

Bone Broth and Lead Contamination: A Very Flawed Study in Medical Hypotheses

March 12, 2013 By [Kaayla Daniel](#) [25 Comments](#)

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A study in the journal *Medical Hypotheses* published January 30 has been scaring people away from eating soups and stews made with old-fashioned bone broth. Entitled “The Risk of Lead Contamination in Bone Broth Diets,” it reports broth made from organic chickens is likely to be contaminated with lead, one of the deadliest toxic metals known.¹

If the study is valid, there is plenty of reason for concern. Lead, after all, is a neurotoxin that can cross the placenta and blood-brain barrier. It is associated with abnormal fetal development as well as a very long list of neurobehavioral disorders and diseases in children and adults including ADHD, violence, social withdrawal, depression, substance abuse, and Parkinson’s.²⁻⁴

Lead may be the oldest toxic agent known. Its dangers were known to the ancient Greeks and Romans, and it has been heavily studied by researchers of every era since.^{5,6}

Today, lead is rated number two out of the 275 substances listed on the Agency for Toxic Substances and Disease Registry (ATSDR) of the Department of Health and Human Services, with number one being arsenic, and number three mercury.⁷

Lead is so bad that the body in its wisdom sequesters it as far from the action as possible. About 90 percent of lead in birds and mammals goes deep into the bones. Other favored organs of accumulation are the kidney and liver. When the body tries to eliminate lead, the principal route of excretion is through the urine, not through the skin.⁸ Lead is a double whammy for children — even well-nourished children — because their bodies and brains are developing and they can absorb a whopping 50 percent of the lead found in their dietary intake. In contrast, adults will absorb 1 to 10 percent.⁹

Chickens, oddly enough, seem to tolerate lead better than humans, horses, dogs and wild fowl such as ducks, and they can hold very high levels without exhibiting clinical signs or hematological changes.¹⁰ Unaware of any problem, small farmers and urban homesteaders may be regularly serving meat, broth and eggs that are contaminated with lead to family members and customers. Although lead poisoning from acute exposure makes news headlines, it is chronic low-level exposure building up day by day — as could occur from the regular drinking of contaminated broth — that we are concerned about here. Because broth is perceived as a traditional healing food and taken by many WAPF members several times a day, the *Medical Hypotheses*

report has attracted far more attention than would be expected from an article in a non-peer-reviewed journal.

Time to take a closer look at the findings from that study.

The researchers cooked up and tested the following for lead:

- Broth made from tap water plus skin and cartilage
- Broth made from tap water plus bones
- Broth made from tap water plus meat
- Tap water alone cooked for the same amount of time as a control.

Surprisingly, the researchers found the highest levels of lead in the broth made from cartilage and skin, not in the broth made from bones, the place where 90 percent of ingested or inhaled lead accumulates. Broth made from meat alone showed the lowest levels, as would be expected, while the water used showed minimal lead contamination.

The figures for lead are:

- 9.5 ugL for broth made with skin and cartilage
- 7.01 ugL for broth made with bones
- 2.3 ugL for broth made with meat
- 0.89 ugL for the lead found in tap water cooked alone.

WHY WORRY?

Seeing those figures, it's hard not to worry about good old-fashioned broth, which would typically be made at home using a combination of bones, cartilage and skin. Indeed the news is so alarming that some people have already cut back on broth despite its long history of healing benefits, longstanding reputation as "Jewish Penicillin" and vital role in the GAPS (Gut and Psychology Syndrome) diet. Broth is also a staple food for people who eat traditional diets in line with the findings of Dr. Weston A. Price.

Not everyone is panicking, of course. Many simply shrug off the news as the latest scare tactic taken by Big Food. Others ask, why single out broth when ALL foods are contaminated today?

Chris Kresser has pointed out in a widely read blog¹¹ that the levels of lead found in the broth tested for this study are lower than the EPA limit for lead in tap water, which is 15 ug/L.¹² That, of course, begs the question of whether the level of contamination permitted in tap water is acceptable. Many health conscious people would agree that it is not, and recommend good quality water filters to purify our tap water. In any case, as Kresser has pointed out, a cup or two of broth a day would go well under the EPA level for a day's water consumption.

Kresser and others have further argued there's no reason to worry about a little lead when bone broth also contains a lot of calcium. Calcium is well known to interfere with lead absorption in the intestines. Unfortunately, it is a myth that broth is high in

calcium. Indeed in 1934, *Archives of Disease in Childhood* reported “extremely low” levels of calcium even when the recipe included wine or vinegar to help pull it from the bones.¹³ Today the labels of two excellent bone broths in the marketplace, Saffron Road and Chef Flavor, report the levels of calcium per one cup serving at 0 percent and 4 percent of the RDA, respectively.¹⁴ Although WAPF plans to have some other quality broth tested, we have no reason to assume the results will be markedly different. The oft-heard claim that a cup of good bone broth has as much calcium as a cup of milk appears to have no basis in fact.

Clearly, we cannot depend on the broth itself to provide us with the calcium we need to handle possible lead toxicity. Studies also reveal Vitamin D deficiency will increase lead accumulation in bones, and Vitamin C and/or iron deficiencies will increase lead levels in the blood. Adequate iron and B vitamins (particularly thiamine and folate) status also seem to reduce the risk of lead toxicity.¹⁵⁻²³ Clearly it is wise to be well-nourished.

THE GUT CONNECTION

In a best broth scenario, people replete in calcium would not suffer any ill effects from lead in the broth. Unhappily, that probably holds true only in people who have healthy guts. Those suffering from autism, allergies and other health challenges invariably have compromised gastrointestinal integrity. Furthermore, Dr. Russell Blaylock has pointed out that lead will magnify any excitotoxicity caused by the glutamic acid in broth.²⁴ This last provides an explanation for why some MSG-sensitive people have a problem handling broth, and a probable reason why many GAPS practitioners have observed that some people do better if they start their healing journeys with meat broth and only later move on to full-fledged broth that has also been made with skin, cartilage and bones.

The takeaway here is that broth containing lead may not be an appropriate prescription for gut healing. Yes, calcium in the diet may protect us from lead in the way selenium in fish protects us from the mercury, as Kresser has pointed out.²⁵ But no, it is still not safe to consume high mercury fish such as tuna daily or broth if it always comes with with a load of lead.

All of which takes us back to our key question: Is all broth contaminated with lead because of our toxic world? Or was the batch stirred up by the three UK researchers unusually contaminated?

The alarming conclusion to the *Medical Hypotheses* study is found in the abstract, which is the only part of a study most people ever read or the news media ever report. A full-text copy costs \$31.50 online, a price tag that will deter most people from ever accessing it. That’s too bad, because the study is, shall we say, thin on its reporting. The researchers do not tell us how the broth was made, where it was made, where the chickens came from, how they lived, or what they were fed. All we know from reading the study is the researchers say they made “broth” and tested three types of it (broth from meat, broth from skin and cartilage, and broth from bones). They also report they tested the water for lead as control, after being simmered in the same

cookware for the same length of time as the broth. The chickens were “organic” though the study offers no specifics on what is meant by that.

That leaves a flock of unanswered questions, starting with the cookware and the ingredients.

- What type of cookware was used?
- What recipe was used? Was the broth made with vinegar or wine? If so, how much?
- Was the tap water fluoridated?
- What was the pH of the tap water?
- If wine or vinegar was used in the recipe, why didn't the researchers simmer the combination of water plus the vinegar or wine and then test for lead?

Why do answers to these questions matter? Some types of pots, particularly those made with ceramic, have been found to be high in lead. Water with an alkaline pH would be less likely to leach lead out of the cookware, while water with an acid pH would be more likely to leach lead. Along this same line, the water should not only have been tested alone after cooking but also after cooking with the same amount of vinegar or wine used in the recipe. Fluoride matters because it increases lead accumulation.

Without the answers to these questions, it's not fair to indict the broth when the cookware might have been the culprit.

Basant Puri, the corresponding author of this study, forwarded our questions to Jean Monro, Director of the Breakspear Medical Group and the lead author of the study. Dr. Monro reported the ingredients for the broth were only chicken and water, that the pH of the water was “irrelevant” and the cookware was stainless.²⁶ Although stainless steel may have toxicity issues related to chromium and nickel, it has never been found high in lead. Having ruled out the cookware as the source of the lead, it's time to learn more about those chickens.

THE CHICKENS

A careful reading of the study once again leaves us with a flock of unanswered questions.

- What were those “organic” chickens fed?
- What water did those “organic” chickens drink?
- Were the chickens “free range” or confined?
- Where were the chickens raised?
- What were their living conditions?

In the *Medical Hypotheses* article, the researchers report the chickens were “organic birds.” That's all, and it is not enough information. Generally, the term “organic,” refers to the process by which that food was grown or produced. Organic certification in the US and UK fails to address environmental contamination, and there is no limit to how much lead or other toxic metals such as mercury, cadmium, arsenic and

aluminum are allowed in organic feeds.²⁷⁻²⁹ In brief, for the study to have any validity, the feed needed to be tested for lead.

“Organic feeds” also contain grains, which contribute more dietary exposure to lead than other foods such as the grasses and bugs eaten by pastured chickens living in areas where the soil itself is not contaminated.³⁰ Organic certification also fails to address the possibility of lead-contaminated water supplies. Was the chicken’s drinking water tested for lead? Was it piped in through old lead pipes? Were the water troughs soldered with lead? And what was the lead level of water in the area where the chickens grew up.

Since none of these important questions were answered in the study itself, we requested more information. Dr. Monro replied that the chickens were from an attested organic farm, “unlikely to have been on land close to a highway” and produced by an organic company called Highlander. She stated that neither the soil nor the water drunk by the chickens was tested for lead.³¹

Attempts to reach the Highlander Company proved fruitless. We wanted to learn more about the chickens and their living conditions, but the company was dissolved in 2011.^{32,33} Extensive online searching yielded no information about where this company’s farms were located, whether their “organic” chickens were free range or confined, or what accreditation body had attested their products as “organic.” A follow up question about Highlander to Dr. Monro has not yet been answered.

The location of the farm is critically important yet we know absolutely nothing. We don’t even know for sure the farm was in the UK! To understand the basic issues a quality research study would have taken into account, let’s look at the conditions that might have been present had the farm in question been located somewhere near the Breakspear Medical Group, which is based in Hemel Hempstead, Hertfordshire, in the Thames region of England, west of London. In 2011, the Chief Inspector of Drinking Water published a report indicating multiple locations east of Hemel Hempstead where public water supplies tested in 2004 and 2010 failed to meet the acceptable future lead standard of 10 ug/L. Areas to the north, south and west of Hemel Hempstead also had pockets where the water supplies failed to meet that standard.³⁴ If the organic chickens were grown in any of those pockets, they could have become lead toxic from the public water supply.³⁵

Groundwater too can become contaminated if the water is acidic, a common situation in acid mine drainage areas. Sources of lead in surface water or sediment include lead-containing dust from the atmosphere, waste water from industries that handle lead (iron and steel and lead producers), urban runoff, and mining piles.³⁶ Because we do not know where the chickens were raised, we have no idea whether conditions such as these might have been present.

Another confounding factor could have been fluoridated water. Fluoride and lead have high synergy, and fluoride has been proven to increase lead accumulation.³⁷ Not all public water in the Thames Basin Region is fluoridated but The Drinking Water 2010 Report reveals there is some natural fluoride there, and it is not removed by conventional water treatment.³⁸ This too could have increased the levels of lead in any chickens grown there.

We do not, of course, know the chickens came from the Hemel Hempstead area. The point of this discussion is to clarify why the researchers had a responsibility to provide details about the chickens and their living conditions. Such details might also have solved the mystery of why the type of broth that proved the most contaminated by lead was not made with bones but from skin and cartilage.

Researchers report that 90 percent of lead ingested or inhaled goes into the bones and is excreted through the urine, not out through the skin³⁹⁻⁴¹ Yet these chickens had more lead in their skin and cartilage than in their bones. How can that be? High lead in chicken skin only makes sense if the chickens were free range and raised in an area where the soil had high lead content. Given the chance, chickens not only go hunting and pecking but root, rock and roll around in the soil. Poultry farmers call this “dusting.”

If the chickens were both free range and local, they may well have been rolling around in soil that was high in lead. That area, as discussed above, has pockets where water supplies have been contaminated by lead. Other factors to be considered are whether the chickens lived near an industrial site (past or present) or beside a highway. Dirt near highways is almost always contaminated with lead. In the US unleaded gas came into the marketplace in 1973 and was banned in 1996, but in the UK the timetable was later, with unleaded petrol not available until 1986 and not prohibited until 2000.⁴²

It is also important to know if the chickens were raised near an old fruit orchard where lead arsenate, a pesticide widely used in England, as well as other countries, would have accumulated in the soil. Lead arsenate was mainly used on apple trees, but also on other fruit trees, garden crops, turf grasses and against mosquitos.⁴³ High lead content would also be expected in the soil near old houses or other structures now painted or once painted with lead paint.⁴⁴ In fact the UK is riddled with lead problems in its water, soil and air. A 2009 comparison of lead exposure standards revealed the UK had the worst occupational exposure limit for airborne lead of 20 countries.⁴⁵

Although “dusting” is the probable reason those chicken skins were high in lead, there is no obvious explanation for the cartilage. Textbooks do not list cartilage in the body as an accumulation site for lead, which makes sense given the fact that cartilage is not nourished by the blood supply. [Lead *has* been found in shark cartilage, but they have no bones and a skeleton that is all cartilage.⁴⁶] Indeed, the only time lead seems to affect joints is when a bullet lodges near a joint, is not removed, and is dissolved over many years by synovial fluid.^{47,48} Since this is extremely unlikely to be the case for the chickens in question, the most probable explanation is that the high lead content of the broth made with both skin and cartilage got its lead almost entirely from the lead-dusted skin.

In short, there are many reasons to think the broth used for this study was an exceptionally contaminated sample. Its lead content should at most serve as a warning to consumers that the careful sourcing of broth is warranted in our toxic world. Such a poorly designed and inadequately reported study should never have been published, but then the editor of *Medical Hypotheses* has taken the position that “even flawed papers may contain ideas well worth thinking about or discussing.”⁴⁹

In this case the flawed paper is very flawed indeed. So flawed that we have to wonder about what might have motivated the researchers. We have to ask, who are they and what are their financial and other ties? In short, is this shoddy study a simple case of incompetence and/or slipshod reporting. Or was it motivated by an anti-broth agenda?

THE RESEARCH TEAM

All three authors are associated with the Breakspear Medical Group, a private clinic with a staff of about 50 in Hemel Hempstead, Hertfordshire, England. Dr. Jean A. Munro is Breakspear's Medical Director. Ron Leon is the Nutrition Manager there, and Basant K. Puri serves the group as a part-time researcher and consultant.

According to its website⁵⁰, the Breakspear Medical Group has treated more than 25,000 patients since 1982 and has specialized in treatments of allergies, autism and environmental illness. Although they have nutritionists on staff to make dietary recommendations, the main focus appears to be on supplements, low-dose immunotherapy, antigen vaccines, and other extensive and expensive, mostly alternative treatment options.

Although avowedly alternative, Breakspear has chosen to keep one foot planted firmly in the establishment camp. Its website indicates it supports vaccination for both children and adults, even the flu vaccine for pregnant women. However, it differs from mainstream doctors on the vaccination issue in two important ways: It recommends single dose vaccines, such as measles, mumps and rubella as three separate shots, instead of the combined MMR that Dr. Andrew Wakefield and others have linked to autism. Although this might suggest a tie to Big Pharm, Merck has announced it will stop manufacturing the single dose vaccines, a decision that perturbs Breakspear. The clinic also states on its website that it uses only mercury free vaccines, but it apparently accepts the aluminum and other toxins contained in the mercury-free versions.

Breakspear's finances seem a bit curious and mysterious. In the UK, companies are incorporated and registered at the UK Companies House and are required to file annual financial statements there. Breakspear, however, does not appear to have filed any accounts for years. Perhaps the amounts were too small to post, but for a clinic with a staff of about 50 that seems hard to believe. A report for the group's charity The Breakspear Hospital Trust declared income of only £3,275 in 2009.⁵¹

Dr. Jean Munro, Medical Director of the Breakspear Medical Group, has credentials in environmental medicine and allergy research. She is a Fellow of the American Academy of Environmental Medicine, and, in 2007, was asked to be a witness for the House of Lords' Select Committee on Science and Technology on allergy treatments.

She has nonetheless been in and out of trouble with medical boards over the years, most recently for alleged medical misconduct related to her recommendation of chelation therapy for lead toxicity.^{52,53} Fighting accusations of quackery and medical impropriety, of course, is not unusual among doctors who successfully practice alternative medicine and threaten the establishment with track records of curing "incurables."

Ron Leon holds a Master of Science degree in nutrition from Bastyr University in Seattle, and has completed clinician seminars offered by DAN (Defeat Autism Now!), an organization now known as the Autism Research Institute. Most, if not all, autistic children have impaired bodily detoxification systems that make them highly vulnerable to toxic injury from heavy metals such as mercury and lead. Given his training, it is reasonable to assume Leon came to wonder about dietary sources of lead in the diet, and whether broth, recommended in GAPS and other protocols, could be part of the problem and not a valid solution.

Basant Puri is a psychiatrist who holds an alphabet soup's worth of credentials, including MA, PhD, MB, BChir, BSc(Hons) MathSci, MRCPsych, DipStat, PG Cert Maths and Mmath. He is a consultant at the Breakspear Medical Group, Professor in Imaging and Psychiatry at Hammersmith Hospital and the MRC Clinical Sciences Centre & Imperial College London. He has studied a variety of conditions, including depression, chronic fatigue syndrome (CFS), attention-deficit hyperactivity disorder (ADHD) and Huntington's chorea, using electrophysiological, brain scanning and biochemical techniques. A highly prolific author, he has published widely in medical journals, is coauthor of *Textbook of Clinical Neuropsychiatry and Behavioral Neuroscience* and other textbooks, and written popular books on natural treatments for ADHD, depression, chronic fatigue and other diseases.

Although all this sounds impressive, Prof. Puri's reputation is checkered. In 2007 his research on an EPA supplement — for which he holds the patent⁵⁴ — was exposed in the London *Guardian* as shoddy and motivated by self interest.⁵⁵ Puri subsequently developed Echiomega, a pro-EPA plant-based supplement containing echium seed oil, said to be “the richest plant source of the omega 3 fatty acid stearidonic acid (SDA)” and “naturally converted by the body to the important long-chain omega-3 fatty acid EPA typically found in fish.” It is marketed as “delivering superior benefits over the commonly available vegetarian omega oil preparations” and a good choice for vegans, vegetarians and people allergic to fish.⁵⁶

Discussing the quality of Puri's work on EPA, Ben Goldacre employed dripping sarcasm in his *Guardian* article. While it is true that Dr. Goldacre, author of the bestseller *Bad Science*, is known for mocking most forms of alternative medicine, in this particular case his caustic commentary seems spot on. We quote Goldacre's article⁵⁷ nearly in full:

“In the media this week . . . a company making VegEPA was wiping the floor thanks to an amazing study. Basant Puri, a GMC-registered doctor from Imperial College London, performed the research. ‘The results of this study were astonishing,’ he said. ‘After taking VegEPA daily for just three months, the children showed an increase in reading age of well over a year.’ Prof Puri, who is on the patent as the inventor of VegEPA, also scanned the four children's brains. ‘The results were astonishing,’ he said: ‘It was as if these were the brains of children three years older.’

“Now oddly, this research was funded by TV company Endemol – home of Gillian McKeith – for a Channel Five documentary for last Thursday. As I read it, the media

now love these 'pill solves complex social problem' stories so much that they're willing to pay for the research to base them on.

"The show was mysteriously pulled by Five at the last minute after 'points were raised', but it hit the front page of the Daily Mail, with a headline: 'Pill that can boost young brain by three years', and got proper space in the Sun, the Evening Standard, the Times (by a science correspondent no less), the Metro, ITV, the BBC, the Scotsman, and more.

"The coverage was what you might call 'uncritical'.

But let's approach these VegEPA promotional pieces like you would a story from a drug rep. There was no placebo, no control group, it was "before and after", and with only four children, whose entire diet and lifestyle was changed. These are old tricks for big pharma, but too foxy for science journalists to spot, apparently.

"Next, you might think about whether the population being examined in the study is the same as the population you are 'treating': in this case, perhaps, your child. On the standard growth charts – which I have in front of me – the four children in this study are not simply overweight, they are in the highest possible weight category on the charts, beyond the heaviest one in 200 of the population for their age. They are very unusual children with, you might guess, exceptional diets.

"The same issue comes up all the time with misleading drug trials. As any doctor would ask: does the population in the trial reflect the population you treat? The answer here is probably not.

"Then you might look at the outcomes measured. Behavioural outcomes, in a study of four children, with no control, and lots of extra attention for the subjects – including TV cameras pointing at them – are meaningless. "One boy who previously scorned books and was hooked on TV developed a love of reading and declared he was 'bored' with television" said the Daily Mail. I bet he did.

But the action, surely, is in this brain imaging data? 'The most striking finding emerged from the brain scans, which all suggested they had denser nerve fibres,' said

the Mail. This is what you call a 'surrogate outcome': they feel all sciencey, drug reps love them, and conjurers would call it a misdirection.

The scan measured something called NAA in the brain. It's been noticed, in other research, that as you grow, especially as a foetus or a neonate, you show more NAA in your brain. To call that a marker of brain development, that you measure and then make a sales claim on, is a very big leap. It is not a reliable or valid predictor of intelligence, or behaviour, or anything meaningful. It is a speculative research finding.

"This individual pill is a sideshow. There is a far greater issue at stake here, beyond even the misrepresentation of the scientific method by the media: the nation's children are being systematically re-educated to believe that they need to take pills every day to lead a normal, happy, productive life. Pill peddlers of all varieties, supplements and pharmaceutical, must be rubbing their hands with glee."⁵⁷

Now what might this have to do with Puri's work on broth? Past evidence of shoddy work? Obviously. Self interest? Possible, but speculative. Would Breakspear lose money if kids with allergies and autism could be cured at home with broth? Well, broth on the menu hardly precludes treatment with supplements and other therapies. A vegan agenda? Not likely. As we have shown, Puri developed a vegan EPA product, but his best known one comes from anchovies. What's more, the Breakspear Medical Group has no history of being anti broth. On the contrary, their Fall 2011 newsletter contains a soup recipe that clients can make with either homemade or store-bought broth,⁵⁸ and Puri wrote a glowing testimonial for Natasha Campbell-Bride's book *Gut and Psychology Syndrome* in 2004.⁵⁹

Might professional rivalry have developed between Breakspear and Dr. Campbell-McBride? Conspiracy buffs would like to think so, but we have no evidence of that. Dr. Campbell-McBride says she does not know the three researchers personally, Puri's endorsement of her book came through "a third party," and she does "not know why they would want to publish such an unscientific exploration."⁶⁰

With no smoking broth, there's no reason to suspect Breakspear of any ulterior motives. The study was in all likelihood motivated by legitimate questions raised by seeing a large number of patients with lead toxicity at the clinic. This idea furthermore matches up with rumors that began circulating in 2012 to the effect that Breakspear had stopped recommending broth consumption to its patients because of lead toxicity issues. At this time, Dr. Monroe has not yet answered the questions, What motivated you to study broth, Have you found especially high lead levels in patients that have come to your clinic, and Have you used the GAPS protocol at Breakspear?

The mystery that now remains is why this study was so poorly done. For all the reasons discussed above, a useful study needed to have been larger, and included the testing of broth made from chickens grown in several locations. It should have thoroughly documented the chickens' living conditions, and tested not only the broth and cooking water for lead but also the chickens' feed, water and soil.

Instead, the three researchers choose to do a quick and dirty study that casts aspersion on a traditional healing food. At most, their finding of lead in broth should serve as a warning to consumers that the careful sourcing of broth is warranted in our toxic world.

Clearly more studies are needed. To date, we've found just one other research study that has looked at lead contamination of broth. The findings published in the journal *Food Additives and Contamination* revealed very little lead in a beef bone broth, more in a beef casserole that used red wine, but the highest level by far in baked potatoes with skins contaminated from the lead in the soil. The researchers determined the predominant source of the metal in food was tap water.⁶¹

Several other studies have investigated the levels of lead found in the muscles and organs of conventionally raised chickens. In each case, the lead appeared where it would be expected — i.e. in the bones, with much less in the skin and cartilage.^{62,63}

Will any good come out of the shoddy *Medical Hypotheses* broth/lead study? Yes, if it prompts more tests and better studies. As Dr. Campbell-McBride puts it: “Many other practitioners now will test their meat stock and bone broth and the whole issue will receive a lot of attention, which in time will give us the full picture.”⁶⁴

To that end, we would like to announce the results of testing performed by The National Food Lab on bone broth from grass-fed beef and pastured chicken from California.⁶⁵ These two broths were prepared in stainless steel soup pots by the Three Stone Hearth Co-op in Berkeley. As tested on February 14, 2013 at a Minimum Detection Level of 10 parts per billion and again on March 1, 2013 with an MDL of 5 parts per billion, the results were as follows:

- Grassfed beef broth. No lead detected
- Pastured chicken broth: No lead detected
- Reverse osmosis water: No lead detected

The Weston A. Price Foundation plans to do further testing of broth, and it encourages consumers to know their farmers and the living conditions under which poultry and animals are raised.

The takeaway? Dr. Campbell-McBride sums it up nicely. “As a whole, my position is unchanged: meat stock and bone broth are healing foods and they need to be made from the best quality grass-fed ecologically clean animals. . .”⁶⁶ In other words, take care with the source of your broth.

* * * * *

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Endnotes

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The Flavor Chef chicken broth label reports calcium at 4% of daily value. I was not able to load a picture of the label here at the Weston A. Price Foundation's website, but it can be seen here: <http://drkaayladaniel.com/boning-up-is-broth-contaminated-with-lead/>

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65. Results from National Food Lab, Livermore, CA. No lead detected in grassfed beef broth, pastured chicken broth. On February 19, 2013 the broths were tested at the minimum detection level of 10 parts per billion. On March 5, 2013 a retest was performed at MDLs of 5 parts per billion. Both times no lead was detected in the reverse osmosis water at MDL of 1 part per billion. I was not able to load a picture of this Analytical Report here at the Weston A. Price Foundation's website, but it can be seen here: <http://drkaayladaniel.com/boning-up-is-broth-contaminated-with-lead/>
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