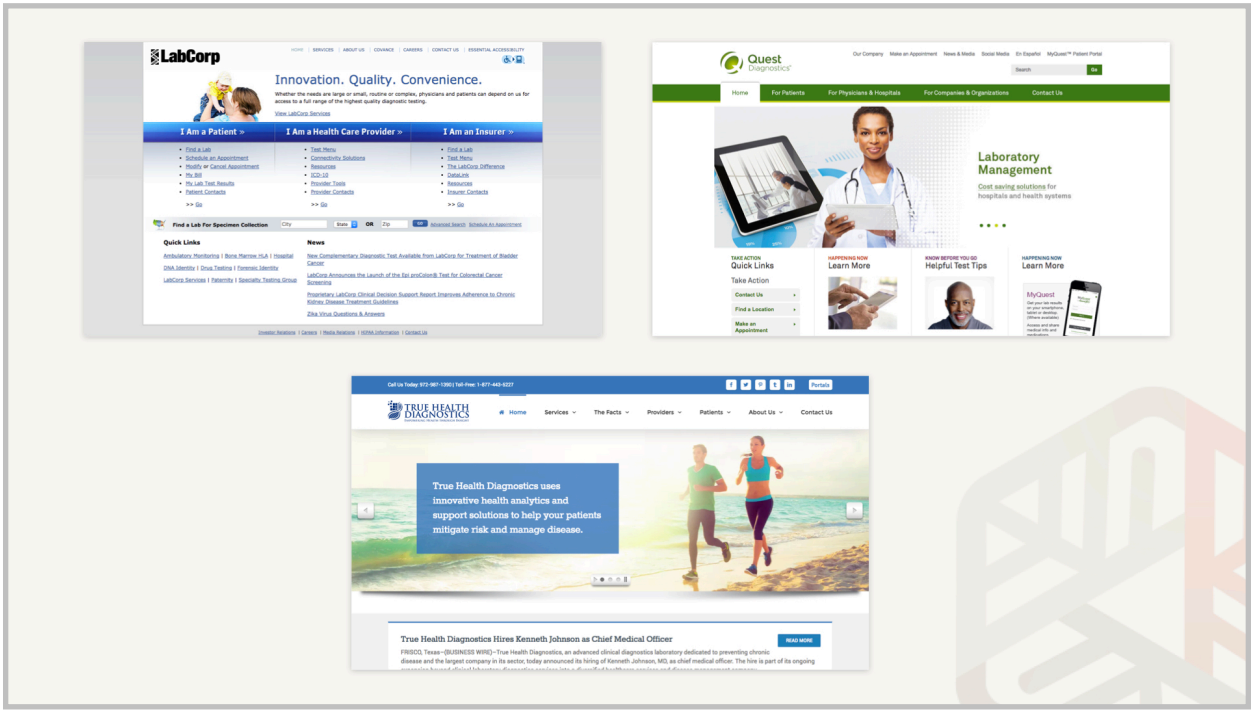
Blood Chemistry Basics, Part 3

There are several options for obtaining these markers for your patients, and what you do really depends on whether your patients are paying cash, using insurance, or some combination of both. We tend to use Professional Co-op. This is a co-op of clinicians who have joined together to get discount volume pricing with LabCorp. If you have an individual account with LabCorp, the pricing you're going to get [will be] awful, so you just don't have any leverage. But, when you join a group like Professional Co-op that has thousands of clinicians, because of the volume of testing and orders, it's able to get very deep discounts on lab pricing. For example, at one point in time, the retail price of this case review blood panel, if you just set up an account with LabCorp by yourself and the patient paid out of pocket, [was] almost $1,700. But through Professional Co-op, patients end up paying less than $300 when paying out of pocket. So, it's a very significant difference—almost a six-fold difference—and it's a phenomenal deal for a blood panel that's this comprehensive.

It's free to join the Professional Co-op. Once you have, you can just order the test #235748 from them. You can also see the LabCorp Professional Co-op Case Review Blood Panel handout in the Handouts section for more information on how to order it. Quest does also have a cash-pay option [so] you can compare pricing between the two. We don't already have a case panel set up with them, but it is an option to order them individually.



If patients are using insurance, you have more options. You can order directly through LabCorp or Quest the markers that you want. The problem is, of course, that not all insurance plans will cover all markers, and the negotiated rate may even be higher than the Professional Co-op price.

The final option is for the patient to order their own lab work through Directlabs.com or AccesaLabs.com, which are these third-party intermediaries that allow consumers to order their own blood testing. I don't think there's any [real] reason to do that. If you're a clinician and you have the ability to order labs and you have accounts through Professional Co-op, they're absolutely going to be able to get better pricing versus having the patient order it themselves. As a clinician, you can pass that pricing on to your patients. It's going to be much lower than through DirectLabs or a similar provider.

Now, we could easily spend two years or more just covering functional blood chemistry and all of the particular markers that we're going to talk about. For example, we're going to touch on thyroid dysfunction, and I think I could probably spend up to six-months on that alone. Obviously, since functional blood chemistry is only three or four months' worth of content in this course, we can't do that with every marker or group of markers that we're going to talk about. The focus in this portion of the program is on using functional blood chemistry as a screening tool, so we're teaching you how to use it to identify potential issues and then point you in the direction of where to look for—how to do additional testing, to get more information on those issues, and then some basics on how to treat the abnormalities that you'll discover in a functional blood chemistry screen. Later on in ADAPT, we may offer more in-depth training on particular conditions or specific blood chemistries and lipidology, but having said that, knowing how to use functional blood chemistry as a screening tool is going to put you light years ahead of most clinicians who are using blood

chemistry. The fact is, the majority of clinicians out there, even in the functional world, don't have a good grasp on blood chemistry. They don't have a good grasp on what the evidence-based functional ranges are for these various markers. They don't necessarily have a good grasp on what kind of follow-up testing should be ordered if markers are out of the functional or reference range. They also don't have access to or haven't developed diagnostic or treatment algorithms based on the functional ranges, so you're going to get a lot [out] of this portion of the course. We're always going to point you in the direction of where to learn more in cases where we're not going to go into a huge amount of depth.

As I'm sure you're aware, there are resources online where you can get more information. UpToDate, for instance, is a fantastic resource for clinicians. You can look up lab markers and health conditions, and there is just a ton of info. It is certainly a conventional paradigm-based resource, but it can still be really useful for the nuts and bolts.

Lab Tests Online is another resource that has basic information on markers and how to interpret high and low values. Then you have resources such as Epocrates, which has a fantastic mobile app. These aren't free, but they're not super expensive. I think it's really justifiable, even if you're just starting out to have access to that kind of information.

We've created a comprehensive online blood chemistry panel. It lists all markers on the case review panel and includes basic descriptions, functional and conventional ranges, and information on significance and interpretation. It's designed to be used as a reference. We made it [an] online manual rather than a printed binder because we often update markers and ranges, and so we want to ensures that you're always getting the most current version.

Marker	Value	Functional Range	Lab Range
Glucose	93	75 – 90	65 - 99
Hemoglobin A1c	5.4	4.4 – 5.4	4.8 - 5.6
Uric Acid	3.6	3.2 - 5.5	2.5 - 7.1
BUN	16	13 – 18	6 - 24
Creatinine	1.04	0.85 – 1.1	0.57 - 1
Sodium	139	135 – 140	134 - 144
Potassium	5.3	4.0 – 4.5	3.5 - 5.2
Chloride	101	100 – 106	97 - 108
C02	25	25 – 30	18 - 28
Calcium	8.9	9.2 – 10.1	8.7 - 10.2
Phosphorus	4.0	3.5 – 4.0	2.5 - 4.5
Magnesium	1.8	2.0 – 2.6	1.6 - 2.6
Protein, total	6.5	6.9 – 7.4	6.0 - 8.5
Albumin	4.5	4.0 – 5.0	3.5 - 5.5
Globulin	2.0	2.4 – 2.8	1.5 - 4.5
A/G ratio	2.3	1.5 – 2.0	1.1 - 2.5
Bilirubin, total	0.6	0.1 – 1.2	0.0 - 1.2
Alkaline Phosphatase	52	42 – 107	39 - 117
LDH	168	140 - 180	119 - 226
AST	33	10 - 30	0 - 40
ALT	18	10 - 22	0 - 32
GGT	19	0 - 28	0 - 60
TIBC	266	250 – 350	250 - 450
UIBC	138	150 - 375	150 - 375
Iron	128	85 – 135	35 - 155
Iron saturation	48	15 – 40	15 - 55
Ferritin	55	15 - 120	15 - 150
Cholesterol, total	174	150 – 250	100 - 199
Triglycerides	41	50 – 100	0 - 149
HDL	72	55 – 85	> 39
LDL	94	0 – 175	0 - 99
T. Chol / HDL Ratio	2.4	< 3	0 4.4
Triglycerides / HDL Ratio	0.57	< 2	< 3.8
TSH	2.610	0.5 – 2.5	0.45 - 4.50
T4, total	8.4	6.0 – 12	4.5 - 12
T3 Uptake	32	28 - 35	24 - 39
T3, Total	78	100 – 180	71 - 180
Vitamin D, 25-hydroxy	28.7	35 - 60	30.0 - 100.0

Marker	Value	Functional Range	Lab Range
WBC	5.8	5.0 – 8.0	3.4 - 10.8
RBC	4.63	4.4 – 4.9	3.77 - 5.28
Hemoglobin	14.8	13.5 - 14.5	11.1 - 15.9
Hematocrit	45	37 - 44	34.0 - 46.6
MCV	97	85 – 92	79 - 97
MCH	32.0	27.7 – 32.0	26.6 - 33.0
MCHC	32.9	32 – 35	31.5 - 35.7
RDW	13.4	11.5 – 15.0	12.3 - 15.4
Platelets	288	150 – 415	150 - 379
Neutrophils	50	40 – 60	
Lymphocytes	41	25 – 40	
Monocytes	6	4.0 – 7.0	
Eosinophils	2	0.0 – 3.0	
Basophils	1	0.0 – 3.0	

Additional Tests:			
T3, Free	2.4	2.5 - 4.0	2 - 4.4
T4, Free	1.66	1 - 1.5	0.82 - 1.77
CRP-hs	0.49	< 1.0	0.00 - 3.00
Homocysteine	6.8	< 9.0	0.0 - 15.0
Vitamin B-12	1022	450 – 2000	211 - 946
Copper	101		72 - 166
Zinc	72		56 - 134
Zinc / Copper Ratio	0.71	> 0.85	

We've also created a handout that lists the markers that are a part of the recommended case review panel and the name of the panel at Professional Co-op, if you want to order it from them. We've provided a blood chemistry template that we use to work up the results, which you can see here on this slide. We've provided that to you as an Excel file and a printable PDF. This can be really helpful for you as a clinician to give you a quick visual of what's going on, and it can also be helpful to present to patients.

Ok, that's it for this video. Next, we're going to dive into the specific blood chemistry patterns. We'll see you then!