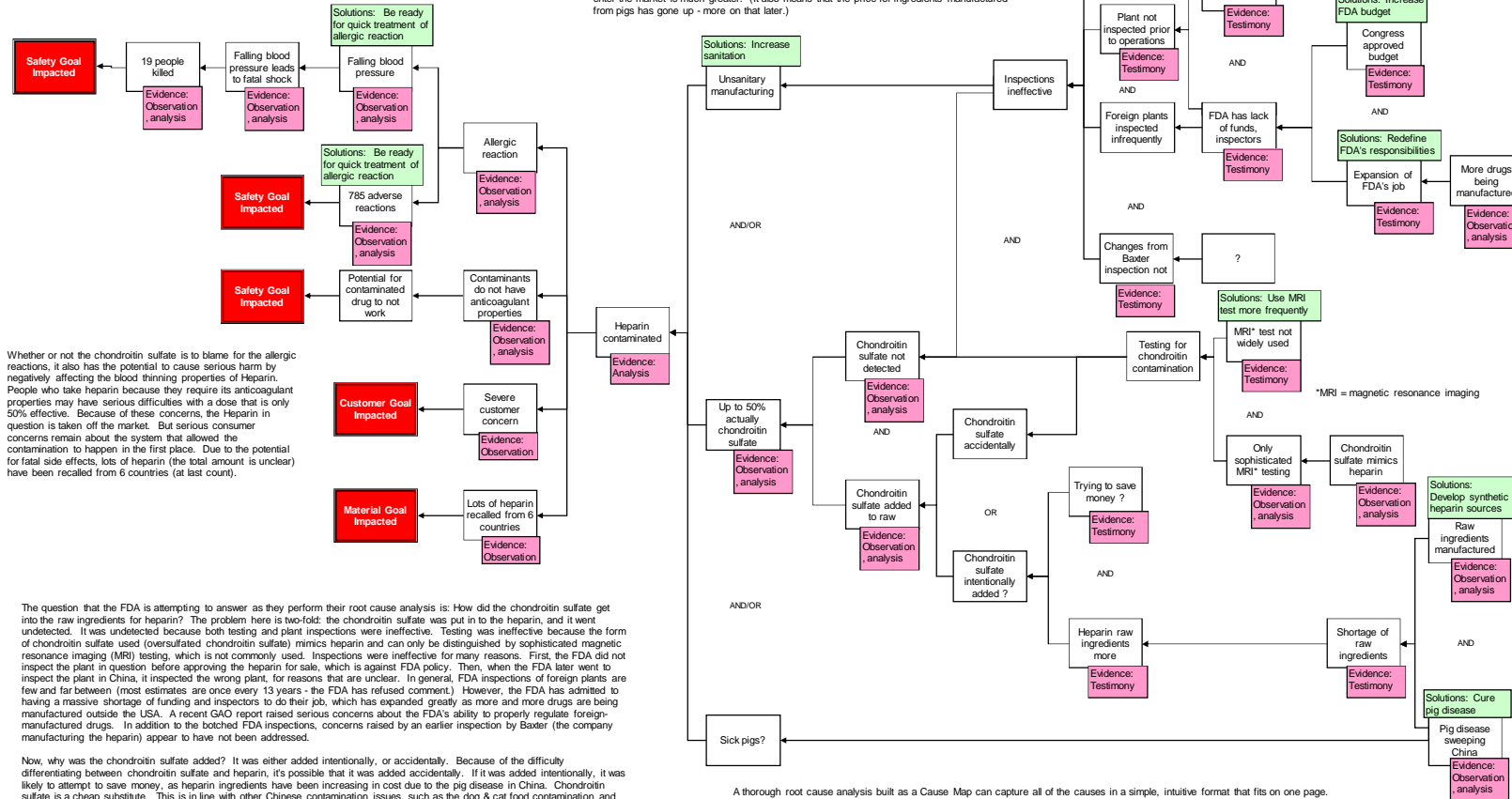


Heparin Contamination - 19 Lives Lost

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Heparin, which is widely used as an anticoagulant (blood thinner) has been in the news lately and the news is scary. 19 people have died, and 785 have experienced adverse reactions due to contaminated heparin. The heparin in question has been found to contain up to 50% oversulfated chondroitin sulfate, which mimics heparin so closely it can not be distinguished in basic tests but provides no anticoagulant activity. The adverse effects are caused by severe allergic reactions, including low blood pressure which can occasionally lead to fatal stroke.

However, the Food & Drug Administration is not sure if the chondroitin sulfate is the reason for the allergic reactions or if there could be even more problems with the heparin, such as unsanitary manufacturing process or sick pigs that have gotten into the supply chain. The raw ingredients for heparin are manufactured from pig intestines, and pig disease has been a huge problem in China lately. The prevalence of sick pigs means that the potential for sick pigs to enter the market is much greater. (It also means that the price for ingredients manufactured from pigs has gone up - more on that later.)



Whether or not the chondroitin sulfate is to blame for the allergic reactions, it also has the potential to cause serious harm by negatively affecting the blood thinning properties of Heparin. People who take heparin because they require its anticoagulant properties may have serious difficulties with a dose that is only 50% effective. Because of these concerns, the Heparin in question is taken off the market. But serious consumer concerns remain about the system that allowed the contamination to happen in the first place. Due to the potential for fatal side effects, lots of heparin (the total amount is unclear) have been recalled from 6 countries (at last count).

The question that the FDA is attempting to answer as they perform their root cause analysis is: How did the chondroitin sulfate get into the raw ingredients for heparin? The problem here is two-fold: the chondroitin sulfate was put in to the heparin, and it went undetected. It was undetected because both testing and plant inspections were ineffective. Testing was ineffective because the form of chondroitin sulfate used (oversulfated chondroitin sulfate) mimics heparin and can only be distinguished by sophisticated magnetic resonance imaging (MRI) testing, which is not commonly used. Inspections were ineffective for many reasons. First, the FDA did not inspect the plant in question before approving the heparin for sale, which is against FDA policy. Then, when the FDA later went to inspect the plant in China, it inspected the wrong plant, for reasons that are unclear. In general, FDA inspections of foreign plants are few and far between (most estimates are once every 13 years - the FDA has refused comment.) However, the FDA has admitted to having a massive shortage of funding and inspectors to do their job, which has expanded greatly as more and more drugs are being manufactured outside the USA. A recent GAO report raised serious concerns about the FDA's ability to properly regulate foreign-manufactured drugs. In addition to the botched FDA inspections, concerns raised by an earlier inspection by Baxter (the company manufacturing the heparin) appear to have not been addressed.

Now, why was the chondroitin sulfate added? It was either added intentionally, or accidentally. Because of the difficulty differentiating between chondroitin sulfate and heparin, it's possible that it was added accidentally. If it was added intentionally, it was likely to attempt to save money, as heparin ingredients have been increasing in cost due to the pig disease in China. Chondroitin sulfate is a cheap substitute. This is in line with other Chinese contamination issues, such as the dog & cat food contamination and another case involving cold medicine in Panama. In both these cases a cheap (and dangerous) substitute was added to the product to increase the apparent yield. As the FDA uncovers more information, we can expand our cause map.

A thorough root cause analysis built as a Cause Map can capture all of the causes in a simple, intuitive format that fits on one page.

Cause Map

Detail Level



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