<th>DESCRIPTIONS AND EXPLANATIONS OF PEGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TREE TRUNK</td>
<td>Imagine the number 1 looking like a huge, brown tree trunk with limbs full of green foliage sitting at the top of a lush, green hilltop.</td>
</tr>
<tr>
<td>2</td>
<td>LIGHT SWITCH</td>
<td>A light switch has 2 positions (ON &amp; OFF). Use a switch OR a bulb for “2”.</td>
</tr>
<tr>
<td>3</td>
<td>STOOL</td>
<td>Imagine a dark, cherry wood stool with 3 legs.</td>
</tr>
<tr>
<td>4</td>
<td>CAR</td>
<td>Cars have FOUR doors and FOUR wheels.</td>
</tr>
<tr>
<td>5</td>
<td>GLOVE or HAND</td>
<td>A glove has 5 fingers. Consider making Michael Jackson’s shiny glove your peg for the number FIVE.</td>
</tr>
<tr>
<td>6</td>
<td>GUN</td>
<td>Another name for a gun is a 6-shooter (since guns used to only hold 6 bullets). GUNS also kill people and put them &quot;6 feet under&quot; the ground.</td>
</tr>
<tr>
<td>7</td>
<td>DICE or CARDS</td>
<td>Lucky number 7! Think Vegas, think craps, think gambling with dice or cards!</td>
</tr>
<tr>
<td>8</td>
<td>ICE SKATE</td>
<td>Ice skaters are known for performing a move called the figure 8. Eight also rhymes with skate.</td>
</tr>
<tr>
<td>9</td>
<td>CAT</td>
<td>Ever heard of the phrase, “Cats have nine lives”?</td>
</tr>
<tr>
<td>10</td>
<td>BOWLING BALL or BOWLING PINS</td>
<td>The goal of bowling is to knock down 10 pins.</td>
</tr>
<tr>
<td>11</td>
<td>AMERICAN FOOTBALL or GOAL POST</td>
<td>In American football, a field goal occurs when a football is kicked through two, white, vertical uprights (the goal post). A goal post looks like the number 11.</td>
</tr>
<tr>
<td>12</td>
<td>EGGS</td>
<td>Eggs usually come in a carton that contains a dozen (12) eggs.</td>
</tr>
<tr>
<td>13</td>
<td>HOCKEY MASK</td>
<td>Unlucky number 13 and the unlucky day/movie <em>Friday the 13th</em>. The main character in the movie <em>Friday the 13th</em> is Jason, a hockey-mask-wearing killer.</td>
</tr>
<tr>
<td>14</td>
<td>ROSE or CHOCOLATE HEART</td>
<td>February 14th is Valentine’s Day! So think of a long-stemmed, red ROSE or perhaps a big CHOCOLATE HEART.</td>
</tr>
<tr>
<td>15</td>
<td>PAYCHECK</td>
<td>You get to give the IRS a huge chunk of your PAYCHECK every single year on TAX-DAY! APRIL 15th. Welcome to healthcare. 😊</td>
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<td>16</td>
<td>DRIVER’S LICENSE</td>
<td>Age at which you get a driver’s license. Other pegs to consider include CANDLES, CANDY, or a BIRTHDAY CAKE for “Sweet SIXTEEN.”</td>
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<tr>
<td>17</td>
<td>MAGAZINE</td>
<td>There is a teen magazine called “SEVENTEEN.”</td>
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<td>18</td>
<td>VOTING BOOTH</td>
<td>Age when you become a legal adult in the U.S. and are allowed to VOTE.</td>
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<tr>
<td>19</td>
<td>KNIGHTING</td>
<td>Imagine a “KNIGHTING” ceremony (sounds like 19) or a KNIGHT.</td>
</tr>
<tr>
<td>20</td>
<td>CIGARETTES</td>
<td>A pack of CIGARETTES has 20 cigarettes in it.</td>
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There are TONS of mnemonics throughout PBR. Many will seem brilliant. Others may not work for you at all. If that happens, please CREATE YOUR OWN. It’s initially intimidating but gets much easier with time.

Click here to read PBR’s article on mnemonics: [www.pbrlinks.com/MNEMONICS](http://www.pbrlinks.com/MNEMONICS)
GETTING THE MOST OUT OF THE PBR FORMAT

* **GRAY HIGHLIGHTING:** In the PBR hardcopy resources, gray highlighting is used over a word, phrase or chapter title to feature content that you **MUST KNOW**! These are very high-yield topics and are likely to be seen on the exam as an answer choice. PBR’s online books may have this content in red text or yellow highlighting.

* **DOUBLE TAKE:** You will LOVE THIS! A “DOUBLE TAKE” alert accompanies topics that are in the book multiple times. Medicine ties together. Ordinarily, that results in flipping back and forth between chapters. Double Take is a PBR-specific system used to increase efficiency by reducing the flipping back and forth between related (or similar) topics. Most of these topics tend to be very high-yield.

* **NAME ALERTS:** Many disease names sound very similar (e.g., Condyloma Lata versus Condyloma Acuminata, or Shwachman-Diamond Syndrome versus Diamond-Blackfan Anemia). NAME ALERTS serve as reminders to look for these subtle differences.

* **ABBREVIATIONS:** Some disorders are discussed using their abbreviations while others are discussed with their proper names. When searching for a topic online you should do a search for both. If you encounter an unfamiliar acronym, try this tool: www.AcronymFinder.com

* **MNEMONICS:** If you’re much smarter than me, you don’t need these. If you have an average memory, like me, you MUST learn to take advantage of memory aids. They can dramatically increase your efficiency as you journey to retain thousands of bits of information. The PBR mnemonics may or may not work for you, but many of them should serve as excellent examples of the various types of memory aids you can begin to create. As a tip, always use as much action, color, exaggeration and “crazy” as possible.

* **PEARLS:** These are bits of information that help tie key concepts together for you. Members LOVE THEM! Here’s a PEARL for you. ☺ There are only a finite number of ways that the ABP can test you on a disease process. Some PEARLS will show you how information could be presented on the exam.

**PBR ERRORS**

Are there errors in the PBR? Of course there are! But I also update the PBR every year with new recommendations and guidelines. I’m able to do this because of YOUR support. If you notice ANY error in the PBR materials (e.g., incorrect spelling, grammar, incomplete sentence, contradictory information, etc.), **PLEASE visit the following link to submit the error:**

www.pediatricsboardreview.com/ERROR

Please **DO NOT** email individual errors or clarification requests to me. It’s WAY too overwhelming. If you have MULTIPLE possible errors, send us a Word document. I LOVE the members who do that!!

Also, because it’s impossible for me to respond to every submission individually, I frequently release **PBR CONTENT & CLARIFICATION GUIDES** to active PBR members (FREE). **Please note that THIS IS NOT A GUARANTEED SERVICE, but it is something I have done every single year.** Your submissions drive this process and allow me to providing you with updated pediatric knowledge year after year.
PBR TOPIC CLARIFICATION OR CONFUSION

If you are struggling with a concept, get help from the members only PBR Facebook CREW! It's EXTREMELY active (especially starting around June or July of every year). If you find a concept explained poorly and think the PBR needs a revision, feel free to use the error portal to bring it to my attention:

www.pediatricsboardreview.com/ERROR

PBR IMAGE LINKS

The image links in the PBR lead to PHENOMENAL images throughout the World Wide Web! BUT, these images are located on NON-PBR websites. Some websites go out of business. When this happens, we simply need to replace the image. Typically, no more than 3% of the links within PBR are “bad.” We have an awesome system that allows us to change the link on our end but we need your help when a link “dies.” Simply submit any “bad link” through the portal below and we’ll take care of it!

www.pediatricsboardreview.com/BADLINK

PBR & AVSAR – THE NON-PROFIT CONNECTION

WHAT IS AVSAR? I started a non-profit organization, named AVSAR Inc., at the age of 27 to help support existing non-profit organizations that were already doing great work in slum areas.

After medical school, I spent one year volunteering in the slums of Mumbai. The need for help was profound and conditions were shocking. Six-year-old children worked as child laborers, using their small, agile fingers to make beautifully detailed handiwork. Others spent their days looking for recyclables in garbage dumps.

I bonded with these children. I then created a non-profit organization under the U.S. IRS, called AVSAR. We recruited volunteers from around the world (college students, dentists, doctors, MBA students) to “help where the help was needed.” My personal success stories included the creation of an efficient Western-style clinic for child laborers and the establishment of an adolescent sex-education curriculum.

AVSAR helped thousands of people, but the core volunteer program was shut down in my last year of residency due to lack of funding and my 80-hour workweeks. Even so, the projects and systems created by volunteers live on and continue to help thousands more every year.

In order to re-launch AVSAR, we needed funding. Through Pediatrics Board Review (a private company) I donated over $50,000 to AVSAR before ever paying myself a penny.

It’s because of my passion for helping people that I created AVSAR, and the passion drives me to help pediatricians through the PBR EXPERIENCE.

I hope that you’re able to use the many resources within the PBR Certification System and the PBR community to EFFICIENTLY study and pass your exam. I very much look forward to being a part of your success. Now let’s get started!
PRODUCT REGISTRATION

As mentioned on the PBR site, our first-time pass guarantee applies to anyone taking an ABP initial or recertification exam for the first time. “Money Back” requests may be made within 30 days of the score release date. The original PBR purchase must have been made at least 45 days prior to the exam. Submission of the product registration form is required for the money back pass guarantee and the form must be submitted within 90 days of your purchase and before you take the exam. For complete details, please visit:

www.pediatricsboardreview.com/guarantee

Visit the following link to register your product(s):

www.pediatricsboardreview.com/register

If you made an official purchase that was initiated through the PBR website but resulted in your purchase being processed through Lulu.com, Amazon.com, or another authorized distributor of PBR resources, please contact us through www.pediatricsboardreview.com/contact so that you can send us a copy of your receipt.
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CARDIOLOGY

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TRANSIENT NEONATAL PUSTULAR MELANOSIS
NEONATAL ACNE (AKA NEONATAL CEPHALIC PUSTULOSIS)
INFANTILE ACNE
LIVEDO RETICULARIS (AKA CUTIS MARMORATA)

ALOPECIA & HAIR FINDINGS
ALOPECIA AREATA
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IMPAIRED PERFUSION/HYPOVOLEMIA

CARDIOPULMONARY RESUSCITATION (CPR)

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VANCOMYCIN, LINEZOLID, AND AMPICILLIN

CEPHALOSPORINS

MACROLIDES

CARBAPENEMS

ALBENDAZOLE & PYRANTEL PAMOATE

METRONIDAZOLE

GRAM-POSITIVE ORGANISMS

ENTEROCOCCUS FAECALIS

LISTERIA MONOCYTOGENES

CLOSTRIDIUM TETANI (AKA TETANUS)

(DOUBLE TAKE) CLOSTRIDIUM BOTULINUM

(DOUBLE TAKE) CORYNEBACTERIUM DIPHTHERIAE

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ALPHA HEMOLYTIC STREPTOCOCCUS (VIRIDANS AND PNEUMONIAE)

BETA HEMOLYTIC STREPTOCOCCUS (AGALACTIAE AND PYOGENES)

STREPTOCOCCAL PHARYNGITIS (AKA STREP PHARYNGITIS OR STREP THROAT)

(DOUBLE TAKE) POST STREPTOCOCCAL GLomerulonephritis (PSGN, AKA POST INFECTIOUS GLomerulonephritis)

PERITONSILLAR ABSCESs

RETROPHARYNGEAL ABSCESs

SCARLET FEVER

OCCULT BACTEREMIA

PNEUMONIA

GROUP B STREPTOCOCCAL SEPSIS (GBS SEPSIS)

GBS SCREENING AND PROPHYLAXIS MADE EASY!

STAPHYLOCOCCUS AUREUS & EPIDERMIs

STAPHYLOCOCCUS AND STREPTOCOCCUS COMPARISON CHART

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CITROBACTER FREUNDII

(DOUBLE TAKE) CHLamydia TRACHOMATIS

CHLamydia PNEUMONIAE

CHLamydia PSITTACI

MYCOPLASMA PNEUMONIAE

HAEMOPHILUS INFLUENZAE (AKA H. FLU)

BORDETELLA PERTUSSIS (AKA WHOOPING COUGH)

PSEUDOMONAS

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**NOTES**: Please note that there is a great deal of overlap and repetition between the puberty section and the Endocrinology section.

* Know conversion from inches to centimeters. 1 inch is about 2.5 cm!

* Sexual Maturity Ratings (SMR) and Tanner Staging begins with ONE. There’s NO ZERO. Tanner/SMR 1 = Prepubertal

* Experts disagree regarding some SMR descriptions. They definitely can’t agree on the age at which Delayed Puberty is diagnosed. Don’t stress! Questions on the exam should be fairly clear.

### NORMAL PUBERTY TIMELINE

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| **Limits** | Delayed Puberty: 13 – 14 yo  
Precocious Puberty: 2° signs before 8 yo | Delayed Puberty: 14 – 15 yo  
Precocious Puberty: 2° signs before 9 yo |
| 1   | **Basal growth at 5–6 cm/yr**, boyish chest (papilla elevation only), no hair | <4 ml volume or <2.5 cm diameter of testicle,  
no hair, baby penis, **basal rate of 5–6 cm/yr**,  
no hair |
| 2   | **Accelerated growth at 7–8 cm/yr**, a breast bud is the 1st sign of puberty (palpable, areola enlarges),  
Hair only along the labia (coarse) | >4 ml or >2.5 cm (this is the 1st sign of puberty),  
hair at base of penis. Penis may start to enlarge (usually at SMR 3) |
| 3   | **PEAK ht velocity of 8–10 cm/yr**, elevation of breast contour, areola enlarges, curly hair at pubis,  
axillary hair begins, acne. This stage is similar to a boy’s SMR 3 + 4 combined.  
"Imagine a girl sitting on a 3-LEGGED STOOL crying because she has hair in her armpit and now has acne!" | Accelerated vertical (and penile) growth  
>12 ml/3.5 cm, Gynecomastia in 50% of boys  
10–16 yo, resolve in 3 yrs), CURLY hair at pubis. "Think about the 3 Stooges. They all had funny pubertal voices, and the fat one had BOOBS/GYNECOMASTIA and was named CURLY." |
| 4   | **Mound on mound**, enlarged areola. Dense hair, none at the thigh. Menses usually occurs around SMR 3 or 4. | PEAK height velocity at 10 cm/yr, no thigh hair, develops AXillary hair, acne, and body odor. "Teenage boy with raging hormones is pissed about acne & hair so takes an AX to his 4 DOOR CAR (SMR 4) which explodes and burns his hair!" |
| 5   | Stop growing at about 16 yo, areola recesses to general contour of breast and the breasts again look like Tanner 3 | >4.5 cm penis, thigh hair, stop growing at ~17 or 18, +facial hair at sides, no more gynecomastia |
NORMAL PUBERTY PEARLS
Here are some great pearls and shortcuts about normal puberty.

* Girls have adult-looking breasts in SMR 3 and 5.
* SMR 4 = mound on mound breasts
* SMR 2 to 5 usually lasts about 3 to 5 years in total duration for both sexes.
* MENARCHE usually occurs in SMR 3 or SMR 4 (more likely 4) OR within 2–3 YEARS of the onset of puberty. Amenorrhea does not require workup until 2 years after puberty has ended. Since puberty may take 5 years to complete, it’s possible a patient may not need a workup for amenorrhea until 7 years after their breast buds form.
* MENSES/HEIGHT: At the onset of menses, girls are probably within 1–2 inches (2.5–5 cm) of their adult height. Why do I say that? Because they’re probably in SMR 4 (which occurs after the peak height velocity).
* VAGINAL BLEEDING: Bloody vaginal discharge while in SMR 2 shouldn’t happen. Consider a foreign body (e.g., toilet paper) in your differential.

HEIGHT
For the test, pre-pubertal basal rate for height in both boys and girls is 5–6 cm/year. The peak is 10 cm/yr. Early puberty results in shorter adult height.

GROWTH SPURTS
Elevated alkaline phosphatase can be normal during growth spurts. Hematocrit increases alongside growth spurts.

THELARCHE, ADRENARCHE THEN MENARCHE
(THELARCHE) Breast development → (ADRENARCHE) Hair development → (MENARCHE) Menses

PEARLS AND MNEMONICS: “Girls are TAMer than boys.” “Boys like to TAP Her!”

- Girls are “TAMer” = Thelarche, then Adrenarche, then Menarche = Breast development → Hair development → Menses. Thelarche = first sign of puberty – stage 2. Adrenarche is the same thing as Pubarche. Breasts: Look most natural at SMR 1, 3, and 5. TAM = “Breasts are higher than Pubic hair which is higher than a Vagina.”
- Boys = “TAP Her” = Testicular enlargement, then Adrenarche, then Phallus/Penile enlargement, THEN Height velocity peaks.

AGE RANGE OF NORMAL PUBERTY
Age ranges for puberty = 8 to 13 for girls, and 9 to 14 for boys. If puberty begins at those age ranges, that is okay, but before that is precocious puberty and after that is delayed puberty.

MNEMONIC: “Imagine Reese Witherspoon being pissed because she hasn’t hit puberty yet! She puts on a HOCKEY MASK and ICE SKATES and then knocks a huge CHOCOLATE HEART out of the hands of Tom Cruise with her hockey stick. He falls backwards and lands on a white CAT! Now they’re both upset and crying like little children!” Those are the shortest celebs I could think of to represent pre-pubertal kids. Hockey Mask and Ice Skates = 13 (Jason from Friday the 13th) and 8 (figure 8). Those are for the normal age range for puberty in girls. Chocolate heart and Cat = 14 (Valentine’s Day) & 9 (nine lives) for the normal age range for puberty in boys.
ESTROGEN
Estrogen causes the development of Breasts + Change in vaginal color + Labial Prominence.

ANDROGENS
Androgens cause pubic hair development. So when you think of pubic hair, think of an androgen-related issue.

PEARL: If you’re presented with an adolescent “girl” with breasts but NO pubic hair, guess what? She’s NOT A GIRL! Think ANDROGEN INSENSITIVITY (aka TESTICULAR FEMINIZATION) in someone carrying XY chromosomes.

PEARL: If presented with an adolescent female with a history of pubic hair development, but no history of preceding breast development, the patient likely has ANDROGEN EXCESS or LOW ESTROGEN.

PEARL: If an adolescent presents with isolated PREMATURE ADRENARCHE (pubic hair with no breasts or no increase in testicular size), get bone age films! If the bone age films are within 1–2 years of the chronologic age, it’s OKAY TO OBSERVE. If not, the patient will need an Endocrinologist to intervene.

PEARL: “Girl” with no breasts (or just buds), no hair or only scant pubic hair, no menses → TURNER’S SYNDROME → Get a karyotype.

PEARL: Always question whether or not the girl in your question is truly a normal XX girl without any hormonal issues/deficiencies.

BREAST MASSES – FIBROADENOMAS AND FIBROCYSTIC DISEASE
Breast masses in children are usually benign and due to fibrocystic disease or fibroadenomas. Check the masses at the end of menstrual periods. Mammography is NOT needed until patients are much older since their breast tissue is dense. To evaluate, use ULTRASOUND. Excisional biopsy is almost never indicated (only if aspirate is bloody).

* FIBROCYSTIC DISEASE is the most common breast disease and is usually bilateral and tender. OCPs may help.

* FIBROADENOMAS are unilateral and ESTROGEN-dependent (bigger with OCPs/pregnancy). Refer to gynecology if there is bloody aspirate or if it persists beyond 3 cycles.

PUBERTY GONE HAYWIRE

PRECOCIOUS PUBERTY
Precocious puberty can be due to a brain hormone problem OR a problem with hormone production from somewhere else. If you suspect precocious puberty on the exam → start to rule out TESTICULAR/OVARIAN TUMORS by your EXAM! LOOK at, and FEEL, the size/consistency of your patient’s gonads. Then move on to getting LH and FSH levels (look for elevations) to look for a central disorder, doing a pelvic ultrasound in girls. For boys, pubarche (adrenarchy/hair growth) + an enlarged phallus without testicular enlargement means there is the presence of excess androgens from outside the normal gonads. Remember, testicular enlargement is the FIRST sign of puberty in boys, so if other signs of puberty exist without testicular enlargement, something is wrong!

* ULTRASOUND is useful to look for adrenal or ovarian masses.

* CENTRAL VS. PERIPHERAL: Get LH, FSH, and Adrenal Steroid levels to help differentiate
GONADOTROPIN-INDEPENDENT PRECOCIOUS PUBERTY

In gonadotropin-independent precocious puberty (AKA precocious pseudopuberty or pseudoprecocious puberty), there is some sex-steroid production going on in the body but not because of pituitary hormone production. The hormones usually come from the adrenals, ovaries or testes. If gonadotropes (LH and FSH) levels are normal and everything in the history sounds like it's on a proper timeline except for one abnormality, such as breast development followed by the onset of menstruation but without pubic hair, then consider this category of precocious puberty. Specific causes of Non-pituitary related precocious puberty include tumors, congenital adrenal hyperplasia, McCune-Albright syndrome and Leydig cell hyperplasia (boys).

PRECOCIOUS PUBERTY IN GIRLS

In girls, precocious puberty is defined as having breasts + vaginal bleeding OR accelerated growth. Get LH, FSH, estrogen, and progesterone. This condition is often idiopathic when brain hormones have started early (elevated LH and FSH). If there are elevated gonadal hormones but low brain hormones (meaning a gonadotropin-independent precocious puberty), this could be BAD (tumor). Look for ovarian tumors with a pelvic ultrasound. You may consider getting an MRI to look for a pituitary tumor if neurologic signs are present and/or central hormones are elevated. Treat CENTRAL PRECOCIOUS PUBERTY with a GnRH Analogue (gonadoTROPIN releasing hormone analogue) called Leuprolide or Lupron®. It's counterintuituitive, but it eventually results in the suppression of LH and FSH release and therefore results in suppression of ovarian (or testicular) steroidogenesis.

PRECOCIOUS PUBERTY IN BOYS

In boys, precocious puberty can be caused by elevated LH alone causing elevated gonadal androgens. HCG can act on the same LH receptors; therefore, an HCG-SECRETING TUMOR can also cause it. Look for increased testicular size/volume.

PEARL/SHORTCUT: In order to choose an answer that has “PUBERTY” in it (CENTRAL PRECOCIOUS PUBERTY or TRUE PUBERTY), there must be evidence of testicular enlargement (>4 ml/2.5 cm). So, if the testes are small (<4 ml/2.5 cm), but there is evidence of extra hair, penile enlargement, and/or a growth spurt, there is a non-central and non-gonadal problem → think late onset Congenital Adrenal Hyperplasia or a VIRILIZING TUMOR or EXOGENOUS STEROIDS!

ADRENAL ANDROGENS

Adrenal androgens cause body odor, acne, and hair development. Etiology of ACNE → androgens. The term adrenarche = hair.

PREMATURE ADRENARCHE

Premature adrenarche is common in girls. Parents bring them to the office quickly because they are concerned about their hairy/mannish princess. It's usually not a big deal. In boys it's VERY concerning, but boys are unfortunately NOT brought to the office often enough because parents think boys are supposed to be hairy! It's serious in boys because it can be due to CONGENITAL ADRENAL HYPERPLASIA (CAH).

PEARL: If workup suggests an adrenal source, choose CAH over adrenal tumor as your answer.

CONGENITAL ADRENAL HYPERPLASIA (CAH) INTRO

In congenital adrenal hyperplasia (CAH), there is a cortisol and aldosterone manufacturing problem in the adrenal glands. Negative feedback results in high levels of ACTH being released from the pituitary glands → Results in an increase in cortisol precursors → Resulting in more ANDROGENS. It is diagnosed by
measuring 17-hydroxyprogesterone (expect levels to be HIGH). (More details in ENDOCRINOLOGY under Congenital Adrenal Hyperplasia)

NORMAL ADRENAL STEROID SYNTHESIS

(17α-hydroxylase)

PROGESTERONE → 17-HYDROXYPROGESTERONE → ADRENAL ANDROGENS

↓ (21-hydroxylase)  ↓ (21-hydroxylase)

DEOXYCORTICOSTERONE 11-DEOXYCORTISOL

↓

CORTICOSTERONE CORTISOL

↓

18-HYDROXYPROGESTERONE

↓

ALDOSTERONE

TROPIC

In endocrinology, TROPIC refers to central hormones. Break down big words. So HYPERGONADOTROPIC refers to an excess of central hormones

PREMATURE THELARCHE

Premature thelarche is defined as thelarche prior to the age of 8, though most cases occur around 2 years of age. Breast development can be unilateral or bilateral, and it's not associated with other secondary sex characteristics. There's normal linear and bone growth. This is usually benign. Treat with reassurance and frequent office visits to ensure there are no additional signs of early puberty.

PEARL: You might hear a parent say, “My baby had boobies since the day she was born!” This is NOT a big deal unless she’s also having menses. Again, this condition is usually benign.

PEARL: If there are additional pubertal signs, look for evidence of excess estrogens from an exogenous source, an estrogen-secreting tumor, or early activation of the hypothalamic-pituitary axis. Endocrinology referral is also warranted.

PREMATURE ADRENARCHE IN GIRLS

Premature adrenarche is defined as having hair development prior to the age of 8 without breast development or other signs of puberty. Get bone age films! The bone age should be within one year of the chronological age. If that’s the case, then it’s okay just to observe at this age!

PEARL: In patients less than 8 years of age with hair development without breast development, look out for extra androgens in the form of exogenous androgens (oral? topical?), ANDROGEN-SECRETING TUMOR, CAH, or EARLY ADRENAL PUBERTY. ADRENAL glands are typically responsible for the ANDROGENS that result in ADRENArche. Remember that LH and FSH are gonadotropic hormones, not released from the adrenals or gonads. However, elevation in LH and FSH can result in GONADAL androgen production. Ovaries ALSO PRODUCE TESTOSTERONE. If that’s difficult to remember, “think of it this way:
In CAH, excess progesterone results in excess androgens being formed. So, maybe the same holds true for excess progesterone floating around from ovarian production!"

**DELAYED PUBERTY**

**DELAYED PUBERTY DEFINITION AND PEARLS**

In girls, delayed puberty is defined as having no breast buds by the age of 13. It can also be defined as a LACK OF MENSES within 2 years of the presence of both SMR 4 breasts (mound on mound) and pubic hair. So, if she has had pubic hair and breasts for over 2 years but hasn’t started her period, she’s DELAYED!

**MNEMONIC:** No breast buds by 13. A 3 on its side looks like breast buds! Also, remember the mnemonic about the HOCKEY MASK? And the hockey/lice SKATES for precocious?!?

**PEARL:** Unlike PREMATURE ADRENARCHE, this is more concerning in girls, but less commonly diagnosed at the time of onset because “how many parents think it’s a bad thing that their little princess hasn’t had her period yet? They probably think it’s a blessing!”

**PEARL:** If TROPIN (LH and FSH) values are elevated (or normal), it’s likely a gonadal issue.

**PRIMARY AND SECONDARY HYPOGONADISM**

The two basic reasons for delayed puberty include:

- The gonads are not responding to FSH and LH by producing sex hormones (primary hypogonadism). In this case, FSH and LH will be elevated since there is no negative feedback to limit their production. Causes of primary hypogonadism (“faulty gonads”) include receptor problems, absent gonads, biosynthesis problems, Turner and Klinefelter syndromes, and so on.

- GnRH hormones (follicle-stimulating hormone—releasing hormone and luteinizing hormone—releasing hormone) have reduced or absent efficacy, leading to low (or normal) levels of FSH and LH (secondary hypogonadism). This category includes problems with the hypothalamus, pituitary, and thyroid.

This is analogous to hypothyroidism, where primary hypothyroidism is a problem with the thyroid gland itself, and secondary hypothyroidism is due to a lack of TSH, the stimulating hormone. As with the thyroid, HIGH STIMULATING HORMONES indicate that the end organ (thyroid or gonad) is having a problem producing the right amount of hormone.

**PROLACTINOMA**

Prolactinoma should be in your differential for a patient with DELAYED PUBERTY. Prolactin suppresses GnRH secretion, and is therefore associated with decreased LH and FSH levels.

**CONSTITUTIONAL DELAY OF PUBERTY**

Bone age films that estimate an age that is younger than the true chronologic age would be consistent with a constitutional delay of puberty. The patient’s height is “normal,” but on a lower curve than expected (patient is short but probably not < 3rd percentile. In boys, 14–15 years old is considered delayed (“remember the CHOCOLATE HEART and the CAT he fell on—for precocious puberty?!?”). If bone age films are as mentioned above, it’s usually not treated with hormones. However, if asked which one could be used, the answer is TESTOSTERONE, NOT GROWTH HORMONE! In girls, 13–14 year old is delayed.
HYPOGONADOTROPIC OVARIAN FAILURE
For delayed puberty associated with hypogonadotropic ovarian failure, consider POOR NUTRITION or an EATING DISORDER as possible etiologies.

KALLMANN SYNDROME
Kallmann syndrome is defined as HYPOGONADOTROPIC HYPOGONADISM + ANOSMIA. So low TROPS resulting in low GONADAL hormones. Patients can also have hypoplasia of the optic nerve, absence of septum pellucidum (a midline portion of the brain) and a micropenis. “This is the only disease with a smelling issue on the exam, and note that all of the involved organs are midline structures! Nose, pituitary, penis, optic nerve (at least the chiasm), septum!”

HYPERGONADOTROPIC OVARIAN FAILURE
TURNER’S SYNDROME results in hypergonadotropic ovarian failure. The TROPINS are elevated because the patient has no real ovaries to provide hormones and negative feedback.

BASIC WORKUP OF DELAYED PUBERTY
- History, family history and physical exam (Family history of delay? Growth curve suggests slowing or cessation of development? Eating & nutritional issue? Physical signs of a syndrome or disorder? Absent sense of smell?)
- Bone age films help to determine whether the delay is constitutional.
- Other imaging if there is a suspicion that the gonads are abnormal or absent.
- FSH, LH, and either estrogen or testosterone (according to sex) to distinguish primary and secondary problems.
- TSH, FT4, and prolactin
- Karyotype in patients with primary hypogonadism.

SHORT STATURE
PEARL: Note that up to a TWO year delay between bone age and chronologic age is NORMAL.

GENETIC OR FAMILIAL SHORT STATURE
A child with genetic or familial short stature is born with normal length, but the height then decelerates over the first 2 years of life to find the new (genetically determined) curve. Bone age MATCHES real/chronologic age. The patient is likely proportional in height and weight. You can also use the biparental height to help guide you.

PEARL: MIDPARENTAL HEIGHT = [Dad’s height + Mom’s height ± 5 inches or 13 cm] / 2. You ADD length for boys and SUBTRACT it for girls. An acceptable range of height is then 2 inches (5 cm) above or below that. Some authors use 3.3 inches (8.3 cm). Note that there are multiple algebraic ways to calculate the MPI. Please use some sample numbers if you note that the formula looks different than what you were taught.

PEARL: If a child’s parents were malnourished, mid-parental height goes out the window. The kids will be much taller if they have adequate nutrition. “Ever notice how children of immigrant parents are so much taller than their tiny little parents?”

CONSTITUTIONAL GROWTH DELAY (& PUBERTAL DELAY)
With a constitutional growth delay, look for normal growth until about 1 year of age, but then the child will be at around the 5th percentile for HT and WT—not less than 3rd percentile. “Delayed bone age which
mirrors height age,” so look at a short child whose height matches up with what the bone age films show. This is a DEceleration phenomenon and may not occur until adolescence, but the key is the delayed bone age + delayed puberty. There is often a similar family history. No treatment is needed; the patient will reach normal adult height.

GROWTH HORMONE DEFICIENCY

Short stature from growth hormone deficiency is rare, but findings will include a micropenis or clitoris and hypoglycemia (seizures may be the only clue that a patient has hypoglycemia). There is DEcelerated growth rate. Since the growth velocity is below normal, lines on the growth curve are crossed. This can be diagnosed by seeing a lack of GH release following insulin or arginine stimulation.

CONGENITAL GROWTH HORMONE DEFICIENCY

Congenital growth hormone deficiency will present with a bone age that's approximately 75% of chronologic age + a decelerated growth rate + WT percentile that's > HT percentile (unlike constitutional growth delay, in which the percentiles are usually proportional).

PEARL: Although this option may be in the list of answers, it is usually NOT a preferred answer choice. Consider other diagnoses such as Crohn’s Disease, Hypothyroidism, Genetic Short Stature, Constitutional Growth Delay, Turner's, Hurler’s, Hunter’s, etc., because this is often a distracter on the boards! So know what it is, but also what it is NOT.

ACQUIRED GROWTH HORMONE DEFICIENCY

If a growth hormone deficiency is acquired (probably due to a PITUITARY TUMOR), the patient may have a delayed bone age and sharply DEcelerated growth rate (NEEDS Endocrinology evaluation and NEEDS to have an MRI evaluation for CNS tumor).

PEARL: When considering one pituitary hormone deficiency, ALWAYS check for other pituitary hormone deficiencies as well (FLATPIG = FSH, LH, ACTH, TSH, Prolactin and Growth Hormone); (Oxytocin and Vasopressin/ADH are secreted in the posterior pituitary.)

OTHER CONSIDERATIONS FOR SHORT STATURE

* HYPOTHYROIDISM: Short + Overweight + Delayed bone age ± Constipation ± dry skin

* CONGENITAL ADRENAL HYPERPLASIA (CAH): Hyperandrogenism, premature closure of growth plates. Look for “early puberty” + accelerated growth but a short final height

* NUTRITION DEFICIENCIES: Bone age mirrors chronologic age. Patients who acquire nutritional deficiencies will initially have lower WT percentile while preserving the HT percentile (become thin while still growing), but eventually HT and WT percentiles will become proportional if the malnutrition continues. If the patient has had poor nutrition since birth (developing country), HT and WT percentiles will be equal.

* TURNER’S SYNDROME: Look for amenorrhea, no breasts (or just the presence of breast buds), no/scant hair. It is okay to treat these patients with GROWTH HORMONE but not testosterone! Testosterone is for boys with CONSTITUTIONAL DELAY OF PUBERTY, but only in rare cases.

* ACHONDROPLASIA: Disproportionate percentiles + signs of the disease
TALL STATURE

**NOTE:** GENETIC predisposition to being tall should be kept in mind.

**(DOUBLE TAKE) KLINEFELTER SYNDROME (AKA KLINEFELTER’S)**

Klinefelter Syndrome (AKA Klinefelter’s) = XXY. It presents with gynecomastia, small testicles, infertility, and normal intelligence to MILD MR. Patients may have mild motor or speech delay, tall stature with long arms and legs, and a low upper-to-lower segment ratio. For workup, REFER FOR CHROMOSOMAL ANALYSIS!

**MNEMONIC:** Gynecomastia = Kalvin Klein FELT HER BREASTS. (Yes, I know Kalvin is misspelled > Klinefelter.)

**PEARL:** Mild mental retardation may be described as a patient who is “awkward,” “below average in school,” or even just “shy.” Generally, though, these patients have some learning disabilities, but their IQ can be normal.

**PEARL:** Someone who is tall with long arms and legs could also be described as having a LOW “upper-to-lower segment ratio.”

**(DOUBLE TAKE) MARFAN SYNDROME (AKA MARFANS SYNDROME)**

Classic features of Marfan Syndrome (AKA Marfans Syndrome) include tall stature with long and thin upper extremities, long fingers, a pectus deformity, joint flexibility/hypermobility, and possible cardiac problems. Cardiac problems may include mitral valve prolapse (MVP), aortic dissection, and mitral or aortic regurgitation. Patients may have a high-arched palate and a speech disorder, but do NOT have cognitive deficits. Patients are also at risk for esophageal perforation.

* **PEARLS:** Patients can have subluxation of the lens, which may also be seen in Ehlers-Danlos and homocystinuria. If they mention SUPERIOR subluxation of the lens, pick Marfan. Any patient with Marfan should not be cleared for sports participation until they have had an echocardiogram and an evaluation by a cardiologist. If they mention “arm span greater than height,” you’re done.

* **IMAGE:** [www.pbrlinks.com/MARFANS1](http://www.pbrlinks.com/MARFANS1) - Please do not get distracted by the reading. Look at the images and move on.

* **IMAGE:** [www.pbrlinks.com/MARFANS2](http://www.pbrlinks.com/MARFANS2)

* **MNEMONIC:** [www.pbrlinks.com/MARFANS3](http://www.pbrlinks.com/MARFANS3) - Michael Phelps won several gold medals. Isn’t that just like winning the Most Valuable Player (MVP = Mitral Valve Prolapse)?

HIGH CALORIC INTAKE

Patients with high caloric intake are tall, overweight, and can have an advanced bone age.

**OBESITY**

The high caloric intake in obesity CAN also result in tall stature with advanced bone age. If obesity is due to a hormonal/endocrine issue, the patient is usually fat but short + delayed bone age. If no bone age is provided in the question, consider Cushing’s as the diagnosis.

**PEARL:** Obesity is a risk factor for depression and Slipped Capital Femoral Epiphysis (SCFE).
GROWTH CHART TRENDS

**NOTE:** There are MANY questions that present with growth charts. Please be as familiar as possible with the above-mentioned information and the information below. These questions are often difficult and come down to a guess between two answers.

**ENDOCRINE DISORDERS**

Endocrine disorders often present with the presence, or development, of short stature. The patient’s weight is often still normal, or possibly even elevated. Considerations include: GH DEFICIENCY, HYPOTHYROIDISM, DIABETES MELLITUS, and CUSHING’S (short/fat—if the patient is tall, it’s NOT CUSHING’S).

**CHROMOSOMAL ABNORMALITIES**

Microcephaly and dysmorphic features should suggest a chromosomal abnormality.

**INADEQUATE CALORIC INTAKE or MALABSORPTIVE DISORDERS**

For a patient with inadequate caloric intake or a malabsorptive disorder, look for an initial decline in the weight curve, THEN a deceleration of the height or length. So if you see that HC and HT are spared while WT falls off, consider CALORIC INSUFFICIENCY.

**PEARL:** If you see a quick drop in weight without significant drop in height yet (low WT for HT), there is a severe underlying disorder. Consider a workup for GI (Celiac, malabsorption), Renal or Metabolic disorders.

**SPARING OF HEAD CIRCUMFERENCE**

If there is sparing of head circumference while the weight and height are falling on the curves, it’s usually due to an ENDOCRINE problem. Sometimes, this can also be seen with GENETIC SHORT STATURE and CONSTITUTIONAL DELAY.

**SMALL HEAD DISORDERS**

* **PRIMARY CRANIOSYNOSTOSIS:** Abnormal suture lines, normal brain on imaging
* **PRIMARY MICROCEPHALY:** Brain is genetically abnormal
* **SECONDARY MICROCEPHALY:** Normal sutures, abnormal brain on imaging because of some type of disease process or environmental exposure.

**AMENORRHEA**

**AMENORRHEA PEARLS**

* Always rule out pregnancy, anatomic obstructions, and malformations. Remember, menarche is usually during SMR 3 or 4.
* PREGNANCY is a frequent answer.
* LH results in Progesterone production.
* FSH results in Estrogen production. Estrogen is responsible for breast development!

**AMENORRHEA WORKUP**

Always start an amenorrhea workup with an HCG; if that is negative, then move on to further testing:
* **PROGESTERONE CHALLENGE**

- **If POSITIVE** (patient bled within 2 weeks of administration), that means there is plenty of ESTROGEN, but progesterone was missing. Why? Obtain an LH level:
  - High LH level = PCOS
  - Low LH level? → Get PRL (prolactin) and TSH levels. Keep in mind that elevated PRL can be the primary disorder or due to hypothyroidism. If only the PRL level is high, then the diagnosis is likely a PROLACTINOMA.

- **If NEGATIVE**, there is NOT enough ESTROGEN. So obtain an FSH level:
  - HIGH FSH: Consider OVARIAN FAILURE (TURNER’S SYNDROME, an autoimmune disease, chemotherapy, premature menopause). It is doubtful that it is increased due to excess release from the pituitary.
  - Low FSH: Means there’s a CENTRAL problem = Mass? Prolactinoma? Craniopharyngioma? Hypothyroid?

**PRIMARY AMENORRHEA**

* Do a workup for primary amenorrhea if the patient has not had menses in the presence of ANY of the following:
  - It’s been 2 years since puberty ended. For example, if puberty started at age 8 and finished at age 11, there is no need to do a workup until at least age 13.
  - Patient is 14–15 years of age in the absence of ANY breast development.
  - Patient is 16–17 years of age in the presence of breast development.

* **LAB WORKUP** as mentioned in the “amenorrhea workup” section. In other words, after HCG is checked, check LH, FSH, PRL, and/or TSH as per the algorithm. BUT if there are signs of ANDROGENIZATION, add TESTOSTERONE and DHEA.

* Possible causes of primary amenorrhea include the following:
  - **EXERCISE INDUCED AMENORRHEA**: Look for DELAYED puberty + LOW LH and FSH. Treatment is to reduce exercise and increase calories.
  - **TURNER’S SYNDROME**: No breasts (or just buds), no/scant hair → Get a Karyotype.
  - **ANDROGEN INSENSITIVITY (AKA TESTICULAR FEMINIZATION)**: Genetically XY = Breasts but no hair!

**SECONDARY AMENORRHEA**

Secondary amenorrhea is defined as 6 months without menses after a patient was regular, or 12 months without menses if the patient was previously irregular. The differential includes ASHERMAN’S SYNDROME (intrauterine adhesions), CYSTIC FIBROSIS, SARCOIDOSIS, phenothiazines, nutrition, brain tumors, and tuberculosis.

**ANOREXIA AS A CAUSE OF AMENORRHEA**

Suspect anorexia as the cause of amenorrhea if the patient has not had a period for 3 months. Anorexia = low HR, orthostasis, hypothermia.

**BULIMIA AS A CAUSE OF AMENORRHEA**

Bulimia is often associated with irregular menses.
I really hope that you've enjoyed this free chapter. The links are active to show you how valuable an online learning experience can be. My sincere recommendation is that you purchase a PBR bundled product that includes both the online AND the hardcopy versions of the PBR materials so that you can mark things up, make notes, but also be EFFICIENT!

Now… how about a handful of free questions?

Scroll to the next page to get a sample of the PBR Questions & Answers.
QUESTIONS

1. A premature baby needs:
   a. More sodium than a full-term neonate. Sodium supplementation should be started immediately.
   b. More sodium than a full-term neonate. Sodium supplementation can be started after 24 hours.
   c. Less sodium than a full-term baby.
   d. The same amount of sodium as a full-term baby.

2. A preemie is born at 33 weeks in a taxi. In the ER, the baby is noted to have a temperature of 35 degrees Celsius. The child should be placed:
   a. In a bassinette.
   b. In an incubator at 40 degrees Celsius.
   c. Under a radiant warmer at maximum temperature.
   d. Under a radiant warmer at preferred skin temperature.

3. An LGA baby is noted to have a firm, freely mobile, erythematous and nodular mass with distinct borders at the upper cheek on DOL 13. This is likely:
   a. Fat necrosis of the newborn.
   b. A lipoma
   c. A sarcoma
   d. Related to child abuse.

4. Which abnormality is common in the recipient of a packed red blood cell (PRBC) transfusion and also in the recipient twin of a twin-to-twin transfusion?
   a. Hyponatremia
   b. Hypokalemia
   c. Hypocalcemia
   d. Hypophosphatemia

5. A child is born by a normal vaginal delivery. About 8 hours later he is noted to be tachypneic and pale. Labs show that he is anemic. The RBC morphology is normal under microscopy. What is the likely etiology of these finding?
   a. Chronic intrauterine blood loss.
   b. Acute blood loss at birth.
   c. Congenital heart disease.
   d. Congenital syphilis
ANSWERS?

WHERE ARE THE ANSWERS?
Sorry, these are real questions from the PBR Q&A Book. You’ll need to get the PBR Ultimate Bundle Pack or the PBR 12-Month ALL ACCESS PASS package by visiting:
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- Ashish & Team PBR
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