

MUSHROOM POISONING IN CANADA AND THE UNITED STATES



Michael W. Beug, PhD

Professor Emeritus,
The Evergreen State College

Over the sixty years I have been collecting and eating mushrooms, the number of people in Canada and the USA who eat wild mushrooms has increased both steadily and dramatically while the serious poisoning numbers have remained steady. Meanwhile the press has been consistent in warning about the dangers of consuming foraged mushrooms.

So how life threatening is mushroom foraging? The annual death rate from mushrooms for the USA and Canada combined has remained steady at less than four deaths per year even while we have seen a dramatically expanding North American range of *Amanita phalloides*, which causes 90% of all worldwide mushroom deaths. We have also seen a dramatic increase in the per capita quantity of mushrooms consumed. In 2021 Dr. Britt Bunyard reported that there had been a 30-fold increase in commercial mushroom production since 1978 (Bunyard, 2021). World per capita mushroom consumption had grown to 4.7 kg/year from 1 kg/year in 1997. Over half of all mushrooms consumed are cultivated edibles, 38% are medicinal, and 8% are wild harvested.

We owe our success in keeping deaths low to education, the rise of mushroom societies, the availability of excellent field guides and excellent magazine articles. In this article, I will describe the different patterns of mushroom toxicity observed in North America. The ten syndromes observed in North America (with pictures of the known species involved) are described in detail on the website of the North American Mycological Association <https://namyco.org/interests/toxicology/mushroom-poisoning-syndromes>.

The information that follows about specific poisoning cases comes from the NAMA toxicology database, started in 1983, with reports going back to the early 1970s. As of January 2025, it contained 3,000 voluntary poisoning reports involving both humans (2/3 of the reports) and animals. Between 1985 and 2020 annual reports were published for most years in the NAMA journal *McIlvainea*, with a thirty-year summary report published in 2006 covering all cases through 2005 (Beug et al., 2006), and the last report done for NAMA covering 2018–2020 (Beug, 2021). Since 2020, the voluntary poisoning reports to NAMA have been very few. Patient

privacy laws have meant that even those reports NAMA receives now have too little detail to be useful.

In addition to the individual reports on which human cases are based, a summary report from the California Poison Control covering 2017 gives one an overall sense of the number of cases a large poison center might have to deal with in a year. In 2017 they had 1,038 mushroom ingestion calls. Of those, 522 were treated at a health care facility. Of those treated, 16 suffered a major health issue including one liver failure leading to coma then recovery. None of these cases led to a report sent to NAMA.

Paul Kroeger, NAMA toxicology identifier from Vancouver, B.C., has developed a close working relationship with Raymond Li at the British Columbia Drug and Poison Information Centre DPIC, one of two Canadian poison control centers (the other Canadian DPIC is in Ottawa). Paul's work with the BC DPIC gives us rare current insight into specific cases. A summary of the 39 symptomatic cases that they dealt with for the period 2018–2020 provided much of the information for my summary report (Beug, 2021) included here and is the reason you might note that a high percentage of the cases in the summary report are from B.C. Out of 40 vouchered asymptomatic cases, Paul noted that the most frequent asymptomatic calls to the poison center resulted from consumption of *Leucoagaricus* (6) and *Panaeolus* (5). Paul reports that "There were also a tedious number of exposure cases where viewing photos allowed them to identify *Agrocybe praecox* or *A. pediades*, *Leucoagaricus leucothites*, *Marasmius oreades*, or *Panaeolus foenicicii*. They report that public awareness efforts warning of Death Cap mushrooms (*Amanita phalloides*) in urban settings resulted in many of these exposure calls where there were no symptoms, just a worried public.

Notably for the period 2018–2020 in all North America, the winner of the award for the mushroom causing the most reported cases (9) goes to *Agaricus bisporus* in one of its manifestations—Crimini, baby bellas, Portobellos, or simply button mushrooms. Second place goes to the morels as a group (6). Morels are normally at or near the top of the list for annual poisoning cases.

There are 7 reports of adverse reactions from *Inonotus obliquus*, (Chaga), usually consumed as tea. However, the number for Chaga is due to intense scrutiny over multiple years as I tried to learn more about the potential medicinal effects of Chaga and actively sought out cases. Normal reporting would have resulted in only two reports of an adverse Chaga reaction. While you should not assume much from the number of Chaga cases, do observe some of the things people did to get themselves in trouble, like drinking old, moldy tea and misidentifying a tree growth as Chaga. One Chaga tea death (outside of North America) was the result of kidney damage from the oxalates in Chaga (Beug, 2019). Avoid over-indulgence of any fungus.

Edible mushrooms with a considerable number of adverse events in the 2018–2020 period include *Leccinum* species (6), *Sutorius (Tylopilus) eximius* (4), *Armillaria mellea* complex (4), *Grifola frondosa* (4), *Hypomyces lactifluorum* (3), *Laetiporus sulphureus* and relatives (4), and *Cantharellus* species (5). The

severity of some of the adverse reactions with *Leccinum*, *Sutorius*, *Armillaria*, *Hypomyces*, and *Laetiporus* has resulted in my decision not to eat any species of these genera. Since 2020, I have learned of additional *Hypomyces lactifluorum* cases that parallel the rising popularity of that mushroom as an edible. I have not seen a similar increase with other edible species. I do not hesitate to eat chanterelles but have noted that most of the chanterelle toxic reports are late in the season leading to worries about people eating spoiled mushrooms. Not all cases are due to spoiled mushrooms. I personally know people who simply cannot tolerate chanterelles. I am sensitive to edible *Agaricus* and *Chlorophyllum* species. If it is a new species for you, it is always wise to start with eating a small amount.

Morels (which are poisonous raw) can remain neurotoxic when only lightly cooked (and therefore must be well-cooked). Indeed, many of the adverse reactions to any edible mushroom result from under-cooking and I recommend thorough cooking for all mushrooms.

With *Leccinum* species, *Morchella* species, and several other edible species, individuals can develop a sensitivity over time. Once sensitized, further meals may lead to ever stronger adverse reactions. Thus, if you have had a bad experience with an edible mushroom, be very careful should you try the mushroom again. However, becoming sensitive to one mushroom does not mean you need to avoid all mushrooms.

The poisonous mushroom that normally leads the pack for total annual mushroom poisonings is *Chlorophyllum molybdites*. The four people who reported consuming this mushroom raw from 2018–2020 discovered that it can cause very violent poisoning including bloody vomit and bloody diarrhea. Even though it was cooked, two people reported discovering that *C. molybdites* is trouble.

Psilocybin and Psilocin

Adverse reactions from *Psilocybe* species were, as usual, very under-reported. There were just seven case reports for the period 2018–2020. In



"I don't want to miss a single issue!"

Send me a full, one-year subscription to FUNGI.

I want to receive 5 big, colorful issues!

(4 seasonal issues + annual special issue)

\$42 USA (print & digital) \$45 Canada or Mexico (print & digital)

\$80 all other Intl. (print & digital) \$20 DIGITAL ONLY

Name _____

Address _____

City _____ State _____ Zip _____

Country _____ Email _____

Place CREDIT CARD orders at the FUNGI website,

www.fungimag.com

or drop your check in the mail today! Make check out to "FUNGI" and send it to:

FUNGI 📮 PO Box 98 📮 Batavia, Illinois 60510-9998, USA

If you give us your email address, we'll send you subscription reminders, announcements, and notices of information placed on the website. Your email address will NOT be traded or sold, and will NEVER be shared with anyone not directly affiliated with FUNGI.

NOTE: we can no longer accept checks from outside the USA.

FUNGI (ISSN 1941-4943) is published five times per year (four seasonal issues plus a special issue) by FUNGI, PO Box 98, Batavia, Illinois 60510-9998, USA. Subscriptions are \$42 per year for USA residents; \$45 for residents of Canada and Mexico; \$80 for all others; \$20 Digital Only. Checks should be made out to FUNGI. For credit card orders please see our Web site: www.fungimag.com.

PUBLISHER'S NOTES: Although many wild mushrooms are quite palatable, some are deadly poisonous. It is advisable to avoid eating any wild organisms, including fungi, unless absolutely certain of identification. And although some mushroom species are edible for many people, those same species may cause allergic reactions or illness in others. When in doubt, throw it out. FUNGI wants to ensure that all readers are long-term subscribers. It is a good idea to have any wild mushroom checked by an expert before eating them. It should be understood that the Publisher and all Editors are not responsible for any consequences of ingesting wild mushrooms. Furthermore, the Publisher and all Editors are not engaged, herein, in the rendering of any medical advice or services. All readers should verify all information and data before administering any drug, therapy, or treatment discussed herein. Neither the Editors nor the Publisher accept any responsibility for the accuracy of the information or consequences from the use or misuse of the information contained herein. Unauthorized reproduction of published content of FUNGI is strictly forbidden, and permission for reproduction must be obtained by application in writing to the Publisher.

COPYRIGHT ©2025 by FUNGI.

All rights reserved. Printed in the USA.

the right set and setting, consumption of psilocybin and psilocin can have exceptional medical benefits. I have been present at eleven psychedelic mushroom conferences where *Psilocybe* mushrooms were consumed.

While events involving alcohol can be very boisterous and sometimes turn violent, even deadly, events involving psilocybin are very quiet and peaceful. In the hundreds of cases where I have observed *Psilocybe* use, I have never observed a “bad trip” (and yes, on all but one occasion, I was simply an observer).

However, misuse can have significant adverse consequences. The strangest case in the past few years is a case where the patient made tea from *Psilocybe cubensis* and injected the tea into his arm. It was a psilocybin micro dosing attempt gone very wrong. He survived after many days in the intensive care unit followed by three weeks in the hospital. He needs ongoing treatment. The culture of his blood revealed bacterial growth and *Psilocybe cubensis* was cultured from his blood (from circulating spores?). In another non-lethal example, a “bemushroomed” individual consumed an assortment of small brown *Entoloma* species and was severely poisoned. The lesson is not to go picking and eating mushrooms while tripping. In yet another incident, the individual experienced temporary paralysis, but fortunately was in a safe location and so no long-term harm resulted.

Always remember to think about set and setting. The information from Paul Kroeger and Raymond Li about cases managed by the B.C. Poison Center illustrates that poison centers regularly deal with “bad trips.” In two B.C. cases and one other Canadian case, two involving purchased *Psilocybe cubensis* and one involving purchased *Psilocybe cyanescens*, the symptoms do not match what I would expect from a simple “bad trip” but lead me to suspect that the purchased mushrooms had been adulterated with additional, more dangerous, psychoactive substances.



Isoxazoles

Isoxazoles, muscimol, and ibotenic acid, were the toxins involved in a total of thirteen cases reported to NAMA between 2018 and 2020.

The mushrooms involved were *Amanita multisquamosa* (2 cases), *Amanita “muscaria”* (5 cases), and *Amanita “pantherina”* (6 cases). (Note:

I use parenthesis around the species epithet when there are look-alikes with the same properties.) In the case of one adult, atropine was used in treating an *Amanita “muscaria”* poisoning victim. Atropine is contraindicated in isoxazole cases since it exacerbates the toxicity of ibotenic acid and muscimol. The individual had consumed a very large quantity of mushrooms and after the initial treatment wound up with respiratory failure and an 8-day hospital stay, very severe symptoms considering that full recovery normally occurs within 24 to 48 hours.

In one case, a young child consumed an entire *Amanita “pantherina”* cap. In a quick trip to the hospital, the child was treated with activated charcoal prior to any symptoms. Similarly, a young child who had consumed a 15 cm piece of *Amanita “muscaria”* was rushed to the hospital, treated with activated charcoal, and did not develop any poisoning symptoms. (Note: use of activated charcoal to induce vomiting is unwise if more than an hour or two has elapsed since mushroom ingestion).

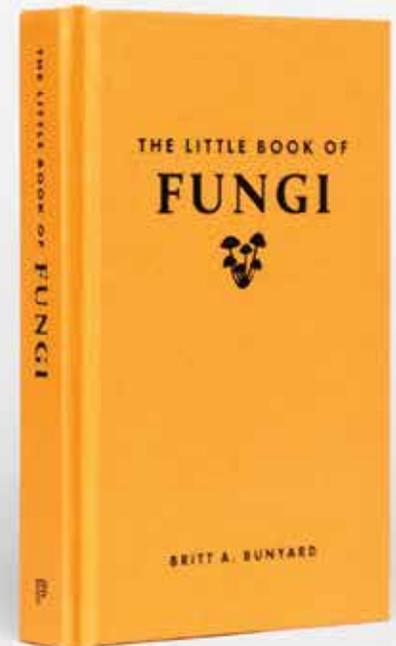
Amanita “muscaria” and *Amanita “pantherina”* are both frequently consumed by individuals intent on getting high. However, consumption with the intent of getting high was only mentioned in one report. Isoxazoles are very nasty compounds to use to get high. Frequently, there is no memory of the event afterwards and the hospital bill for treatment can be significant.

Muscarine

Since NAMA has been keeping records, there has been one reported human death due to muscarine from a *Clitocybe* (one of two look-alike species now known as *Collybia rivulosa*) and

The Little Book of Fungi

Britt A. Bunyard



A charming, richly illustrated, pocket-size exploration of the world’s fungi

A beautifully designed pocket-size book with a foil-stamped cloth cover

Features some 140 color illustrations and photos

Makes a perfect gift



one human death from *Rubroboletus pulcherrimus*. Death was due to respiratory failure.

All *Rubroboletus* species are toxic. *Rubroboletus eastwoodiae* smells like a ripe outhouse and thus is not eaten. A large percentage of *Inocybe* species contain dangerous levels of muscarine.

Muscarine contributes to toxic symptoms in the *Amanita* species in section *Amanita* (notably *Amanita "muscaria"* and *Amanita "pantherina"*). *Clitocybe dilatata* (now *Leucocybe connata*) is also reported to contain dangerous levels of muscarine.

Muscarinic symptoms typically appear in fifteen to thirty minutes and are recognized by excessive perspiration, lachrymation, and salivation accompanied by pinpoint pupils and gastrointestinal distress. There can be visual disturbances, irregular pulse, low

blood pressure, and breathing difficulty. Dogs are frequent victims, and death has been the outcome for dogs in numerous incidents. Careful dosing with atropine is recommended in cases of poisoning by muscarine.

Hydrazines Gyromitrin and Agaritine

First general safety measures. Most mushrooms need to be well-cooked before consumption. Well-cooked means to the point where the fungi are starting to caramelize (and as a bonus,

Dogs are frequent victims, and death has been the outcome for dogs in numerous incidents.



Morchella americana, C. Cripps.

Burn morels, M. Beug.



the flavor is usually best). Mushrooms known or suspected of containing hydrazines (which are volatile when heated) must always be cooked as hydrazines are carcinogenic, and can cause death in cases where monomethyl hydrazine is produced in members of the *Gyromitra esculenta* group including *G. splendida* and *G. venenata*. *Piscidiscina* (*Gyromitra*) *leucoxantha* and *Piscidiscina* (*Gyromitra*) *persicula* also contain gyromitrin, though at low levels (Dirks et al., 2025).

Though there have been no reported deaths in North America associated with gyromitrin, there have been cases of severe liver damage. Consuming members of the *Gyromitra esculenta* group may also significantly increase your odds of contracting ALS, so they are dangerous, even well-cooked (Lagrange et al., 2024).

The *Agaricus* species sold in stores contains agaritine, which decomposes to release hydrazines and should be cooked until starting to caramelize.

Unknown Neurotoxins in the Pezizales

All *Pezizales* appear to contain unknown neurotoxins and should be eaten in moderation (less than a half-pound per meal and not eaten every day) as the neurotoxins cannot be fully destroyed on cooking and can build to levels where they can cause adverse reactions to alcohol, gastrointestinal distress, and loss of muscular coordination. Cook the mushrooms until starting to caramelize. Commonly consumed species include *Verpa bohemica*, *V. conica*, *Gyromitra montana* (now *Maublancomyces montanus*), *G. olympiana* (now *Maublancomyces olympianus*), *G.*

korfii (now *Maublancomyces korfii*), *G. americanigigas* (now *Maublancomyces americanigigas*), *G. caroliniana* (now *Neogyromitra caroliniana*), *G. brunnea* (now *Neogyromitra brunnea*), *G. ancilis* (now *Discina ancilis*), and *G. mcknightii* (now *Discina mcknightii*) (Dirks et al., 2025).

Unknown Neurotoxins in Morels

Unidentified neurotoxins are present in morels in dangerous amounts. These toxins decompose slowly on cooking and so cook all *Morchella* species until they start to caramelize (nicely browned) and even then eat them in moderation (less than one pound per day and not eaten every day). Raw morels consumed in a restaurant in March and April of 2023 resulted in 51 mild-to-severe cases of gastrointestinal distress with three

About Mushroom Cooking

Heather Hallen-Adams

I'm just going to say it: mushrooms should be cooked. Yes, there are a few true exceptions (*Amanita caesarea*, *Tuber* species); yes, there are some things like *Agaricus bisporus* that we know better (produces carcinogenic hydrazines) but everyone eats raw anyway, but the default should be, cook your mushrooms!

Food safety: in the past several years two edible mushrooms have been in the news for all the wrong reasons: undercooked morels (*Morchella* species) have caused severe gastrointestinal distress and multiple deaths, and cultivated enoki (*Flammulina velutipes*) has caused numerous recalls and at least two foodborne outbreaks due to contamination with the bacterium *Listeria monocytogenes*. Adequate cooking would kill *Listeria*. Adequately cooked morels do not cause gastrointestinal illness (much less death).

Food quality: even if food safety were not a concern, most mushrooms taste better and are more digestible when

cooked. Studies¹ of multiple species show an increase in umami flavors in cooked mushrooms. Cooking enhances protein digestibility and promotes the flavor-enhancing Maillard reaction.

To date, there has been little to no guidance on mushroom cooking parameters. Mycophiles know that you should cook morels; chefs often do not, and assume that mushrooms can be treated like vegetables (used raw or lightly sauteed). We recommend cooking mushrooms to an internal temperature of 135°F, consistent with several existing food safety guidelines. While this is a beginning and may be refined over time (for example, as we conduct empirical studies on morels and on *Listeria* in mushrooms), it will be an unequivocal improvement over raw.

¹Rotola-Pukkila, M., B. Yang, and A. Hopia. 2019. The effect of cooking on umami compounds in wild and cultivated mushrooms. *Food Chemistry* 278: 56–55. <https://doi.org/10.1016/j.foodchem.2018.11.044>.

hospitalizations and two deaths (Cripps et al., 2024); (note that data from 2023 is not included in tables).

In April of 2023 two men rafting with other friends consumed undercooked morels and quickly fell seriously ill. One died, the other vomited and recovered. Recent deaths from morels have also been documented in Europe. In some years, the North American Mycological Association has received more reports of morel poisonings than of any other mushroom. Undercooked morels are known to cause adverse reactions to alcohol, severe loss of muscular coordination, and gastrointestinal distress.

Amanitins

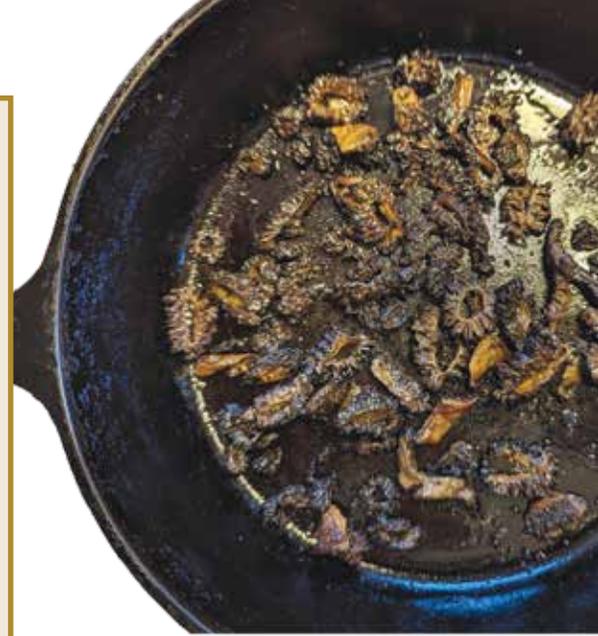
It is of paramount importance for foragers to learn the identification of fungi that contain amanitins, especially the large, often delicious deadly *Amanita* species in section *Phalloideae*, the Death Cap. *Amanita phalloides*, and Destroying Angels, numerous white look-alikes including *Amanita ocreata* (Western) and the *Amanita bisporigera*

group (Eastern). They share a common set of features: gills that are barely free or narrowly attached to the stipe, a white spore print, a partial veil that usually leaves an obvious ring on the stipe, and a universal veil that ruptures to leave a cup-like volva at the base of the stipe.

Except in a mixed ingestion with other mushrooms where symptoms can occur within 1–3 hours, symptoms do not appear for 6–24 hours and include bloody vomit, intense stomach cramps, and severe diarrhea. The shorter the lag time, the poorer the prognosis. Then there is a one-to-three-day period of apparent recovery followed by jaundice and liver dysfunction.

Without treatment, there is a greater than 50% chance of death. With prompt treatment involving copious IV fluids the chance of death is in the range of 10%, even without a liver transplant (Beug, 2016).

Three healthy young adults consumed a meal of *Amanita phalloides* on New Year's Eve, 2024. They became ill within hours but did not seek medical help



Well-cooked caramelized morels in a pan, M. Beug.

(neither the time delay nor the symptoms were published). On Jan 3, 2025, they reported to a small local hospital with jaundice and apparent liver dysfunction. They were administered IV fluids and soon transferred to Stanford where there was a kidney transplant team. I was able to learn that injectable silymarin was quickly obtained but not used and all three survived with supportive treatment. Meanwhile because the young men reported that they purchased the mushrooms from a vendor in a truck parked outside of a Salinas, CA supermarket there was a search for the truck vendor that ended in failure after about four days. In a follow-up report, one California newspaper reported that the young men then changed their story and revealed that they had foraged the mushrooms themselves.

Fungi other than *Amanita* species in section *Phalloideae* that contain potentially lethal levels of amatoxin are small and not often eaten. The additional amatoxin species include all *Galerina* species in subgenus *Naucoriopsis* (*G. marginata*, *G. castaneipes*, etc.), most *Pholiotina* species that have a partial veil and subsequent ring on the stipe (*P. rugosa*, *P. filaris*, etc.), and numerous small, scaly *Lepiota* species including *L. brunneoincarnata*, *L. castanea*, *L. spiculata*, *L. subincarnata*, *L. venenata*, and *L. helveola*. To be safe do not eat any *Lepiota* like *L. clypeolaria*, *L. cristata*, or *L. magnispora*.

I am aware of two deaths from mistaking either a *Galerina* in the



Naucoriopsis subgenus or a veiled *Pholiotina* for a *Psilocybe*. The first case, never reported to NAMA, was in the 1980s and involved a *Galerina* species consumed by an inexperienced teenage forager seeking *Psilocybe* species. The most recent case was in December 2024 and the individual purchased mushrooms on the street.

The source of the suspected amatoxin (based on symptoms) was never identified.

In 2020 a sensitive rapid test for amatoxins in urine was published (Bever, 2020) and this test can also be used on fresh mushrooms. It looks like a pregnancy test kit and as of this writing it is once again commercially available. It is marketed as the Amatoxtest. The price was three tests for \$90 or fifteen tests for \$380 (at the beginning of 2025).

Orellanine—Delayed Kidney Damage

Orellanine causes delayed kidney damage and took a long time to discover because the symptoms first appear from 36 hours to as much as three weeks after mushroom consumption, making it hard to connect the kidney damage to a previous mushroom consumption. Initial symptoms include nausea, vomiting, lethargy, anorexia, frequent urination, burning thirst, headache, sensation of coldness and shivering, and evidence of kidney failure.

Orellanine toxin is only known from species of *Cortinarius*, notably *Cortinarius rubellus* (synonyms *C. rainierensis*, *C. speciosissimus*, and *C. orellanoides*), *Cortinarius orellanus* (in Europe), and *Cortinarius orellanosus*.

There are two recorded poisoning cases in North America. The first was a case in Michigan affecting a woman who found a then unnamed *Cortinarius* under oaks and the mushroom resembled European *Cortinarius orellanus* and thus was named *Cortinarius orellanosus*. The second case in 2010 involved a Quebec man who found *Cortinarius rubellus* in a sphagnum bog (its usual habitat) and



Montana burn morel, Jungle Fire, 2007, C. Cripps.

mistook it for a chanterelle.

The mode of action is like that of the herbicides paraquat and diquat. Even in mild cases years of dialysis may be required after consuming this mushroom. Kidney failure can result in the need for a kidney transplant. There have been numerous deaths in Europe. *C. rubellus* has recently been found in Virginia under pines, not in a bog. Orellanine causes fungi (and human tissue) to fluoresce blue in uv light and so this is a useful test for its presence.

Allenic Norleucine and Chlorocrotylglycine—Prompt Kidney Damage

On occasion Western foragers have mistaken *Amanita smithiana* for Western Matsutake, *Tricholoma murrillianum* with devastating, though not lethal results. Four to eleven hours post ingestion, the main symptoms are gastrointestinal distress, anxiety, chills, cramps, disorientation, and kidney failure sometimes accompanied by malaise, sweating, warm feeling, oliguria, polyurea, and thirst. Recovery involves hospitalization and a long period of kidney dialysis. There have been no deaths. Allenic norleucine (2-amino-4,5-decanoic

acid and chlorocrotylglycine have been isolated and are the presumed toxins.

Visually, *Amanita smithiana* has a powdery universal veil and a powdery partial veil, white almost free gills, and a stipe with a bulb ending in a point. *Tricholoma murrillianum* has a membranous veil and bluntly attached to notched gills and a stipe that tapers to a point without any bulb. A unique feature of *T. murrillianum* (and *Catathelasma* species) is that your knife will squeak when you cut the stipe because the flesh is so dense. Indeed, if you squeeze the stipe with all your might, it will not break (unless wormy), while *A. smithiana* has firm flesh but will shatter if you squeeze hard.

Paxillus involutus Group—Immune-Modulated Hemolytic Anemia

Members of the *Paxillus involutus* group can be eaten for a year or more without adverse effects. However, your body can sometimes develop an immune response that involves rupture of the red blood cells. Death can result. Consequently, consumption of any

Paxillus involutus group member is very unwise. There have been deaths in Europe, but none have been reported so far in North America. Doctors should inquire about the consumption of this mushroom in any case of idiopathic immune response.

Coprine

Coprine, a highly carcinogenic compound found in members of the *Coprinopsis atramentaria* group (*C. atramentaria*, *C. insignis*, *C. quadrifidus*, *C. romagnesiana*, *C. striata*, and *C. variegata*) can cause Antabuse-like symptoms if alcohol is consumed with or as long as five days after eating them. The symptoms are racing heart and palpitations, tingling arms and legs, warmth, and flushing, sometimes headache, heavy limbs, and salivation.

Adverse reactions to alcohol from other mushroom species have different symptoms and I suspect primarily occur when the mushrooms have been undercooked. These other mushrooms include morels, the *Armillaria mellea* group, *Coprinus comatus*, assorted boletes, and *Pleurotus* species.

Pleurotus species can digest nematodes (meat), and it seems prudent to heat deactivate the enzymes that break down meat (you?).

Illuden M and Illuden S

The glow-in-the-dark species *Omphalotus illudens* (Eastern) and *Omphalotus olivascens* (Western) are at times mistaken for chanterelles and the result one to three hours later includes nausea, vomiting, abdominal pain, headache, feelings of exhaustion, sometimes weakness, dizziness, diarrhea, sweating, and salivation. Recovery in about twelve hours is thankfully relatively quick.

Encephalopathy

One small polypore, *Hapalopilus rutilans* (syn. *H. nidulans*) with a velvety cinnamon to pinkish orange cap grows on hardwoods and turns red to violet on application of a drop of KOH. It contains as much as 40% of dry weight polyporic acid (a derivative of dihydroxyquinone). Consumption of this species can cause kidney dysfunction and brain damage (Beug, 2012a). It is common in the East and rare in the West. The western *Hapalopilus*

salmonicolor with a yellow pink to ochre cap grows on conifers. It turns fleetingly lavender with a drop of KOH.

In Japan *Pleurocybella porrigens*, a small white oyster-like species that grows on rotting hemlocks, fruited in staggering abundance (and large size) in the fall of 2004. Fifty-nine people fell ill and seventeen died. There was one further death in 2009. All deaths involved elderly men and women on kidney dialysis (average age 70) who consumed immense amounts. They died because of brain damage (Beug, 2011). In 2011 a suspect chemical was isolated (Wakimoto, 2011) and named pleurocybellaziridine, but it was never clearly proven that this was the lethal agent.

Rash

Sometimes simply handling mushrooms can cause a poison oak-like rash in susceptible individuals. *Suillus americanus* and similar species are most often cited as the cause, but it can happen with many different mushrooms. Occurrences are rare.

Shiitake Dermatitis

Consumption of raw or lightly cooked Shiitake, *Lentinula edodes*, can result in a severe rash where the person looks and feels like they have been beaten by a whip (Beug, 2012b). The rash appears after about two days and lasts for about ten days. The cause appears to be lentinan, a heat sensitive polysaccharide that triggers the peripheral blood vessels to expand and leak. With the raw food movement, this rash has become common and now most doctors recognize the cause and know the treatment.

Blood Thinning— Szechuan Purplea

Many species of *Auricularia*, jelly fungi known as Wood Ears, and popular for texture in Asian cooking, can cause blood thinning resulting in purple bruise-like blotches and bleeding. Menstruating women can suffer horrible periods and people on prescription blood thinners need to use caution.

Gastrointestinal Distress

The most common mushroom poisonings are the result of gastrointestinal irritants. Symptoms last until the irritants are expelled. Onset

typically is in one-half to four hours and symptoms are nausea, vomiting, cramps, and diarrhea. Hospitalization may be required in severe cases. It is important to protect the kidneys from damage by replacing fluids and electrolytes—either at home with Pedialyte or something like Gatorade or with IV fluids in a hospital for severe cases.

It is very **IMPORTANT** to immediately seek medical help if initial symptoms start after at six to twenty-four hours since amatoxins may have been ingested, or if symptoms appear after four to eleven hours and there is impaired kidney function (*Amanita smithiana* possibility), or after twenty-four hours to twenty-one days AND there is severely impaired kidney function.

Be aware that delayed/associated and/or other symptoms may be due to other causes, not mushrooms. I have frequently observed problems induced simply by fear of mushroom poisoning.

With a little experience, mushrooming is exceptionally safe. You can safely taste any mushroom, just chew for a minute or two and then spit it out. Individuals have even consumed a big bite or two of Destroying Angels and not required hospitalization—but DO NOT try this yourself. Some plants are far more toxic than any mushroom. The same is true of some fish and some amphibians—merely a lick of the wrong amphibian or wrong plant and you may die and quickly. Mushrooms are much safer, and it is not hard to learn safe foraging practices.

References Cited

- Beug, M., M. Shaw, and K.W. Cochran. 2006. Thirty-plus years of mushroom poisoning: summary of the approximately 2,000 reports in the NAMA Case Registry. *McIlvainea* 16(2).
- Beug, M. 2011. *Pleurocybella porrigens* toxins unmasked. *McIlvainea* 20.
- Beug, M. 2012a. Polyporic acid in fungi. *McIlvainea* 21.
- Beug, M. 2012b. Shiitake dermatitis alert. *McIlvainea* 21.
- Beug, M. 2016. Amatoxin poisoning in North America. *McIlvainea* 25.
- Beug, M. 2021. North American mushroom poisonings and adverse reactions to mushrooms 2018–2020. *McIlvainea* 30.
- Bever, C.S., K.D. Swanson, and E.I. Hamelin, et al. 2020. Rapid, sensitive, and accurate point-of-care detection

of lethal amatoxins in urine. *Toxins* 12: 123–133. DOI: 10.33290/toxins12020123.

Bunyard, B.A. 2021. World mushroom production: an overview. *Fungi* 14(1): 8–13.

Cripps, C., M. Beug, and H. Hallen-Adams. 2024. Are morels safe to eat? *The Mycophile Quarterly* (April-June): 34–41.

Dirks, A.C., A.S. Methven, and A.N.

Miller et al. 2025. Phylogenomic insights into the taxonomy, ecology, and mating systems of the lorchel family *Discinaceae* (*Pezizales*, *Ascomycota*). *Molecular Phylogenetics and Evolution* <https://doi.org/10.1016/j.ympev.2025.108286>.

Lagrange, E., M.-A. Loriot, N.K. Chaudhary, et al. 2014. Corrected speciation and gyromitrin content of false morels linked to ALS

patients with mostly slow-acetylator phenotypes. *eNeurologicalSci* 35: 100502. DOI: 10.1016/j.ensci.2024.100502.

Wakimoto, T., T. Asakawa, S Akahoshi, T. Suzuki, K. Nagai, H. Kawagishi, and T. Kan. 2011. Proof of the existence of an unstable amino acid: pleurocybellaziridine in *Pleurocybella porrigens*. *Angewandte Chemie International Edition* 50(5): 1168. †

Supplementary Tables: Summary of Toxicology Reports from 2006–2014

Table I: Hallucinogenic Syndrome: Effects of Psilocybin and Psilocin and other Tryptamines.

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Calbovista subsculpta</i> and <i>Calvatia sculpta</i> AZ	2 Adults hours	Non-stop vivid dreaming 4 of 5 times after a meal of either species. Cooked, sometimes one glass of wine each.
<i>Conocybe cf cyanopus</i> (possible) CO	2 Children soon	Giggling, laughing, and dilated pupils (2).
<i>Gymnopilus penetrans</i> WA	Adult 5 hours	Consumed in attempt to get high but only became nauseated.
<i>Gymnopilus cf villosipes</i> WA	1 Adult 0.5 hour	Diarrhea, intestinal cramps, disorientation, nausea, dry mouth, week-long joint pain, and sweating, tingling sensations.
<i>Inocybe</i> sp. NM	1 Child ?	Agitated, hallucinating, fever, seizure, coma. Note: <i>Inocybe</i> confirmed.
Magic Mushroom tea BC	1 Adult 6 hours	Had been consuming same mushrooms over course of a year, died in a hot spring. Autopsy showed heart, lung, and intestinal lesions, brain swelling.
Magic Mushrooms plus Marijuana MT	1 Adult ?	Confrontational, agitated, pulled knife, maced, flat-lined in ambulance, coma for 2 days while screaming and thrashing, after 10 days vision still not returned.
Magic Mushroom + <i>Salvia divinorum</i> ? CO	1 Adult ?	Sweating, anxiety, hallucinations.
<i>Gymnopilus spectabilis</i> PA	1 Adult ?	Woman hit three cars while driving—three species of fungi found on seat beside her including probable <i>Gymnopilus</i> .
<i>Panaeolus cinctulus</i> HI, OH	3 Adults <1 hour ?	Consumed raw (2), dizzy (2), nausea (2), abdominal pain (2), headache (1), and diarrhea.
<i>Panaeolus</i> sp. OH?	1 Child ?	Hallucinations (lawn grazing incident).
<i>Psilocybe</i> sp.? CO	1 Adult ?	Hands tingling, back hurting, reported “hands look strange,” too terrified to work for three weeks.
<i>Psilocybe azurescens</i> OR	1 Adult 6 hours	Unable to focus eyes, jaw muscles weak, next day loss of balance, felt like being squashed.
<i>Psilocybe cubensis</i> ID, HI, WA	3 Adults 0.75 hour	Dilated pupils, tachycardic. The second case of slightly moldy mushrooms gave brief hallucinations followed by stomach pain and fatigue. Severe hyperthermia (108°F).
<i>Psilocybe</i> sp. HI, OR, MI (7)	9 Adults 0.75–8 hours	Abdominal pain after consuming a handful of dried fungi. Normal 6 hours high followed by abdominal pain, nausea, vomiting, shivering, headache. Two days of hallucinations, confusion, mild tachycardia, hypertension. Combative (3), flailing, panic attack, palpitations, chest pain, shortness of breath, insomnia, and vomiting (3).

¹Number in parentheses is number of times observed

Table II: Amatoxin Syndrome: Poisoning by Amanitins.

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Amanita ocreata</i> CA (6)	10 Adults 6–12 hours (24 hours)	Three considered for liver transplant, one transplanted, diarrhea, severe diarrhea 48 hours, abdominal cramps, nausea, vomiting (2), elevated LFTs, coagulopathy, liver failure. and death (2). One mild elevation of liver enzymes after consuming one button. One fast onset mild case from consuming one cap (nausea, abdominal pain, vomiting, diarrhea, and slightly elevated liver enzymes).
<i>Amanita cf bisporigera</i> CT, MD, MN (2), NJ (3), NY(7), OH, ON, PA, QB, VI(2), WI, ?	29 Adults, 4 Children, 5 Unknown 6–12 hours (12–18), 12.5	Hospitalized and recovered (12), hospitalized, transplanted and died a few days later from an infection; diarrhea (10), salivation, cramps (7), sweating, vomiting (18), nausea (15), abdominal pain (9), headache, three to ICU—1 child died, 1 death awaiting liver transplant, 1 death after refusing liver transplant. One death after consuming 10–15 mushrooms. Another death 2 days after two large meals. One death and one transplant—no other details. After consuming just one, person had extensive diarrhea, intestinal cramping, vomiting, nausea, and slightly elevated LFTs. Vomiting and diarrhea from one mushroom (2).
<i>Amanita bisporigera</i> ID as <i>A. virosa</i> NJ	20 Adults 17 hours	Diarrhea (20) and vomiting (20), and mildly elevated LFTs (1) from shared soup with three species of mushroom in it.
<i>Amanita bisporigera</i> in mixture of other species VA	2 Adults 2 hours	Wife not sick enough to be hospitalized. Husband profuse watery diarrhea for three days then renal failure and slow recovery.
<i>Amanita cf bisporigera</i> possible MT, MI	2 Adults 1 child ?, 5 hours	Vomiting, severe bloody diarrhea, elevated LFTs, and kidney damage.
<i>Amanita phalloides</i> BC (2), CA (8), MA, ON, OR (2), WA (3)	27 Adults, 3 children ?, 12–16 hours, 12 hours, 8–10 hours, 11 hours	14 Treated with “Santa Cruz protocol,” recovered (11). Severe coagulopathy and acute renal failure but recovered (1), liver transplant (1), and death (2); 1 liver transplant (facing \$800,000 medical bill, \$1500/mo for meds). Nausea (4), vomiting (4), diarrhea (2), weak (2), hospitalized at 44 hours with elevated liver enzymes, discharged day 17. Diarrhea (5), intestinal cramps (5), vomiting(4), and hepatitis with elevated hepatic transaminases (3). Death (1). Mild to moderate symptoms from 4 caps (1), survived liver failure (2), survived liver failure after consuming 5 large caps. One woman survived consumption of 6 specimens—had gall bladder drainage and IV silibinin. One child death but no details. Two adults survived with only supportive treatment.
<i>Amanita phalloides</i> or <i>A.</i> <i>ocreata</i> CA (4)	7 Adults ?	Caregiver and 4 elderly patients consumed meal—all four elderly died despite IV silibinin late in course of poisoning. Man presented at hospital days after mushroom consumption with liver completely necrosed and no transplant available (died?). Diarrhea, vomiting, nausea, weakness, and drowsy from one small piece.
<i>Amanita cf phalloides</i> or more likely <i>A. bisporigera</i> group OH (3 cases)	17 adults, 5 children ?, ?, ?	Laotian family of 4; 3 in intensive care, 1 treated and released; Chinese family of 5; 2 admitted, 3 treated and released; Caucasian man and 12 acquaintances ill, four with severe hepatitis
<i>Amanita “virosa”</i> (<i>bisporigera</i> group) ON	1Adult 6 hours	Presented with diarrhea and intestinal cramps. Treated and discharged. Two days later returned in fulminant hepatic failure; death day 8.
<i>Galerina marginata</i> (suspected) BC, CA, IL, ?	3 Adults ?, ?, 14 hours	Possible liver damage when mushroom mistaken for a <i>Psilocybe</i> —survived. One death from multi-organ failure (Legalon-SIL used late in course); one survived. Survived. Multiple drug abuser survived 4 days of dry heaves and diarrhea while self-medicating with oral milk thistle.
<i>Lepiota subincarnata =L.</i> <i>josserandii</i> IL, NY, QB	3 Adults ?, 9 hours	Death, no other details. Successful liver transplant, no other details. Vomiting, profuse diarrhea, intense cramps in lower limbs, metabolic acidosis, and slightly elevated LFTs.

¹Number in parentheses is number of times observed.

²Number in parentheses is one report of unusually long or short onset not included in average

Table III: Inebriation and Poisoning by Isoxazole Compounds (Muscimol, Ibotenic Acid).

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Amanita albocreata</i> QB	3 Adults ?	Typical ibotenic acid/muscimol poisoning (3), comatose for 2 days (2), convulsions, and respiratory distress.
<i>Amanita alpinicola</i> OR	2 Adults ?	Nausea.
<i>Amanita aprica</i> OR	2 Adults 4 hours	Feeling drunk, feeling but not seeing hand tremors, coma-like sleep, and incontinent.
<i>Amanita flaviconia or muscaria</i> MI	1 Child ?	Vomited after being given charcoal.
<i>Amanita gemmata</i> CA, OR	1 Adult, 1 child ?, ?	Vomiting, sweating, wild visions for several hours, and unwell for days. Child salivation, muscle spasms, drowsy, fixed dilated pupils and then unconscious.
<i>Amanita muscaria</i> CO, ID (3), ME, MI (5), MT, PA (2), VA, ?	22 Adult 0.25–1.5 hours (3–5 hours)	Hallucinations (8), sweating (5), vomiting (16), diarrhea (2), drowsy (6), bradycardia (4), rigidity, agitation, tremors, coma (4), hypotension, respiratory depression (2), nausea (6), awoke aggressive towards friends, blurred vision (4), dizzy(3), unsteady(4), and violent, hospitalized 1 week, metallic taste in mouth, like 3-day drunk, unresponsive, incoherent, and gas.
<i>Amanita muscaria</i> WY	1 Adult 2 hours	After consuming 6–7 dried specimens, male was sweating, flushed skin, slurred speech, deep sleep for 2 hours, and found dead next morning.
<i>Amanita muscaria</i> in mixed ingestion CO	2 Adult 1.5–2 hour	Agitation, rapid eye movement, dilated pupils, muscle spasm, and vomiting.
<i>Amanita muscaria</i> or <i>Amanita “pantherina”</i> MT	2 Adult 0.5 hour	Vomiting (2), trouble walking (2), confused, and very combative.
<i>Amanita muscaria</i> (partially detoxified) MT	1 Adult 1 hour	“Buzzing in hands,” abdominal pains from 1/2 cap cooked after soaking overnight in salt water.
<i>Amanita “pantherina”</i> CO(6), MN (2), MT, NM, OR (4), WA(4), MI	21 Adults, 3 children (0.5) 1–1.5 hours (one notable case where 10 mushrooms consumed produced only mild effects)	Found vomiting and twitching (3), dizzy (4), disoriented (8), drowsy (7), blurred vision (3), not breathing (2), diarrhea (2), nauseated(6), vomiting (9), cramps, muscle spasms, incontinent (1), uncoordinated (7), hallucinating (6), seizures (3), drowsy then coma, coma for 4 hours (6), agitated (1), drooling, hyperactive, sweating (3), urinating (2), awake but unresponsive (2), low blood pressure (2), hospitalized but no details (1), intubated and intensive care (3), and memory loss for about 3 months (1).

¹Number in parentheses is number of times observed.

²Number in parentheses is one report of unusually long or short onset not included in average

Table IV: Bleeding Syndromes.

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Auricularia</i> sp. TN	1 Adult 2 Days	Excessive bleeding from a small cut.
<i>Amanita “rubescens”</i> CA	2 Adults ?	Male had blood filled pimples pop up on skin on two occasions. Female had unexplained red blood cell disorder.

¹Number in parentheses is number of times observed.

²Number in parentheses is one report of unusually long or short onset not included in average

Table V: Mushrooms with Unique Toxins, Kidney Failure Common.

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Amanita smithiana</i> BC, OR (2), WA (2)	1 Child, 4 Adults ?, 6 hours	Failing kidneys and elevated creatine levels in children. Ongoing nausea and vomiting, urine stopped day three, hospitalized day, and renal problems (4).
<i>Amanita smithiana</i> + <i>Tricholoma focale</i> OR	1 Adult 5 hours	Acute renal failure with hepatic involvement after a meal of 3 <i>T. focale</i> + 1 cap of <i>A. smithiana</i> (all as “Matsutake”).

¹Number in parentheses is number of times observed

²Number in parentheses is one report of unusually long or short onset not included in average

Table VI: Gyromitrin Poisoning.

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Gyromitra esculenta</i> group BC (2), ID (2), KS, MI (13), ME, MT, WA, ?	3 Children, 19 Adults 0.3–2 hours, 2–5 hours, >6, 12 hours, (24 hours)	Intense abdominal pain (7), vomiting (10), diarrhea (8), fatigue (2), nausea (2), dizzy (2), unable to walk, weakness, nausea (4), chills, flushing, headache, light headed, tachycardia (2), LFT 1,000 (1), liver failure (placed in ICU and considered for liver transplant), elevated liver tests (2), jaundice (3), stomach ache, twitching stomach muscles on two meals in a row (2), and ALT 52. One case Alt 161, AST 139, elevated transaminases, dark red urine, bilirubin 4, and 3 days ICU. Second case elderly couple AST 64 and 81, Alt 52 and 97, bilirubin elevated, bilirubin 32 and 6.3, both 4 days in hospital. One case rapid hepatic and renal failure resulting in 1 month hospitalization.

¹Number in parentheses is number of times observed

²Number in parentheses is one report of unusually long or short onset not included in average

Table VII: Poisonings Where Effects Are Associated with Alcohol Consumption.

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Coprinopsis</i> <i>atramentaria</i> CO	1 Adult 3 hours	Vomiting, diarrhea, and heart palpitations.
<i>Coprinus comatus</i> MI	1 Adult 11 hours	Flushing.
<i>Leccinum fibrillosum</i> CO	1 Adult 3 hours	Chills, diarrhea, intestinal cramps, vomiting, nausea, and weak for three hours.
<i>Morchella elata</i> clade MT (2)	4 Adults 2 hours, 12 hours	Vomiting (3), diarrhea (3), vomited 3x, diarrhea, and dizzy (with “lots of beer”).
<i>Pholiota spumosa</i> complex WA	1 Adult ?	After several glasses of wine and mushroom meal, presented with “Serotonin syndrome”—hyper reflexive arms and legs, global seizures, unresponsive, and sweating.

¹Number in parentheses is number of times observed

²Number in parentheses is one report of unusually long or short onset not included in average

Table VIII: Gastrointestinal Syndromes from Cooked Mushrooms.

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Agaricus</i> sp. (commercial Cremini) CO, ?	2 Adults ?	Vomiting, diarrhea, and hallucinations. Second report was of nightmares following every meal with Cremini.
<i>Agaricus</i> sp. (commercial Portobellos) ?	2 Adults ?	Hospitalized multiple days each of three times they ate Portobellos.

Table VIII: Gastrointestinal Syndromes from Cooked Mushrooms. (Continued)

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Agaricus</i> sp. (commercial Cremini) CO, ?	2 Adults ?	Vomiting, diarrhea, and hallucinations. Second report was of nightmares following every meal with Cremini.
<i>Agaricus</i> sp. (commercial Portobellos) ?	2 Adults ?	Hospitalized multiple days each of three times they ate Portobellos.
<i>Agaricus xanthodermus</i> CO, MI, MT	2 Adults, 1 Child ?, 5 hours	Gastro-intestinal distress, vomiting (2), nausea, diarrhea, and elevated LFTs.
<i>Agaricus</i> sp. (Cremini) NY	1 Adult 3 hours	Diarrhea, vomiting, cramps, and nausea.
<i>Agrocybe vernalis</i> group CA	1 Child 2–4 hours	Severe abdominal pain.
<i>Amanita calyptroderma</i> CA	1 Adult 2 hours	Swelling of the tongue; two episodes with same person.
<i>Amanita vaginata</i> complex WA	1 Adult 2 hours	Severe upset stomach.
<i>Amanita verrucata</i> CA	1 Adult 3 hours	Shills, sweating, vomiting, and nausea.
<i>Apiosporina morbosa</i> and <i>Daldinia concentrica</i> MD	1 Adult ?	Stomach issues for three days after making medicinal tea.
<i>Armillaria cf solidipes</i> AB, ON (2), OR, WA	7 Adults 3–6 hours	Vomiting and nausea in one of 6 at meal. Ten hours of nausea (3), vomiting (4), diarrhea (3), sweating, dizzy (3), intestinal cramps (2), chills, nausea, headache, drowsy, weak (2), and body aches.
<i>Armillaria tabescens</i> NJ	1 Adult 5 hours	Diarrhea, vomiting, and sore stomach on the following day; bad taste in throat.
<i>Boletus castaneus</i> MA	2 Adults 2–3 hours	Gas pains (2) and diarrhea.
<i>Boletus edulis</i> CA, WA	2 Adults 4–5 hours, 0.75 hour	Diarrhea, chills, nausea, headache, and vomiting (2).
<i>Boletus huronensis</i> ME (2), VT	4 Adults 1.5–3 hours	Dry heaves then 5 hours severe vomiting and diarrhea (2). Chills, diarrhea, vomiting (2), nausea, muscle spasms, intestinal cramping, and cramps in legs, feet, and back.
<i>Boletus cf marshii</i> WA	1 Adult 12 hours	Chills, flushing, and nausea.
<i>Rubroboletus pulcherrimus</i> CA (2)	6 Adults ?, 3.5 hour	Severely ill in hospital (4); bright red blood (1). Vomiting many times over 24 hours (2), diarrhea (2), and gas.
<i>Boletus subvelutipes</i> ME	1 Adult 6 hours	Intestinal pain and dizzy.
<i>Cantharellus "cibarius"</i> ID, OR	1 Adult 2 hours	Intermittent stomach cramps lasting 5–6 hours. Second case extreme hypertension, increased visual acuity, cold intolerance, nightmares.
<i>Cantharellus formosus</i> WA (3), OR (3)	6 Adults <2 hours, 3 hours	Vomiting and sickness for hours (2 successive occasions, 2 different people), and diarrhea (2 successive occasions). Intestinal cramps, vomiting, and nausea (2 successive occasions). Nausea and drowsy. Severe abdominal pain with slightly elevated creatine and BUN (2).

Table VIII: Gastrointestinal Syndromes from Cooked Mushrooms. (*Continued*)

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Cantharellus lateritius</i> NC	1 Adult 2 hours, 2 days	The first episode was diarrhea 2 days after meal. Two hours after the second meal—vomiting for 2 hours.
<i>Cantharellus roseocanus</i> CO, AZ	1 Adult, 1 Child 1–2 hours	Vomiting (2), fever, cramps, nausea, and weakness.
<i>Chlorophyllum molybdites</i> CA (2), CO (5), HI (2), ID, IN, KS (2), MD, MI (5), MN, NB, NY (2), QB, TN (3), TX (2), WV	32 Adults, 0.5–4.5 hours (7 hours)	Abdominal cramps (11), vomiting (24), severe vomiting (4), vomiting for 24 hours, diarrhea (25), diarrhea for 24 hours (2), bloody diarrhea (2), nausea (11), sweating (6), cold sweats (3), flushing (2), fever (2), abdominal pain (4), chills for 9 hours (4), muscle spasms (3), hyperglycemia, electrolyte imbalance, salivation, appetite loss, light sensitive, prostration, weak (3), headache, discomfort, disoriented, attempting to get high (2), critically sick in hospital, ataxia, elevated creatinine, pneumonitis, and hospitalized for 1 week.
<i>Chlorophyllum rachodes</i> WA	1 Adult 3–4 hours	Vomiting and feeling awful.
<i>Clitocybe dealbata</i> NE, PA	2 Adults 1 hour	Chills (2), diarrhea, excessive salivation (2), intestinal cramps, profuse sweating (2), vomiting for 5 hours, drowsy, sneezing, and runny nose.
<i>Coprinus comatus</i> QB, AB	2 Adults 12–24 hours, 1 hour	Slight nausea, then second meal 2 days later—chills, nausea, muscle spasm, trembling, and numbness over whole body. Year previous, no problems. Second case with bloating followed by nausea on two occasions.
<i>Entoloma cf sinuatum</i> (white) NF	2 Adults 0.75 hour	Vomiting for 5 hours, vertigo, and complete loss of bowel control.
<i>Entoloma cf rhodopolium</i> HI	2 Adults 1 hour	Nausea, vomiting, and intestinal cramping.
<i>Floccularia luteovirens</i> CO	1 Adult 3–4 hours	Mild headache and felt a little drunk.
<i>Ganoderma applanatum</i> CO	1 Adult 3 hours	Small piece in tea led to tingling around mouth.
<i>Gomphus floccosus</i> + <i>Fuscoboletinus?</i> OR	1 Adult 6.5 hour	Severe vomiting, dizziness, and weakness. Assumed field guide “Not Recommended” meant it would not taste good.
<i>Grifola frondosa</i> NY	1 Adult 4 hours	Flushing, intestinal cramps, and vomiting.
<i>Hygrophoropsis aurantiacus</i> GA	1 Adult ?	Vomiting.
<i>Hypomyces lactifluorum</i> ?	1 Adult 3 hours	Dizzy, stomach cramps, sweating, and nausea.
<i>Inocybe rimosa</i> QB	3 Adults 0.5–1 hour	Chills (2), headache (2), diarrhea (2), nausea (2), sweating (3), and weakness (2).
<i>Laccaria ochropurpurea</i> IL	1 Adult 1.5 hour	Chills, vomiting, weakness, and nausea.
<i>Lactarius cf fragilis</i> OH	2 Adults 3 hours	Vomiting (2).
<i>Lactarius</i> sp. (white) NC	1 Adult 1 hour	Salivation, extensive vomiting, and diarrhea.
<i>Laetiporus cincinnatus</i> NJ	Adult Rapid	Face red and puffed, rapid pulse, difficulty walking for 2 days, and difficulty breathing for 4 days.
<i>Laetiporus conifericola</i> WA	Adult 0.75 hour	Salivation, dizzy, vomiting, and nausea for 3 hours.

Table VIII: Gastrointestinal Syndromes from Cooked Mushrooms. (Continued)

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Laetiporus gilbertsonii</i> CA (2)	2 Adults ?, 2 hours	Nausea (2), vomiting, weak, and fear of having consumed wrong mushroom.
<i>Laetiporus sulphureus</i> ?, OH, CA	7 Adults ?, 0.25 hour, 1.5 hours	Mild drowsiness every time. Vomited for hours (5) and nausea (2).
<i>Leccinum insigne</i> CO	2 Adults 5–6 hours	Chills (2), diarrhea (2), dizzy (2), intestinal cramps (2), sweating (2), vomiting (2), and nausea (2).
<i>Leccinum</i> sp. + <i>Boletus edulis</i> (?) ME	2 of 3 Adults 3 hours	Severe vomiting (2), dizzy (2), and low blood count over 3 days.
<i>Leccinum</i> sp. + <i>Russula</i> sp. CO	1 Adult 6 hours	Severe diarrhea, severe vomiting, cramps, and stomach upset lasting 36 hours (from conference mushroom tasting event).
<i>Leccinum</i> sp. CO (3)	3 Adults 3, 15 (2) hours	Diarrhea (2) and vomiting. Stomach pains and extreme weakness; fainted.
<i>Lentinula edodes</i> CA, GA, MN, NC, VA	4 Adults 2.5, 12, 48 hours	Chills, flushing, diarrhea, dizziness, intestinal cramps, sweating, weak, tingly, and numb all over; painful hands. Flagellate dermatitis (4) and fever.
<i>Leucopaxillus cf albissimus</i> HI	1 Adult 1 hour	Diarrhea and vomiting.
<i>Leucopaxillus gentianeus</i> ?	! Adult ?	Intestinal cramps, hot flashes, paranoia, and horrible taste.
<i>Lycoperdon candidum</i> MI	1 Adult 0.5 hour	Nausea and abdominal pain.
<i>Lyophyllum</i> sp. NV	1 adult 3.5 hours	Vomiting, diarrhea, and unwell for 12 hours from one bite.
<i>Macrocybe spectabilis</i> HI	1 Adult ?	Vomiting.
<i>Marasmius nigrodiscus</i> CT	1 Adult ?	Acute nausea after 0.75 tsp consumed for research.
<i>Marasmius oreades</i> OR	1 Adult 5–6 hours	Vomited three times and then more vomiting for several days.
<i>Megacollybia rodmanii</i> CT	1 Adult 5.5 hours	Diarrhea and fatigue.
<i>Morchella cf americana</i> MI, OH	2 Adults 5 hour, 0.3 hour	Diarrhea, cramps, sweating, spasms, vomiting, and nausea (had eaten for 30 years, no ill effect). One person went into anaphylactic shock 2 years in a row right after meal.
<i>Morchella</i> sp. ID (2), MI (9), WA (2), MO (2), NY	14 Adults 1–4 hours (12 hour)	Vomiting (7), diarrhea (6), nausea (6), bloating, unsteady, severe back pain, fever, confusion, abdominal pain (5), and oral irritation. Violently ill if he eats just one, after eating them for years, with no problem. Muscle weakness with tremors. One case of severe diarrhea, nausea, and abdominal pain followed by hypoglycemic shock and acute renal failure. Chills, diarrhea, intestinal cramps, sweating, vomiting, nausea, and weak on two occasions after eating them for years (3).
<i>Morchella elata</i> clade BC, CA (2), ID (2), MI, WA	8 Adults 1–8 hours	Vomiting 5 hours after meals (2 meals in a row) of morels; eaten previously for years without adverse effect. Double vision, GI upset, and tremors after years with no problem (1). Vomited and violently ill on fourth day after morels in pasta three days in a row. Nausea (4), vomiting (3), diarrhea (4), intestinal cramps (4), weakness (2), salivation, dizzy, hallucinations, chills, fever, sweating, disoriented, gas, terrible gas, and bloating.
<i>Morchella tomentosa</i> WY	1 Adult ?	Severe gastrointestinal distress and bloody stools.

Table VIII: Gastrointestinal Syndromes from Cooked Mushrooms. (Continued)

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Omphalotus illudens</i> GA, KS, ME (4), NC, NJ, NY, ON, MN	22 Adults, 1 child 0.5–3 hours	Vomiting 16x over 8 hours (2); intestinal cramps (15), vomiting (19), nausea(18), GI distress, then vomiting for 1.5 hr (1), chills (2), sweating (4), and weak (7). Weakness for 1 week, headache, and diarrhea.
<i>Paxillus involutus</i> BC	1 Adult ?	Hospitalized and no details.
<i>Pholiota squarrosa</i> group OR	1 Adult 1 hour	Bloating and cramping; vomiting.
<i>Pleurocybella porrigens</i> BC, OR	2 Adults ? 2 hours	Feeling stoned, itchy, hot and cold flashes, sweating, and vomiting then better. Second case gastrointestinal upset, no vomiting or diarrhea.
<i>Pleurotus ostreatus</i> CA, NC	2 Adults 2, 5 hours	After years of eating oyster mushrooms safely, one meal led to cramps and nausea and the next meal led to worse cramps and nausea. Second man awoke hot, heart racing, “out of body tripping,” anxious, then bloating and gas for days.
<i>Pleurotus</i> sp. CO, SD, UT	3 Adults 4–10 hours	Cramps followed by watery then bright red bloody diarrhea. Diarrhea (2), vomiting (2), dry heaves, stomach and intestinal cramps, fever (101F), and nausea after consuming 1 cup cooked.
<i>Polyporus squamosus</i> MI	1 Adult 7 hours	Nausea and vomiting.
Puffball, small CO	1 Adult 1 hour	Gas then nausea and cramping; four others not ill.
<i>Pycnoporellus alboluteus</i> CO	1 Adult 7 hours	Cramping, vomiting, diarrhea for 4–5 hours, intestinal irritation for a few days.
<i>Ramaria rasilispora var scatesiana</i> WA	1 Adult 12 hours	Diarrhea.
<i>Ramaria</i> sp. (yellow) CA	1 Adult ?	Acute gastrointestinal distress.
<i>Ramariopsis astrella</i> (form of <i>R. kunzei</i>) ME	1 Adult 5 hours	Intense upper GI distress; AST liver enzymes 10x normal after meal of 4 corals.
<i>Russula brevipes</i> NJ	1 Adult 6 hours	Vomiting and nausea.
<i>Russula cf brevipes</i> & <i>R. cf virescens</i> SC	1 Adult 3 hours	Vomiting, diarrhea, nausea, sweating, and chills.
<i>Russula decolorans</i> CO	2 Adults ?	Increasing gastrointestinal distress over several days (2).
<i>Russula</i> sp. (red) FL, CO (3), MI	6 Adults 4–6 hours	Nausea (4), diarrhea (2), and vomiting (4). Vomiting and diarrhea for 24 hours.
<i>Scleroderma cf cepa</i> OR (2), WA	4 Adults ?, <1 hour	Hospitalized with severe gastrointestinal distress. Two vomited after eating 1/2 mushroom each. Sweating, vomiting, weakness, hypotension, and malaise.
<i>Scleroderma cf citrinum</i> ME	3 Adult ?	Cramping (3), vomiting (3), and diarrhea (3).
<i>Scleroderma</i> sp. MA, ME	4 Adults 0.5–3 hours	Abdominal pain (4), sweating (3), vomiting (4), diarrhea(4), and fainting.
<i>Spathularia spathulata</i> MA	1 Adult 10 hours	Vomiting and nausea.
<i>Suillus</i> sp. WI	2 Adults 4 hours	Diarrhea (2), vomiting (2), weakness (2), headache (2), and dizzy (2).
<i>Tricholoma focale</i> CO	1 Adult ?	Severe gastrointestinal distress.

Table VIII: Gastrointestinal Syndromes from Cooked Mushrooms. (Continued)

Species and Location ¹	Number and onset ²	Symptoms ¹
<i>Tricholoma cf pessundatum</i> CO	1 Adult 0.5 hour	Gastrointestinal distress.
<i>Tuber gibbosum</i> ID	Adult 6 hours	Felt cold, stomach uneasy, diarrhea 3x, and fainting 3x.
<i>Tylopilus eximius</i> MA, ME (2), VT	4 Adult 2–3 hour	Diarrhea (3), dizzy, cramps for 24 hours, disoriented, vomiting (3), nausea (3), and weakness.
<i>Verpa bohemica?</i> MT, OR	6 Adults 0.5 hour	Feeling bloated (1), nauseated (4), lightheaded and tremors next day (1) from restaurant meal. Couple consumed large meals for several days then severe diarrhea (1) and woozy (1).

Table IX: Cases Involving Dermatitis, Spore Inhalation, or Contact Effects.

Species and Location	Ingested, handled, or spores inhaled?	Onset	Symptoms
<i>Amanita muscaria</i> or <i>A. "pantherina"</i> CO	Child hit in leg	16	Red rash lasting days on legs, arms, and face.
<i>Amanita muscaria</i> CO	Handled only	0.5 hour	Skin itching, then after 1 hour paranoid, confused, irritable, and vision changes.
<i>Amanita muscaria</i> WA	Inhaled spores	?	Dizzy, disoriented, nausea, headache, and loss of balance.
<i>Amanita phalloides</i> CA (2)	Handled, not eaten	?, 48 hours	Cold-like symptoms of irritated sinuses and sore throat; 2 persons affected. Second case: rash.
<i>Cantharellus formosus</i> OR	Ingested	3 hours	Vomited day one, next day could not hold second meal in mouth, and then noticed rash on arms, stomach, and later back.
<i>Morchella</i> sp. ?	Cooked	?	First year rash on left arm, second year rash in armpits, back of legs, and crotch area. Second person developed rash several days after three successive morel meals.
<i>Russula</i> sp. ID	Ingested raw	?	Eyes red and puffy
<i>Sparassis crispa</i> WA	Carried only	3–5 days	Hives and itching, lasting 4 days. Mushroom not eaten.

¹Number in parentheses is number of times observed.

Table X: GI Distress Cases Involving Raw, Unknown Preparation, and Spoiled Mushrooms.

Species and Location ¹	Number & onset ²	Raw or spoiled?	Symptoms ¹
<i>Agaricus augustus</i> OR	2 Adults ?	Raw?	Gastrointestinal distress (2) and weakness for days (2).
<i>Agaricus</i> (Portobello) CT	1 Adult 15 hours	Some raw and more cooked	Excessive stomach bloating, blood in urine, unwell for several days, and lost 8 pounds.
<i>Agaricus cf hondensis</i> WA	1 Adult ?	Unknown prep	Nausea and vomiting.
<i>Agaricus placomyces</i> MI	1 Child 7.5 hours	Raw	Abdominal pain, vomiting, and fever.
<i>Agaricus</i> sp. CO, WA	2 Child 1, 8 hours	Raw	Vomited (2).

Table X: GI Distress Cases Involving Raw, Unknown Preparation, and Spoiled Mushrooms. (Continued)

Species and Location ¹	Number & onset ²	Raw or spoiled?	Symptoms ¹
<i>Agaricus xanthodermus</i> CO (3), ID, NV	3 Adults 3 children 0.5–1.5 hours (10 hours)	Raw	Nausea (3), vomiting (3), diarrhea (3), abdominal cramps (2), vomiting for 6 hours, staring, high, and dizzy.
<i>Agaricus cf xanthodermus</i> CO, ID	1 Adult, 1 child 1.5 and 2 hours	Raw	Vomiting 3–4x (2) and diarrhea.
<i>Amanita frostiana</i> MA	5 Adults 2 hours	Raw	Sixteen hours of explosive vomiting (3), severe stomach cramps (3), cramps (2), and feeling awful (2) from seeking <i>A. muscaria</i> .
<i>Amanita cf "pantherina"</i> OR	1 Adult ?	Unknown prep.	Nausea, vomiting, acting strange, and aggressive.
<i>Armillaria cf mellea</i> WI, PA	2 Adults ?, 6–8 hours	Raw	Chills, diarrhea, vomiting, and weakness. Intestinal discomfort and nausea after small bite.
<i>Armillaria cf ostoyae</i> VT	1 Adult 3–5 hours	Raw	Nausea, vomiting, and diarrhea.
<i>Armillaria tabescens</i> SC, AL	3 Adults, 2 children 8–10 hours	Raw and unknown prep (1)	Diarrhea (5), intestinal cramps (4), vomiting (4), weak (4), headache, and sinus problems.
<i>Armillaria cf solidipes</i> ?	1 Adult ?	Unknown Prep	Ill.
<i>Auricularia auricula</i> CO	1 Child 1–2	Raw	Vomited 2x.
<i>Boletus edulis</i> WA	1 Adult 7 hours	Very wormy, cooked	Flushing, dizzy, vomiting, weak, headache, and stomach pains for three days.
<i>Boletus pulcherrimus</i> CA	1 Adult 1+ hours	Tasted raw. 2 times	Nausea, gastro-intestinal distress and dizzy for a few hours after tasting and spitting, or after simply touching of tongue.
<i>Boletus regius</i> OR	1 Adult 0.5 hour	Raw	Mycologist took one bite of raw mushroom to test bitterness and lips swelled for 1/2 hour.
<i>Boletus cf spadiceus</i> CO	1 Adult 5 hours	Lightly cooked	Brief nausea, vomiting, and diarrhea.
<i>Calvatia gigantia</i> WI	1 Adult 3 hours	Yellowed from 24 hours in warm room, then cooked	Diarrhea, intestinal cramps, nausea, and temporary elevated liver enzymes
<i>Cantharellus formosus</i> OR	1 Adult 1 hour	Cooked moldy mushrooms	Chills, diarrhea, hallucinations, disorientation, dizziness, and weakness.
<i>Cantharellus sp.</i> WA	1 Adult 1 hour	Raw	Chills, salivation, intestinal cramps, vomiting, and headache.
<i>Chlorophyllum cf brunneum</i> CA, WA	2 Adults ?, 16 hours	Raw?, raw?	Gastro-intestinal distress, bloody diarrhea, diarrhea, and vomiting.
<i>Chlorophyllum molybdites</i> CA (4), CO (11), FL, HI (12), KY, MI (12), MN (2), NV, NY, PA, TN	37 Adults 11 Children 0.5–5 hours	Raw (45), Unknown prep (3)	Vomiting 7x (5), vomiting 10–15x (2), vomiting for 24 hours from one bite (6), pinkish urine, vomiting (30), diarrhea (17), greenish diarrhea (2), bloody diarrhea (3), flushing (3), salivation, dizzy, intestinal cramps (10), sweating (6), disorientation (2), muscle spasms (4), chills(5), nausea(15), weakness (5), anxiety, fussy, gassy, hallucinations, bloody sputum, hypotension (2), rapid, dry heaves, headache (2), elevated creatinine, and elevated bilirubin.

Table X: GI Distress Cases Involving Raw, Unknown Preparation, and Spoiled Mushrooms. (Continued)

Species and Location ¹	Number & onset ²	Raw or spoiled?	Symptoms ¹
<i>Chlorophyllum</i> sp. MI	1 Adult 2 hours	Raw	Tingling, headache, and nausea.
<i>Clitocybe dealbata</i> NY	1 Adult 0.25 hour	Raw	Racing heart, painful spasms in back of throat, and profuse sweating.
<i>Clitocybe</i> sp. WA	1 Adult ?	Unknown prep	Vomiting.
<i>Conocybe cf rickenii</i> ID	1 Child 2 hours	Raw	Diarrhea followed by dry heaves the next day.
<i>Coprinellus micaceus</i> ?, OR	2 Child, 1 Adult ?, 8 hours	Raw	Vomiting 5–6x (2 children). Nausea, vomiting, and diarrhea.
<i>Coprinus comatus</i> MI	1 Adult 4 hours	Unknown prep	Hypotension, tachycardia, diarrhea, and vomiting.
<i>Cortinarius</i> sp. WA	1 Adult ?	Unknown prep	Gastrointestinal upset.
<i>Cortinarius cf vanduzerensis</i> WA	1 Adult ?	Unknown prep	Ill, but no details.
<i>Entoloma</i> sp. CO	1 Child 0.5 hour	Raw	Vomiting and diarrhea.
<i>Gomphus (Turbinellus) floccosus</i> WV	1 Adult “hours”	Unknown prep	Twenty hours of vomiting, diarrhea, and dizziness.
<i>Grifola frondosa</i> NC, MO	3 Adults ?, 0 hours	Unknown prep (3)	Several hours of flushing and tachycardia (2 from one case). Chills, dizziness, sweating, weakness, tingling mouth, and numb throat (2) from second case.
<i>Gymnopilus cf sapineus</i> GA	2 Adults 2 hours	Unknown prep	Explosive burning diarrhea (2).
<i>Hydnum cf repandum</i> WA	1 Adult ?	Kept 1 week in auto, eaten	Gastrointestinal cramps were so severe that victim passed out.
<i>Hypholoma fasciculare</i> WA	1 Child 5 hours	Raw	Diarrhea for 2 days; stool burns skin.
<i>Inocybe geophylla</i> CA	1 Child 14 hours	Raw	Rash and vomiting.
<i>Laccaria laccata</i>	1 Adult 6 hours	Refer 5 days after cooking	Diarrhea.
<i>Lactarius cf luculentus</i> WA	1 Adult ?	Unknown prep	Vomiting.
<i>Laetiporus gilbertsonii</i> CA	2 Adults ?	Lightly cooked	Vomiting (2) and spitting up blood (2).
<i>Laetiporus sulphureus</i> FL	1 Adult 1 hour	Unknown prep	Chills, hallucinations, dizzy, intestinal cramps, disoriented, muscle spasms, drowsy, nausea, and weakness.
<i>Leccinum cf alaskanum</i> AK	1 Adult 6–10 hours	Raw	Diarrhea, salivation, intestinal cramps, nausea, vomiting, drowsy, and weakness.
<i>Leccinum cf insigne</i> CO (4)	6 Adults 1–3 hour	Raw	Diarrhea for 24 hours, diarrhea for 6 hours (3), vomiting, nausea (2). for 5–6 hours, headache, and abdominal pain.
<i>Leccinum cf insigne</i> + <i>Suillus brevipes</i> CO	1 Child 0.5 hour	Raw	Vomited 4x.
<i>Leccinum</i> sp. CO, WA	3 Adults 0.5, ? hour	Lightly cooked and raw; dried	Nausea, vomiting 3x, watery diarrhea, and mild intestinal distress (2).

Table X: GI Distress Cases Involving Raw, Unknown Preparation, and Spoiled Mushrooms. (Continued)

Species and Location ¹	Number & onset ²	Raw or spoiled?	Symptoms ¹
<i>Lentinula edodes</i> AL, CA (3), FL, GA (2), IN, LA, NY, OR (2), SC, TX, VA, WA, ? (2)	18 Adults 0.2, 0.5 hour, 10 hours, 24–84 hours	Lightly cooked (5) raw (11) unknown (2)	Nausea (2), chills (3), flushing (3), unspecified rash (4), stinging ears and face, diarrhea (4), intestinal cramps (3), sweating, muscle spasms (2), drowsy (2), weakness (2), vomiting, diarrhea, headache, vomiting, and diarrhea from one bite raw. Flagellate dermatitis (12), odd stomach cramps, tightness in chest twice after Chinese restaurant meals, diarrhea, and intestinal cramping. Note: dermatitis lasting up to 7 days (at least 3).
<i>Lentinula edodes</i> MT	1 Adult 2 hours	Contaminated with <i>Listeria</i> ?	Flushing, salivation, dizzy, sweating, dDisoriented, muscle spasms, nausea, weakness, and painful tingling fingers.
<i>Lepiota cristata</i> PA	1 Adult 2.5 hours	Prep unknown	“Gastrointestinal distress.”
Purchased <i>Leucangium carthusianum</i> PA	4 Adults 0.25 hour	Raw infused in soup	All four suffered chills, fever, diarrhea, intestinal cramps, nausea, intense burning of GI tract, 3 days vomiting, and diarrhea. Contamination suspected.
<i>Leucoagaricus americanus</i> OH	1 Adult 4 hours	Raw	Chills, hallucinations, and disorientation.
<i>Leucoagaricus leucothites</i> ID	Child 3 hours	Raw	Vomiting.
<i>Lycoperdon candidum</i> MI	Child ?	Raw	Nausea and vomiting.
<i>Megacollybia platyphylla</i> VT	Adult 0.5 hour	Raw	Vomiting and diarrhea for 6 hours.
<i>Morchella</i> sp. ID (2), MI, MT (6)	10 Adults ?, 0.5–3 hour	Raw (6) and unknown prep (3)	Feeling unwell, nausea (5), vomiting (8), diarrhea (3), swollen nasal passages, bloated feeling, chills, burning throat, and elevated BUN.
<i>Morchella</i> sp. (almost raw, old) CA	2 Adults 1-2 hours	light cook refer 5 days	Felt ill (2), vertigo next day, hospitalized with low blood pressure, low heart rate, and 2 days later fluid and blood clots in lungs.
<i>Morchella (elata clade)</i> MT, ID (2), WA	6 Adults, 1 child 0.5–2 hours	Raw (1 case unknown prep)	Vomiting (6), diarrhea (5), watery diarrhea, and severe gastrointestinal distress.
<i>Morchella (esculenta clade)</i> MI, PA	3 Adult 0.3–0.5 hour	Raw and unknown (2)	Nausea, vomiting (3), diarrhea, hypotension, hypothermia, drowsy for 2 days (2), and vertigo (2).
<i>Omphalotus illudens</i> PA	1 Adult ?	Unknown prep	Vomiting, intestinal cramps, and diarrhea.
<i>Pholiota</i> sp. WA	1 Adult 8–10 hours	Raw?	Vomiting after mistaking for a hallucinogen.
<i>Pleurotus ostreatus</i> WA, ?	2 Adults Fast, 2 hours	Raw	Vomiting (2), nausea, and tingling in mouth.
<i>Psathyrella gracilis</i> (suspected) MI	1 Child 1–2 hours	Raw	Salivation and hallucinations.
<i>Russula</i> sp. (red) CO (2)	2 Adults 4–8 hours	Raw and unknown prep	Severe vomiting (2), diarrhea (2), and intestinal cramps (2).
<i>Sparassis crispa</i> OR	1 Adult ?	Prep unknown	Vomiting.
<i>Scleroderma cepa</i> CA	1 Adult 0.5 hour	Unknown prep	Vomited 8x, nausea, and intestinal cramps.

Table X: GI Distress Cases Involving Raw, Unknown Preparation, and Spoiled Mushrooms. (Continued)

Species and Location ¹	Number & onset ²	Raw or spoiled?	Symptoms ¹
<i>Scleroderma cf citrinum</i> OR	1 Child 1 hour	Raw	Vomiting.
<i>Scleroderma</i> sp. TX	1 Adult 1–2 minutes	?	Vomiting, diarrhea, salivation, chills, dizzy, sweating, disorientation, headache, low blood pressure, low heart rate, dry mouth, fainting, and difficulty breathing.
<i>Sparassis radicata</i> WA	1 Adult ?	Unknown prep	Severe vomiting.
<i>Suillus americanus</i> IA	1 Adult 4 hours	cleaned and refrigerated 3 days, cooked	Chills, diarrhea, intestinal cramps, vomiting, nausea, and weakness.
<i>Suillus cavipes</i> ID	2 Adults 0.1 hour	Frozen mushrooms picked, cooked	Mouth “on fire” for 0.5 hour.
<i>Suillus granulatus</i> CT	1 Adult 0.75 hour	Very buggy and old, cooked	Diarrhea and weakness.
<i>Suillus</i> sp. WA	1 Adult ?	Frozen raw, then cooked	Vomiting, diarrhea, and low blood pressure.
<i>Tricholoma myomyces</i> ON	1 Adult 4 hours	Raw	Major diarrhea.
<i>Verpa bohemica</i> ID, MI	3 Adults 0.1 hour, 1 hour	Barely cooked, raw	Immediate flushed feeling (2), vomiting(2), and vomiting for 16 hours.
<i>Volvariella esculenta</i> MI	1 Adult ?	?	Abdominal pain, nausea, vomiting, diarrhea, and respiratory depression.

¹Number in parentheses is number of times observed

XI: All Morel Cases from the entire NAMA database 1974–2022 (may include *Verpa* species which are also in the Morchellaceae). Reported in order received by NAMA.

Species and Location ¹	Number & onset ²	Symptoms ¹
<i>M. esculenta</i> MD	Adult M 3 hours	Cooked. With alcohol. Diarrhea, intestinal cramps, nausea, sweating.
<i>M. americana</i> MI	2 Adult 2.5 hrs.	Cooked. Alcohol unknown. Diarrhea, nausea, vomiting.
<i>M. americana</i> ID	1 Adult 2.5 hrs.	Cooked. Alcohol unknown. Diarrhea, intestinal cramps, nausea. Only one of six ill.
<i>M. americana</i> OH	1 Adult 2.5 hrs.	Cooked. Alcohol unknown. Nausea vomiting.
<i>M. angusticeps</i> MI	1 Adult 4.5 hrs.	Cooked. With alcohol. Vomiting, diarrhea. No problems if no alcohol at other meals.
<i>M. angusticeps</i> MI	1 Adult 4.5 hrs.	Cooked. With alcohol. Vomiting, diarrhea. No problems with no alcohol at other meals.
<i>M. americana</i> MI	child 4.5 hrs.	Cooked. Vomiting, chills, weakness.
<i>M. americana</i> WI	1 Adult 2.5 hrs.	Cooked. Alcohol unknown. Nausea, vomiting, diarrhea, abdominal discomfort. One ill, three unaffected.

XI: All Morel Cases from the entire NAMA database 1974–2022 (may include *Verpa* species which are also in the *Morchellaceae*). Reported in order received by NAMA. (Continued)

Species and Location ¹	Number & onset ²	Symptoms ¹
<i>M. angusticeps</i> CO	1 Adult 3 hrs.	Dizzy, throat constricted. Eaten for food w/ alcohol at evening meal; had eaten 3 caps for breakfast (no alcohol) w/o ill effects. Eaten by 6 other adults, w/o ill effect.
<i>M. americana</i> NC	1 Adult 2-3 hrs	Nausea, diarrhea. Eaten raw by 65-year-old female 2 days in a row. Symptoms are more severe on the 2nd day.
<i>M. angusticeps</i> MI	1 Adult 0.5 hr	Nausea, burning throat.
<i>M. "elata"</i> WA	1 adult 1 hour	Nausea, vomiting, diarrhea, weakness. Three to four caps, cooked.
<i>M. "elata"</i> OR	3 Adult 2.5 hrs.	Nausea, vomiting, diarrhea, sweating, chills, muscle spasm from cooked morels.
<i>M. 2 species black morels</i> OH	1 Adult 0.5 hr.	Nausea, vomiting, intestinal cramps, muscle spasm. Mixed morels eaten by 4, only 55-year-old male ingesting alcohol ill.
<i>M. black morel</i> OH	3 Adult 3 hrs.	Nausea, vomiting, diarrhea, weakness, intestinal cramps, flushing, dizzy. 5–6 eaten by 69-year-old male, 1 of 3, all ill. Cooked.
<i>M. black morel</i> OH	1 Adult 3 hrs.	Nausea, vomiting, diarrhea. Of the 2 people, only 1 ill. Eaten many times before, sick four times.
<i>M. importuna</i> ? WA	1 Adult 2 hrs.	Nausea, vomiting, diarrhea, intestinal cramps. Few spoonfuls eaten cooked, found in city yard.
<i>M. "elata"</i> MT	1 Adult 0.1 hr.	Immediately after eating one raw, mouth and throat felt numb and constricted, lasted 2 hr.
<i>M. americana</i> ? BC	76 Adult 0.25 hr.	Raw morels, raw <i>Agaricus</i> and raw Shiitake in salad at banquet. Symptoms of 24 of the victims: nausea 20/24, diarrhea 16/24, vomiting 12/24, intestinal cramps 7/24, bloating 4/24, hives 2/24, thirst 2, sweating, flushing, numb tongue. One serious poisoning. About half had alcohol.
<i>M. "elata"</i> BC	1 Adult ? hrs.	Nausea, dizzy, tinnitus, coma. Commercially purchased. No cooking or alcohol details known.
<i>M. americana</i> WA	1 Adult 4 hrs.	Nausea, vomiting, diarrhea, intestinal cramps, chills, weakness, muscle spasm, drowsy, dizzy. Cooked. Alcohol. Same symptoms no alcohol a week later. Five others were not ill in the first episode, 19 others not ill in second episode.
<i>M. sp.</i> MT	1 Child 2hrs.	Vomiting, flatulence in 12-year-old after eating 16 morels cooked.
<i>M. "elata"</i> OR	1Adult 3 hrs.	Nausea, vomiting, intestinal cramps, diarrhea from three frozen, then thawed and cooked morels. Previously ill from fresh cooked morels.
<i>M. americana</i> WA	1 Adult 1 hour	Vomiting, chills, severe diarrhea, headache from eight cooked morels. Alcohol unknown.
<i>M. "elata"</i> OR	1 Adult ? hour	Large amount fresh morels cooked, followed by vomiting. Part frozen and eaten month later with more severe effects.
<i>M. americana</i> WA	1 Adult ? hrs.	Adult male ate several raw caps from yard, then explosive diarrhea.
<i>M. americana</i> NJ	1 Adult 0.3 hr.	Nausea, disoriented, hands numb. Consumed two large caps. Eaten before without ill effect.
<i>M. americana</i> MO	1 Adult 2.5 hrs.	Diarrhea, intestinal cramps, nausea, vomiting. Symptoms severe for 6 hrs., nausea for 16 hrs. from six small morels raw.
<i>M. sp.</i> IL	1 Adult 5.5 hrs.	Diarrhea, nausea, intestinal cramps, sweating, vomiting, weak. Eaten cooked. Had beer. Third time in a row ill after many previous times with no ill effects.

XI: All Morel Cases from the entire NAMA database 1974–2022 (may include *Verpa* species which are also in the *Morchellaceae*). Reported in order received by NAMA. (Continued)

Species and Location ¹	Number & onset ²	Symptoms ¹
<i>M. americana</i> NY	1 Adult ? hrs.	Nausea, sneezing for 24 hours in 15 min bouts, queasy for 2 hrs. Small amount cooked. 2–3 others not ill.
<i>M. sp.</i> MT	1 Adult 10 hrs.	Nausea, dizziness, headache, tremors. Consumed cooked and with alcohol. No previous adverse reactions.
<i>M. sp.</i> MT	1 Adult 2 hrs.	Vomiting. Consumed cooked and with alcohol, 2nd person ill (the first was the 10-hour case). Person with no alcohol not ill.
<i>M. sp.</i> ID	1 Adult 0.75 hr.	Chills, nausea, intestinal cramps, salivation. Consumed 2 caps dried-rehydrated on pizza. Second person not ill. Alcohol?
<i>M. "elata"</i> OR	1 Adult 3 hrs.	Ate "pretty big meal" of them and was vomiting.
<i>M. "elata"</i> MT	1 Adult 0.5 hr.	Male commercial picker with little English ate handfuls raw.
<i>M. sp.</i> MT	2 Adult 0.5 hr.	Diarrhea, dizziness, cramps, vomiting, nausea, weakness, headache. Two ill, 5 caps each in restaurant meal, cooked.
<i>M. sp.</i> OR	1 Adult ? hrs.	Vomiting. Adult ate several raw pieces raw.
<i>M. "elata"</i> WA	1 Adult 1 hour	Diarrhea, nausea. Adult ate 4 caps raw.
<i>M. sp.</i> IL	1 Adult 1 hour	Flushing, dizzy, sweating, hallucinations, disorientation, vomiting, weakness, headache, vertigo-like symptoms and lack of muscle coordination. Eaten in a restaurant in Chicago. Morels in a cream sauce. With alcohol.
<i>M. sp.</i> MI	1 Adult 2.5 hrs.	Vomiting 3X, diarrhea, dizziness. Several beers before and after 13 mushrooms that were well-cooked.
<i>M. sp.</i> MT	1 Adult 1-2 hrs.	Nausea, vomiting and diarrhea. Alcohol? Consumed several previously frozen both raw and cooked morels.
<i>M. tomentosa</i> WY	1 Adult ? hrs.	Severe GI distress, bloody stools. Eating cooked morels once a week and this was after a second meal in one week.
<i>M. "elata"</i> MT	1 Adult 1 hour	Vomiting after eating unreported quantity raw, no alcohol.
<i>M. sp.</i> MO	1 Adult 1 hour	Chills, diarrhea, Intestinal cramps, sweating, vomiting, nausea, weak. Cooked. Has eaten for years. This year (2011) mild reaction first meal, violent reaction at a second occasion. Three others were not ill.
<i>M. "elata"</i> ID	3 Adult 2 hours	Nausea and vomiting. Three adults consumed raw black morels at three separate times over 24-hour period.
<i>M. sp. or Verpa sp.</i> MI	1 Adult 1 hour	Vomiting for 16 hours after consumption raw. Alcohol and amount are not indicated.
<i>M. sp. or Verpa</i> MI	1 Adult 3 hours	Vomiting for 4 hours. Cooked. No alcohol.
<i>M. sp. or Verpa</i> MI	1 Adult 4 hours	Vomiting, abdominal pain, diarrhea for 12 hours from unknown quantity of cooked morels, no alcohol. Five are not ill.
<i>M. sp. or Verpa</i> MI	1 child 0.3 hrs.	Vomiting for 4 hours.
<i>M. sp. or Verpa</i> MI	1 Adult 2.5 hrs.	Vomiting for 12 hours, abdominal pain from cooked morels with alcohol.
<i>M. sp. or Verpa</i> MI	1 Adult 0.5 hr.	Diarrhea, lips and face numb. With alcohol, cooked.

XI: All Morel Cases from the entire NAMA database 1974–2022 (may include *Verpa* species which are also in the *Morchellaceae*). Reported in order received by NAMA. (Continued)

Species and Location ¹	Number & onset ²	Symptoms ¹
<i>M. sp.</i> or <i>Verpa</i> MI	1 child 12 hrs.	Agitation, vomiting. Cooked, the rest of family were not affected.
<i>M. sp.</i> or <i>Verpa</i> MI	1 Adult 3.5 hrs.	Diarrhea, vomiting from cooked morels, no other details.
<i>M. sp.</i> or <i>Verpa</i> MI	1 Adult <1 day	Diarrhea, abdominal pain, vomiting from cooked morels, no alcohol. One other not affected.
<i>M. sp.</i> or <i>Verpa</i> MI	1 Adult 15 hrs.	Vomiting for 1 day. Cooked, consumed with alcohol. One other is not ill.
<i>M. sp.</i> MI	1 Adult 2 hours	Diarrhea and vomiting. Cooked. Alcohol is not mentioned. One other is not ill.
<i>M. sp.</i> MI	1 Adult 4 hrs.	Nausea, bloating, unsteady. Consumed 3-4 morels, cooked. Consumed alcohol.
<i>M. sp.</i> ID	1 Adult 2 hrs.	Nausea, vomiting, severe back pain after several bowls full of cream soup. Well cooked, no alcohol.
<i>M. sp.</i> MI	1 Adult >8 hrs.	Fever, vomiting, nausea, diarrhea after 10 mouthfuls. No alcohol.
<i>M. sp.</i> MI	1 adult 2 hrs.	Confusion, vomiting, and diarrhea lasted about 8 hours. Alcohol is not indicated. Cooked.
<i>M. "elata"</i> MI	1 Adult 3 hrs.	Nausea, vomiting, diarrhea, cramps, weak. Alcohol is not indicated. Cooked.
<i>M. sp.</i> MI	1 Adult 3 hrs.	Abdominal pain, nausea, vomiting, oral irritation. Cooked, no alcohol. Eaten before with same effect.
<i>M. sp.</i> MI	1 Adult 4 hrs.	Diarrhea, feeling sick from cooked morels. No alcohol. Previously no problems.
<i>M. sp.</i> ID	1 Adult ? hrs.	Nausea, vomiting, elevated BUN Creatine AST and ALT normal. No cooking or alcohol information.
<i>M. sp.</i> NY	1 Adult 1.75 hrs.	Chills, diarrhea, dizziness, intestinal cramps, sweating, drowsy, weak, light-headed, flatulence, shaking/trembling, tingling. Serious for 24 hours. Cooked, no alcohol. Previously no problems with morels.
<i>M. americana</i> NY	1 Adult 1 Child 0.5 hr.	Immediately tired and slept for several hours. Awoken by severe vomiting, then had vertigo. Slept the entire following day. Two ill, two not ill. Amount, cooking and alcohol not indicated.
<i>M. eximia</i> group (burn morels) WA	1 Adult 4-8 hrs.	Chills, fever, diarrhea, hallucinations, salivation, dizziness, intestinal cramps, sweating, disorientation, vomiting, drowsiness, nausea, weakness, headache, depression, malaise for the following two days. One of the two people was affected. Cooked, no alcohol, <1/4 ounce consumed.
<i>M. eximia</i> group CA	1 Adult 1 hour	Vomiting, nausea, weakness. Ate about 6 ounces of cooked burn morels. Had eaten these before with no bad effects.
<i>M. snyderi</i> WA	1 Adult 2 hrs.	Watery diarrhea 2 hours after eating 3 mushrooms that were big and old. No cooking or alcohol information.
<i>M. americana</i> OH	1 Adult 1.5 hrs.	Flushing, dizziness, disorientation, drowsiness, rash and areas with rash were numb, burning, swelling. Consumed dime-sized piece raw. No alcohol.
<i>M. americana</i> ID	1 Adult 11.5 hrs.	Chills, diarrhea, intestinal cramps, weakness. Ate 10–12 lightly cooked caps, never been sick from them before, the other diner did not get sick, Alcohol consumed.

XI: All Morel Cases from the entire NAMA database 1974–2022 (may include *Verpa* species which are also in the *Morchellaceae*). Reported in order received by NAMA. (Continued)

Species and Location ¹	Number & onset ²	Symptoms ¹
<i>M. americana</i> OR	1 Adult 1 hour	Dizziness, intestinal cramps, disorientation, muscle spasms, elevated heart rate 150 bpm for an hour, tremors, convulsions, dilated pupils, high blood pressure for 6 months after. Ate 1/2 cup sliced and well-cooked mushrooms—had eaten before with no ill effects—3 other people ate mushrooms with no ill effects.
<i>M. populiphila</i> OR	1 Adult 2 hours	Chills, flushing, diarrhea, intestinal cramps, nausea, sensitivity to sound and smell, body numbness, anxiety. Ate 1/8 pound or less of well-cooked mushrooms—had eaten before with no ill effects. Another person ate mushrooms and was not adversely affected. Alcohol consumed.
<i>M. americana</i> MD	1 Adult 3 hours	Diarrhea, intestinal cramps, nausea, sweating. Eaten cooked food. Prior and later ingestions of lesser amounts without reaction. Alcohol use not indicated.
<i>M. americana</i> MI	1 Adult 2.3 hrs.	Diarrhea, nausea, vomiting. Cooked. Quantity and alcohol use are not indicated.
<i>M. americana</i> ID	1 Adult 2.5 hrs.	Diarrhea, nausea, vomiting. Cooked. Quantity and alcohol use are not indicated. Five others were not ill.
<i>M. americana</i> OH	3 Adult 2.5 hrs.	Nausea, vomiting lasting 2 hr. Eaten cooked for food, “cupful.” Three affected.
<i>M. sp.</i> IN	1 Adult 2.5 hrs.	Diarrhea, intestinal cramps, vomiting, nausea. Ate about 1/2 cup or so (maybe 4 small mushrooms) of well-cooked mushrooms; 2 people ate mushrooms but only 1 became ill. Third time that victim has had these mushrooms and had same reaction, but this was much worse. Alcohol consumed.
<i>M. sp.</i> IA	1 Adult 1 hour	Diarrhea, salivation, dizziness, intestinal cramps, sweating, vomiting, nausea, weakness, tachycardia, systolic hypertension. Ate 10 small lightly-cooked mushrooms, Alcohol not indicated.
<i>Morchella</i> sp.; grey and half free PA	1 Adult 3 hours	Chills, flushing, fever, dizziness, intestinal cramps, sweating, vomiting, drowsiness, nausea, weakness, headache, violent dry heaving. Ate 7 well-cooked mushrooms—had eaten before with no effects. Other person who did not consume alcohol did not experience ill effects.



FUNGI Magazine

Just in case you can't get enough...

Complete sets of Volumes 1-10 or 11-15 — every issue plus index!
 USB Archive I: Volumes 1-10 | USB Archive II: Volumes 11-15
\$50.00 USA | \$60.00 Foreign
(Includes Shipping)

Scan to order or visit our website at:
fungimag.com

\$50⁰⁰ each