

Welcome to the forensic toxicology podcast. My name is Dr. Sanela Martić. I am an assistant professor in the Department of Forensic Science at Trent University. Today's podcast is on the topic of pharmaceutical over-the-counter medicine. Part one. OTC medicines are those that can be sold directly to people without prescription. It's something you can pick up off the shelf in your pharmacies. OTC medicines can treat a variety of illnesses and their symptoms including pain, coughs and colds, constipation, so on. Some of these OTC medicines actually have active ingredients with potential misuse if you use that higher than recommended dosages. So how do people use and misuse over the counter medicines? Number one, you may be taking medicine in a way or a dose that's not appropriate or not as directed on the package. And number two, you may be using it for the effect that it causes, for example, high feeling. Number three, it could be that you're mixing OTC medicines altogether to create a new chemical or a new kind of effect. Behind the counter medicines. So one example is pseudoephedrine, which is a nasal decongestant. It's found in many OTC cold medicine and can be used to make metamphetamines in clandestine labs. For this reason, products containing pseudoephedrine are sold behind the counter nationwide, specifically in US. This information actually comes from the website, drug abuse dot government publications and drug facts. For pseudoephedrine. For example, a prescription is not needed in most states, but in some states it does require a prescription. There are limits on how much a person can buy each month in order to regulate that. In some states, there's also a legal age of 18 years of age before one can buy pseudoephedrine. Let's look quickly at two types of OTC medicines I wanted to just briefly mention from his website. One is the dextromethorphan, DXM. It's in a cough suppressant found in many medicines. And the source of the abuse is because it's extra strong and it is in cough syrup tablets and gels. Of course you can swallow it in its original form or may be mixed with the drinks for flavoring. Sometimes users also inject it. Yes, a person can overdose on cold medicines containing DXM. The other compound of interest is loperamide. And in both cases at the overdose with the DXM or loperamide could actually lead to life threatening actions or even death. In conclusion, this website clearly states and describes several chemicals present in OTC medicines that could be abused and lead to toxicity and death as well. You've just heard part one, which was focused on over-the-counter medicines and examples of two chemicals that can have detrimental effects if overused, it could even lead to toxicity and death. The part two is actually focused on young children and fatalities encountered when over-the-counter medication is being overprescribed or accidentally ingested. Part two content is taken from the website publications from pediatrics journal article number 1813 in 2012. Specifically the article on pediatric fatalities as associated with over-the-counter medication. A little bit of background to this publication or to this work. In 2008, over-the-counter cough and cold medicines underwent labeling changes. And this was in response to safety concerns because there were fatalities reported and children who were exposed to these medications. The objective of this paper was to describe fatalities associated with exposure to CCMs in children that are less than 12 years old that were detected by a safety surveillance. And this was in a period of 2008 to 2016, thousands of children were actually surveyed. So fatalities in children under 12 years old that occurred in that period range were associated with 40 exposure to one or more of the chemicals. They were identified by pediatric cough and cold safety surveillance system team. The expert panel reviewed all the cases to determine the casual relation between the exposure and death. If the intent of exposure was therapeutic. Indeed, if the dose was super therapeutic, bidding over dosing. Of course, other factors related to the channels that were also considered, such as accidental overdosing, mixing of medication. This study revealed that off the 180 fatalities that were captured during the period, 40 of them were judged by the panel experts to potentially be related to these medicines. The majority of them over 60%, occurred in children that are two years old or younger and involved non-therapeutic intent. Most frequently involved index ingredient was diphenhydramine. In some cases, about 15% over the counter medication was administered to actually murdered a child. In another 17% of the cases death followed the intentional use of CCM medicine to sedate the child and it was obviously accidental. In conclusion, this particular paper in this part two clearly illustrates that they are pediatric fatalities associated with over-the-counter medication and pharmaceutical chemicals that may occur primarily in young children after they either deliberately medicated. Drugs being administered to them by the caregiver. Part three is focused on the actual CanLii case, ED versus SK 2017, CanLii case 2643. This case was presented in the slide deck on over-the-counter medication. Let's look at the background. There was a tragic case of death of a 20-year-old woman, the daughter of the applicant. The respondent is a family medicine physician at the hospital who treated the patients in the ER on the evening of February second in 2014 when the applicant's daughter was brought there. Now the patient had a medical history that included hypertension and that she was on medications including acetazolamide. She had been treated previously at the same hospital where she underwent various tests and so on. Her medication included Tylenol three for migraine, etc. She has been seen by various doctors and in particular February second 2014. On that evening, the paramedics brought the patient from home by ambulance to the emergency room. And he was found by her mother in the apartment struggling to breathe and she had a decreased consciousness. Paramedics noted that there was an almost

empty 200 tablet container of 222s and taught that the patient had overdosed. Or the applicant advice that the paramedics and the health professionals at the hospital, she advised him that he was not an overdose and she informed them about their medical history. The patients was treated and he was intubated. She received IV fluids, Narcan and the activated charcoal and so on. And bloodwork toxicology assays are also performed. An arterial blood gas showed severe metabolic acidosis, show salicylate at a therapeutic level, meaning that aspirin could have been used. Salicylate is one of the metabolites of aspirin. Also has shown opiates were found on a urine toxicology. While in the ICU, the patient had also a consultation with the doctor and Dr. W. In this case treat the patient for increased intracranial pressure and gave their propofol as well. The patients, in addition, deteriorated anyway, and from that morning on February third of 2014 and over the next few days, diagnosis of cerebral vet was confirmed and unfortunately the patient passed away on February 7th. The coroner was contacted, of course, resulting in the corners and investigation statement, postmortem report and toxicology report with respect to the death of this patient. Now the applicant expressed concern about the care provided to the patient by the respondent and four other physicians who treated the patient. the committees addressed the applicants concerns regarding the other four physicians in separate decisions. Let us look at what was the background and context. Let's look at the complaint and the response. The applicant, who was a patient's mother, expressed concern that the respondent failed to provide adequate care to the patient in that he failed to diagnose the underlying condition despite the toxicological reports, listen to parental concerns and consideration, and notify the doctor V who is the patient's ophthalmologist. applicant, who is the mother of the disease, also stated in the complaint that there was no possible history of an aspirin overdose, and she advised the paramedics and nurses and physicians. This fact, the responded responded in writing to the complaint which included the following information. He described that the patient's history and presentation upon arrival to the ER, he explained how and why he managed the patient the way he did based on her condition at the time. He tried to stabilize her and also ordered bloodwork and tox work. The only investigation results that were available at the time were an arterial blood gas showing severe metabolic acidosis, the absence of ketones. There was also salicylate at the therapeutic level and opiates found on urine tox. Once the patient was stabilized, he transferred the patient to the ICU. The respondent also stated that based on the history and physical examination, there was a possibility of an aspirin overdose. So he initiated treatment which would have been beneficial if overdose was indeed present, but would not have been harmful if one was not present and it would not lead to death. So responded noted that although he did not have direct contact with the applicant, his senior resident spoke with her and documented in the clinical knows that the patient had hypertension and cerebral edema in her past medical history so that he was aware of her medical history in with respondents submission regarding the toxicology screening, counseled noted that the urine tests indicated a level of opiates which would be explained by the use of Tylenol. Three, the salicylate levels elevated DO within the therapeutic range. Dr. M. Provided the opinion that the patient was not suicidal and that was really a accidental poisoning likely. And he explained that in 2004, the issue was advised by the resident of the hospital who was involved in patient's treatment that low levels of aspirin and acetazolamide could be toxic together. If he us is chronic or irregular. He said that aspirin levels could be low in the blood plasma, but high in the tissues, and able to cross the blood-brain barrier when a patient is acidotic, this will really be exacerbated by acetazolamide. Then it would explain why aspirin would be undetectable in the tox screen and only salicylic acid was detected. He also wanted to write a case report for the Journal of Clinical Toxicology to make doctors more aware that the low levels of combination of medications such as aspirin with acetazolamide, which is a dimer box, could be toxic at low levels even in chronic and regularly abusers. You just heard a podcast on the over-the-counter medication composed of three parts. The source was a governmental website on over-the-counter medicine. The second source was the journal article on the over-the-counter toxicity in young children. And the third part was straight from the CanLii case, where a combination of drugs, including over-the-counter medications such as aspirin may have caused the death. This was a forensic toxicology podcast. Thank you for joining me.