Preplanned Studies

Mushroom Poisoning Outbreaks — China, 2024

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Summary

What is already known about this topic?

Mushroom poisoning is a serious food safety problem in China. Since 2019, China CDC has conducted a series of investigations into mushroom poisoning outbreaks. These investigations have revealed the spatial and temporal distribution patterns of mushroom poisoning and the diversity of poisonous mushroom species in China.

What is added by this report?

In 2024, China CDC investigated 599 mushroom poisoning incidents across 28 provincial-level administrative divisions (PLADs). These incidents affected 1,486 patients and resulted in 13 deaths, with a case fatality rate of 0.87%. Investigators identified 110 poisonous mushroom species causing 7 distinct clinical disease types, including 8 species newly documented as poisonous mushrooms in China.

What are the implications for public health practice?

Timely species identification, toxin detection, and clinical type confirmation are crucial for effective mushroom poisoning control and proper patient treatment.

ABSTRACT

Introduction: Mushroom poisoning represents a significant food safety concern in China. Over the past decade, China has established an effective mushroom poisoning control and prevention system involving government agencies, clinicians, CDC experts, and mycologists.

Methods: Under the system of mushroom poisoning control and prevention, information of mushroom poisoning incidents were systematically collected, with identifing species, detecting toxins, and analyzing the spatial and temporal distribution characteristics and species diversity.

Results: In 2024, the China CDC investigated 599 mushroom poisoning incidents across 28 provincial-level administrative divisions (PLADs), involving 1,486 patients and resulting in 13 deaths, with a case fatality rate of 0.87%. The number of cases per incident ranged from 1 to 14 (median=2), with 11 incidents involving more than 10 patients. Among these cases, 50 patients (including 2 fatalities) from 17 incidents consumed poisonous mushrooms purchased from markets, 37 patients from 14 incidents were poisoned after consuming dried mushrooms, and 15 patients from 10 incidents consumed uncooked wild mushrooms. Temporal analysis revealed that mushroom poisoning incidents occurred throughout the year, with the highest frequency between June and October, peaking in June. Geographically, incidents were reported in 28 PLADs, with 13 PLADs reporting more than 10 incidents. Sichuan, Yunnan, Hunan, Guizhou, and Chongqing were the five most affected regions. Deaths were reported in Guizhou (5 deaths), Sichuan (2 deaths), Chongqing (2 deaths), Heilongjiang (2 deaths), Hunan (1 death), and Jiangsu (1 death). A total of 110 poisonous mushroom species causing 7 distinct clinical syndromes were identified, including 8 newly documented poisonous species, bringing the total number of mushroom species involved in poisoning incidents in China to approximately 246 by the end of 2024. The five most lethal mushrooms were *Amanita exitialis*, *A. molliuscula*, *A. subpallidorosea*, *Lepiota brunneoincarnata*, and *Russula subnigricans*, each causing 2 deaths. *Chlorophyllum molybdites* was responsible for the highest number of poisoning incidents (147 incidents affecting 269 patients). *Paxillus obscurosporus*, which causes hemolysis, was identified in a poisoning incident for the first time.

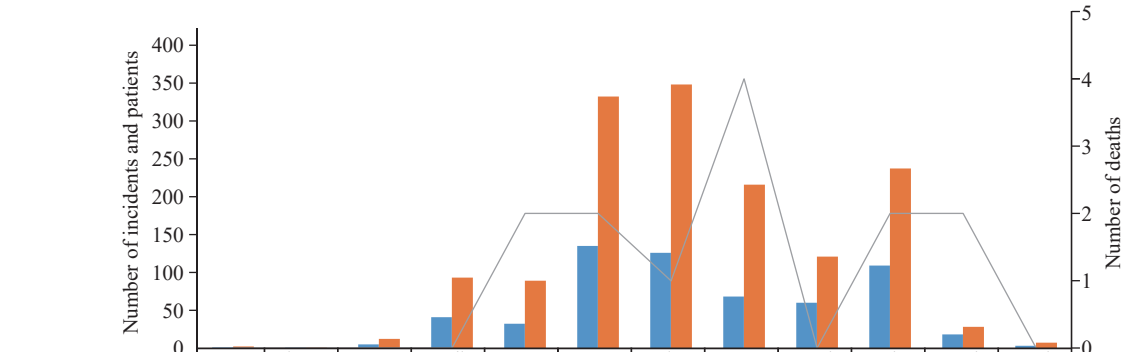
Conclusions: The persistent severity of mushroom poisoning in China underscores the need for continued public education efforts, strengthened market supervision, and enhanced collaboration across departments and disciplines to reduce the incidence of mushroom poisoning.

Mushroom poisoning represents a significant food safety challenge in China. Over the past decade, China has established an effective mushroom poisoning control and prevention system that integrates government agencies, clinical physicians, China CDC experts, and mycologists (*1*–*5*). Within this system, CDC personnel and hospital staff promptly collect mushroom specimens, photographs, and biological samples such as blood and urine immediately following poisoning incidents. Mushroom specimens and photographs are forwarded to mycologists for species identification, while mushroom and biological samples are sent to CDC experts and hospital professionals for toxin detection. Based on species identification, toxin analysis, and clinical manifestations, patients receive accurate diagnoses and timely treatment (*1*–*5*). In 2024, the China CDC investigated 599 mushroom poisoning incidents across 28 provincial-level administrative divisions (PLADs), involving 1,486 patients and resulting in 13 deaths, yielding a case fatality rate of 0.87%. Investigators successfully identified 110 poisonous mushroom species, including 8 newly documented species, associated with 7 distinct clinical manifestations. This brings the total number of mushroom species linked to poisoning incidents in China to 246 by the end of 2024.

In 2024, the number of cases per mushroom poisoning incident ranged from 1 to 14, with a median of 2 cases per incident. Among these incidents, 11 involved more than 10 patients. Notably, 50 patients (including 2 fatalities) from 17 incidents consumed poisonous mushrooms purchased from markets, while 37 patients from 14 incidents were poisoned after consuming dried mushrooms. Additionally, 15 patients from 10 incidents became ill after consuming uncooked wild mushrooms (Supplementary Table S1, available at https://weekly.chinacdc.cn/).

Temporal distribution analysis revealed that mushroom poisoning incidents occurred throughout the year, with the highest frequency observed between June and October (498 incidents, 1,254 patients, and 9 deaths), peaking in June (135 incidents, 332 patients, and 2 deaths). The first death occurred on May 2 in Chongqing. The highest mortality was recorded in August (4 deaths), followed by May, June, October, and November (2 deaths each) (Figure 1).

Regarding geographical distribution, mushroom poisoning incidents were reported in 28 PLADs, with 13 PLADs recording more than 10 incidents. Sichuan, Yunnan, Hunan, Guizhou, and Chongqing PLADs were the 5 most affected regions (Table 1). Deaths were reported in 6 PLADs: Guizhou (5 deaths), Sichuan (2 deaths), Chongqing (2 deaths), Heilongjiang (2 deaths), Hunan (1 death), and Jiangsu (1 death) (Table 1). Southwestern China (Sichuan, Yunnan, Guizhou, and Chongqing) was the most severely affected region, with 321 incidents, 882 patients, and 9 deaths, followed by Central China (Hunan, Hubei, Henan, and Jiangxi) with 126 incidents, 235 patients, and 1 death. East China (Zhejiang, Anhui, Jiangsu, Fujian, and Shanghai) reported 59 incidents, 130 patients, and 1 death; Northwestern China (Ningxia, Qinghai, Xinjiang, and Shanxi) had 31 incidents, 68 patients, and no deaths; Southern China (Guangxi, Guangdong, and Hainan) recorded 30 incidents, 77 patients, and no deaths; Northern China (Hebei, Shandong, Shanxi, Beijing, and Inner Mongolia) had 22 incidents, 62 patients, and no deaths; and Northeastern China (Heilongjiang, Liaoning, and Jilin) reported 10 incidents, 32 patients,



	January	February	March	April	May	June	July	August	September	October	November	December
Number of incidents	1	1	5	41	32	135	126	68	60	109	18	3
Number of patients	2	1	12	93	89	332	348	216	121	237	28	7
Number of deaths	0	0	0	0	2	2	1	4	0	2	2	0

FIGURE 1. Monthly distribution of mushroom poisonings in China, 2024.

TABLE 1. Geographical Distribution of Mushroom Poisoning Incidents in China, 2024.

PLADs	Number of incidents	Number of patients	Deaths	Mortality (%)
Sichuan	116	307	2	0.65
Yunnan	99	281	0	0
Hunan	99	174	1	0.57
Guizhou	54	173	5	2.89
Chongqing	52	121	2	1.65
Ningxia	26	48	0	0
Zhejiang	23	52	0	0
Hubei	23	49	0	0
Guangxi	16	56	0	0
Anhui	12	34	0	0
Jiangsu	12	24	1	4.17
Guangdong	12	13	0	0
Fujian	11	18	0	0
Hebei	8	27	0	0
Heilongjiang	8	20	2	10.00
Shandong	7	19	0	0
Shanxi	3	6	0	0
Qinghai	2	15	0	0
Hainan	2	8	0	0
Henan	2	7	0	0
Beijing	2	5	0	0
Inner Mongolia	2	5	0	0
Jiangxi	2	5	0	0
Xinjiang	2	3	0	0
Liaoning	1	8	0	0
Jilin	1	4	0	0
Shaanxi	1	2	0	0
Shanghai	1	2	0	0
Total	599	1486	13	0.87

Abbreviation: PLADs=provincial-level administrative divisions.

and 2 deaths. Detailed information for each PLAD is presented in Table 1.

In 2024, a total of 110 species of poisonous mushrooms were identified in mushroom poisoning cases, resulting in 7 distinct clinical syndromes. Among these, 8 species (*Lactarius trivialis*, *Lactifluus bertillonii*, *Ligymnopus moseri*, *Marasmius maximus*, *Russula insignis*, *Tricholoma olivaceum*, *T. ustaloides*, and *Tylopilus vinosobrunneus*) causing gastroenteritis were newly documented as poisonous mushrooms in China (*1*–*7*) (Figure 2K–O, Supplementary Table S1).

The five most lethal mushrooms were *Amanita exitialis*, *A. molliuscula*, *A. subpallidorosea*, *Lepiota brunneoincarnata*, and *Russula subnigricans* (Figure 2A–E), each responsible for 2 deaths (Supplementary Table S1). *Chlorophyllum molybdites* (Figure 2I) caused the highest number of poisoning incidents (147 incidents affecting 269 patients), either alone or in combination with other species. This species also exhibited the widest geographical distribution (found in 16 PLADs) and the longest active period (from late March to late November).

In 2024, 8 species of *Amanita*, 1 species of *Galerina*, and 1 species of *Lepiota* were identified as causes of acute liver failure in China (Supplementary Table S1). Among these, *Amanita exitialis*, *A. molliuscula*, *A. subpallidorosea*, and *Lepiota brunneoincarnata* (Figure 2A–D) were the most dangerous species, each causing 2 deaths. The three mushroom species responsible for the highest number of incidents were *Galerina sulciceps* (15 incidents with 26 affected patients), *Lepiota brunneoincarnata* (14 incidents with 32 affected patients and 2 deaths), and *Amanita molliuscula* (7 incidents with 19 affected patients and 2 deaths).

Two species, *Amanita oberwinklerana* and *A. pseudoporphyria*, were identified as causes of acute kidney injury in 2024 (Supplementary Table S1). *A. oberwinklerana* was the most prevalent species, present in 10 incidents involving 30 patients, either alone or in combination with other species. *A. pseudoporphyria* (Figure 2F) resulted in 1 fatality across 6 incidents affecting a total of 19 patients.

Russula subnigricans (Figure 2D) caused 15 cases of rhabdomyolysis, affecting a total of 37 patients and resulting in 2 fatalities, either independently or in conjunction with other mushrooms. *Paxillus obscurosporus* (Figure 2G) along with 4 other species caused hemolysis in one incident affecting 5 patients in late July in Chongqing. Additionally, *Cordierites frondosus* (Figure 2H) caused photosensitive dermatitis when consumed with edible *Auricularia* sp., resulting in 1 incident with 3 patients in Yunnan during mid-June (Supplementary Table S1).

A total of 70 mushroom species causing gastroenteritis were identified in China in 2024 (Supplementary Table S1). Among these, 8 were newly identified as poisonous mushrooms and have been added to the Chinese poisonous mushroom list (*1*–*7*). The three most commonly encountered species in this category were *Chlorophyllum molybdites* (Figure 2I, appeared in 147 incidents affecting 269 patients), *Russula* aff. *japonica* (appeared in 40 incidents affecting

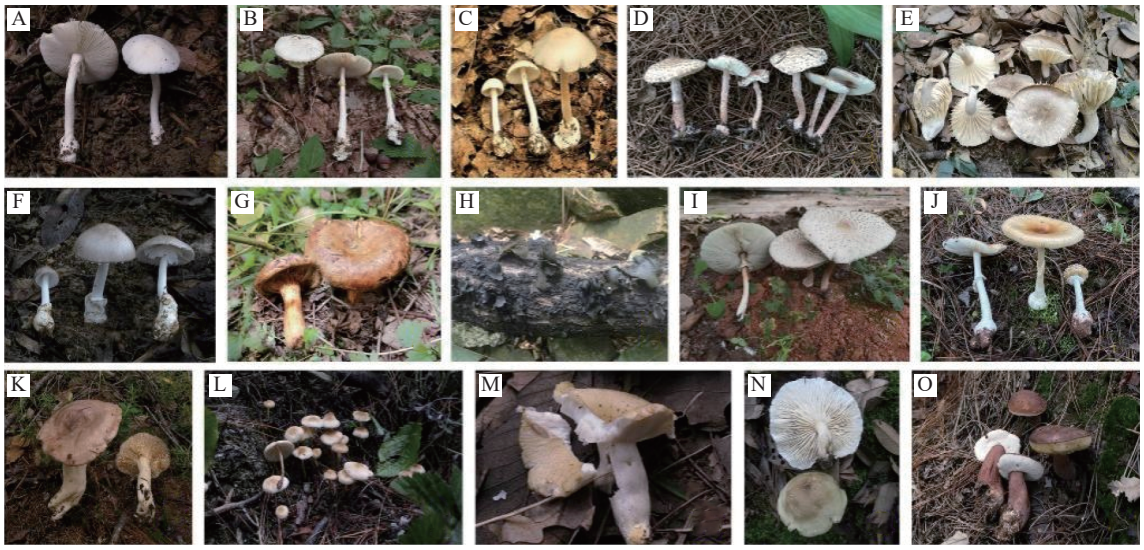


FIGURE 2. Fifteen important poisonous mushrooms were discovered from mushroom poisoning incidents in China, in 2024, which caused deaths, resulting in the highest number of different types of poisoning or newly added to the Chinese poisonous mushroom list. (A) *Amanita exitialis*, (B) *A. molliuscula*, (C) *A. subpallidorosea*, (D) *Lepiota brunneoincarnata*, (E) *Russula subnigricans*, (F) *A. pseudoporphyria*, (G) *Paxillus obscurosporus,* (H) *Cordierites frondosus*, (I) *Chlorophyllum molybdites*, (J) *Amanita subglobosa*, (K) *Lactarius trivialis*, (L) *Marasmius maximus*, (M) *Russula insignis*, (N) *Tricholoma olivaceum*, (O) *Tylopilus vinosobrunneus*.

92 patients), and *Entoloma omiense* (appeared in 31 incidents affecting 105 patients).

In 2024, 25 mushroom species associated with psycho-neurological disorders were identified in China (Supplementary Table S1). The three most frequently encountered species were *Amanita subglobosa* (Figure 2J, 14 incidents affecting 35 patients), *Anthracoporus nigropurpureus* (11 incidents affecting 24 patients), and *Gymnopilus dilepis* (8 incidents affecting 13 patients).

DISCUSSION

In 2024, the number of mushroom poisoning incidents and patients ranked second highest in the past six years, though with the fewest deaths (*1*–*5*). Among the 2024 poisoning incidents, 110 poisonous mushroom species were successfully identified, with 84 previously documented (*1*–*5*), bringing the total number of mushrooms involved in poisoning incidents in China to approximately 246 by the end of 2024. Unlike previous years (*1*–*5*), the most dangerous mushrooms causing fatalities in 2024 were more diverse, with 4 species each causing 2 deaths. Acute liver failure and rhabdomyolysis were the most lethal clinical presentations, with the remaining deaths attributed to acute renal failure and hemolysis. Most poisoning incidents resulted from mushrooms causing gastroenteritis and psycho-neurological disorders, from which patients typically fully recovered.

Our studies (*1*–*5*) found that patients from many incidents consumed mixed mushrooms, sometimes including poisonous species causing different clinical syndromes. This highlights the importance of comprehensive investigations by CDC staff, physicians, and mycologists to collect all suspicious mushroom samples to avoid missing potentially dangerous species.

The temporal distribution analysis revealed that mushroom poisonings in 2024 primarily occurred from June to October, a shorter period compared to 2019–2023 (*1*–*5*). Similar to 2022 and 2023, the peak of mushroom poisonings in 2024 was observed in June (*1*–*5*). Unlike previous years (*1*–*5*), Sichuan had the highest number of incidents among all PLADs in 2024.

In 2024, among species causing acute liver failure, *Amanita exitialis* was first discovered in Chongqing, resulting in 1 incident involving 4 patients and 2 deaths (*1*–*6*,*8*–*9*). *Amanita molliuscula*, first described in China in 2016 (*8*–*9*), was identified in mushroom poisoning incidents (7 incidents, 19 affected patients, and 2 deaths) for the first time, expanding its known distribution from its type locality in Shanxi to include Hubei, Henan, Jilin, and Heilongjiang.

In 2024, only *Amanita oberwinklerana* and *A. pseudoporphyria* were identified as causes of acute

kidney injury, similar to findings in 2023 but fewer than observed during 2019–2022 (*1*–*5*). *Russula subnigricans* caused 15 incidents of rhabdomyolysis, equal to the number reported in 2019 and 2022, less than in 2021 (16 incidents), and more than in 2020 (12 incidents) and 2023 (14 incidents) (*1*–*5*). Notably, *Paxillus obscurosporus* was documented as a cause of hemolysis in poisoning incidents for the first time (*2*–*4*).

In 2024, we identified 70 species causing gastroenteritis, including 8 newly recorded poisonous mushrooms, exceeding the number identified in each of the previous five years (*1*–*5*). Additionally, 25 mushroom species associated with psycho-neurological disorders were documented, fewer than in 2020 (28 species), 2022 (32 species), and 2023 (33 species), but more than in 2019 (18 species) and 2021 (22 species) (*1*–*5*).

This study represents only incidents that were investigated through our collaborative system comprising CDC staff, doctors, and mycologists. It is important to note that numerous poisoning incidents lacked mushroom specimens or even photographic documentation, making it impossible to confirm the exact species of poisonous mushrooms involved and thereby hindering targeted treatment for affected patients.

To reduce the incidence of mushroom poisoning, we advocate for closer collaboration among CDC staff, physicians, and mycologists. This includes developing diverse and accessible educational materials about poisonous mushrooms and conducting extensive public education campaigns to raise awareness about mushroom safety.

Conflicts of interest: No conflicts of interest.

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SUPPLEMENTARY MATERIAL

SUPPLEMENTARY TABLE S1. Mushroom species implicated in cases of poisoning and their spatial and temporal distribution in China, 2024.

Mushroom species	Number of incidents	Number of patients	Deaths	Case fatality (%)	Spatial and temporal distribution
Acute liver failure					
Amanita exitialis	6	23	2	8.70	May 2, Chongqing; May 29 to July 18, Yunnan
Amanita fuliginea	3	6	0	0.00	June 11 to 26, Hunan, Anhui
Amanita fuliginea, *A. fritillaria*[P]	1	2	0	0.00	June 26, Anhui
Amanita fuligineoides	1	1	0	0.00	June 16, Yunnan
Amanita molliuscula	7	19	2	10.53	August 22 to 31, Heilongjiang (2 incidents, 4 patients, 2 deaths ate mushrooms bought from the market)
Amantia rimosa	1	1	0	0.00	June 13, Hunan
Amantia rimosa and *Amanita* sp.[U]	1	1	0	0.00	June 30, Zhejiang
Amantia rimosa, *Russula* sp.[U] and *Agaricus* sp.[U]	1	1	0	0.00	June 29, Zhejiang
Amanita subfuliginea	1	3	0	0.00	May 19, Chongqing
Amanita subjunquillea	4	12	0	0.00	April 29, Hebei (dried mushrooms, collected in August to September, 2023); July 9 to August 19, Chongqing, Yunnan, Hebei
Amanita subjunquillea and *Lactarius cremicolor*[U]	1	4	0	0.00	August 16, Hebei
Amanita subpallidorosea	3	7	2	28.57	March 19, Chongqing (dried mushrooms, collected in 2023); October 18 and November 10, Yunnan, Guizhou
Amanita subpallidorosea and *A. parvipantherina*[P]	1	3	0	0.00	October 27, Sichuan
Amanita subpallidorosea, *A. citrina*[P], *Stropharia aeruginosa*[G], *Agaricus parasubrutilescens*[U], and *Lepiota* sp.[U]	1	2	0	0.00	November 7, Yunnan
Amanita sp.	1	4	1	25.00	June 19, Sichuan
Galerina sulciceps	13	23	0	0.00	May 2 to 9, Chongqing and Sichuan; October 16 to December 8, Sichuan, Yunnan, Hubei, Chongqing
Galerina sulciceps and *Pholiota microspora*[U]	1	1	0	0.00	November 4, Sichuan
Galerina sulciceps and *Gymnopilus* sp.[U]	1	2	0	0.00	November 17, Sichuan
Lepiota brunneoincarnata	12	29	2	3.90	June 9 to 26, Xinjiang, Guizhou; July 9, Shandong; August 13 to October 19, Ningxia, Beijing, Chongqing (poisoned in Ningxia), Inner Mongolia, Jiangsu
Lepiota brunneoincarnata, *Pseudosperma arenarium*[P], *Inocybe nobilis*[U] and *I. pallida*[U]	1	1	0	0.00	August 15, Ningxia
Lepiota brunneoincarnata, *Leucoagaricus barssii*[U], and *Agrocybe dura*[E]	1	2	0	0.00	August 17, Ningxia
Rhabdomyolysis					
Russula subnigricans	13	33	2	6.06	July 6 to October 20, Yunnan, Guizhou, Zhejiang, Sichuan, Fujian, Anhui, Guangxi
Russula subnigricans and *Amanita pallidorosea*[ALF]	1	1	0	0.00	July 1, Guizhou
Russula subnigricans, *Inosperma muscarium*[P], *Russula* sp.[U], and *Ramaria* sp.[U]	1	3	0	0.00	June 17, Yunnan
Acute kidney injury					
Amanita oberwinklerana	5	14	0	0.00	May 9 to October 15, Hunan, Yunnan, Shandong, Sichuan
Amanita oberwinklerana and *A. subglobosa*[P]	1	2	0	0.00	July 30, Shanxi

Continued

Mushroom species	Number of incidents	Number of patients	Deaths	Case fatality (%)	Spatial and temporal distribution
Amanita oberwinklerana, *A. subglobosa*[P], *Gymnopus similis*[G], *Xerula sinopudens*[E], *Lactarius mirus*[U], *Agaricus luteopallidus*[U], *Russula* sp.[U], *Entoloma* sp.[U]	1	7	0	0.00	July 2, Guizhou
Amanita oberwinklerana and *Russula flavescens*[G]	1	2	0	0.00	August 26, Shanxi
Amanita oberwinklerana and *Russula* cf. *olivacea*[E]	1	2	0	0.00	July 26, Sichuan
Amanita oberwinklerana, *A.* cf. *princeps*[E], *Agaricus* sp.[U], and *Russula* sp.[U]	1	3	0	0.00	July 19, Sichuan
Amanita pseudoporphyria	3	10	1	10.00	May 2 to August 16, Guangdong, Guizhou, Hunan
Amanita pseudoporphyria and *Russula flavescens*[G]	1	5	0	0.00	August 19, Guangxi
Amanita pseudoporphyria and *Tylopilus* sp.[U]	1	3	0	0.00	July 23, Shandong
Amanita pseudoporphyria, *A. sinocitrina*[P], *A. sinesis*[E], *A. ochracea*[E], *Lactarius vividus*[E], *Cantharellus* sp.[E], *Amanita* spp.[U], *Marasmius* sp.[U] and *Russula* sp.[U]	1	1	0	0.00	June 25, Zhejiang
Gastroenteritis					
Agaricus tibetensis	1	5	0	0.00	July 15, Sichuan
Baorangia major	1	3	0	0.00	August 20, Hunan (dried boletes)
Baorangia aff. *pseudocalopus*, *Lactifluus glaucescens*[G], *Russula rufobasalis*[G], *Suillus pinetorum*[G], *Tylopilus neofelleus*[G], *Anthracoporus nigropurpureus*[P], *A. sinensis*[E], *Russula rosea*[E], *R. huotanjun*[E], *Entoloma* aff. *cyanoniger*[U], and *Lactarius gloeocarpus*[U]	1	2	0	0.00	May 14, Hunan (dried mushrooms)
Boletellus indistinctus	2	8	0	0.00	June 25 and 26, Sichuan and Yunnan
Chiua virens and *Sutorius eximius*[G]	1	1	0	0.00	July 14, Yunnan
Chlorophyllum demangei and *Entoloma* sp.[U]	1	7	0	0.00	July 19, Sichuan
Chlorophyllum globosum	1	3	0	0.00	June 20, Sichuan
Chlorophyllum cf. *globosum*	13	36	0	0.00	May 18 to October 26, Sichuan, Chongqing
Chlorophyllum cf. *globosum*, *Agaricus xanthodermus*[G], *Gymnopilus dilepis*[P], and *Marasmius* sp.[U]	1	2	0	0.00	July 11, Sichuan
Chlorophyllum hortense	6	12	0	0.00	June 9 to November 12, Yunnan, Sichuan, Hunan
Chlorophyllum molybdites	145	267	0	0.00	March 24 to November 30, Guangxi, Hunan, Chongqing, Guangdong, Guizhou, Hainan, Fujian, Zhejiang, Sichuan, Anhui, Hubei, Yunan, Shandong, Henan, Jiangsu, Shanghai (1 patient from Zhejiang ate raw mushrooms; 2 patients in 1 incident from Chongqing ate mushrooms bought from the market)
Chlorophyllum molybdites and *Chlorophyllum hortense*[G]	1	1	0	0.00	May 29, Guangdong
Chlorophyllum molybdites and *Marasmius maximus*[G]	1	1	0	0.00	May 9, Guangdong (1 child ate raw mushrooms)
Coprinellus micaceus	1	1	0	0.00	October 15, Hebei (1 child ate raw mushrooms)
Coprinopsis atramentaria	1	1	0	0.00	May 5, Ningxia
Coprinus comatus	1	3	0	0.00	October 29, Hubei
Entoloma caespitosum	2	7	0	0.00	June 13 and 29, Sichuan
Entoloma cf. *subsinuatum*, *Russula insignis*[G], *Ganoderma lucidum*[M], *Descolea quercina*[U], *Hebeloma asperosporum*[U], *Tricholoma* sp.[U] and *Russula* sp.[U]	1	2	0	0.00	October 24, Sichuan

Continued

Mushroom species	Number of incidents	Number of patients	Deaths	Case fatality (%)	Spatial and temporal distribution
Entoloma omiense	20	67	0	0.00	May 21 to September 17, Hainan, Hunan, Yunnan, Zhejiang, Sichuan, Jiangsu
Entoloma omiense, *Agaricus flocculosipes*[E] and *Agaricus* sp.[U]	1	3	0	0.00	July 16, Sichuan
Entoloma omiense, *Agaricus flocculosipes*[E] and *Amanita* sp.[U]	1	1	0	0.00	July 16, Sichuan
Entoloma omiense and *Amanita* sp.[U]	1	4	0	0.00	June 20, Hunan
Entoloma omiense, *Gymnopilus* sp.[P], *Amanita sepiacea*[P], *Tylopilus balloui*[E], *Collybiopsis subnuda*[E], *Amauroderma rugosum*[M], *Collybiopsis clavicystidiata*[U], and *Amanita* sp.[U]	1	3	0	0.00	June 28, Guizhou
Entoloma omiense, *Lactarius akahatsu*[E], *Termitomyces* sp.[E], *Amanita hamadae*[U], and *A. ceciliae*[U]	1	3	0	0.00	June 9, Hunan
Entoloma omiense, *Lactarius vividus*[E], *Agaricus luteopallidus*[U], *Stropharia* sp.[U], and *Russula* sp.[U]	1	2	0	0.00	July 15, Sichuan
Entoloma omiense and *Marasmius maximus*[G]	1	4	0	0.00	July 17, Sichuan
Entoloma omiense and *Marasmius* sp.[U]	1	1	0	0.00	June 2, Hunan
Entoloma omiense and *Oudemansiella* sp.[E]	1	10	0	0.00	June 28, Sichuan
Entoloma omiense, *Scleroderma yunnanense*[E] and *Entoloma* sp.[U]	1	4	0	0.00	June 25, Guizhou
Entoloma omiense and *Tylopilus* sp.[U]	1	3	0	0.00	July 16, Sichuan
Entoloma sp., *Collybiopsis clavicystidiata*[U] and *Marasmius* sp.[U]	1	2	0	0.00	July 18, Sichuan
Entoloma spp.	2	6	0	0.00	July 18 and October 30, Sichuan, Hunan
Flammula alnicola	1	2	0	0.00	July 5, Guizhou
Gymnopus densilamellatus	4	26	0	0.00	May 14 to June 25, Guizhou, Yunnan; July 19, Jilin; September 10, Yunnan
Gymnopus densilamellatus and *Infundibulicybe ellipsospora*[U]	1	2	0	0.00	June 19, Guizhou
Gymnopus spp.	2	2	0	0.00	June 26 to July 10, Yunnan
Heimioporus japonicus	1	1	0	0.00	June 30, Yunnan
Hypholoma fasciculare	2	3	0	0.00	July 3 to 4, Yunnan, Guizhou
Lactarius laccarioides	1	3	0	0.00	August 1, Yunnan
Lactarius subhirtipes	3	6	0	0.00	June 11 and July 22, Guizhou, Sichuan
Lactarius subzonarius, *Suillus granulatus*[G], *Russula* cf. *olivacea*[E], *Lactarius* sp.[U], and *Russula* sp.[U]	1	2	0	0.00	July 28, Shandong
Lactarius trivialis, *Tricholoma sinoportentosum*[G], *Neoboletus venenatus*[G], *Turbinellus szechwanensis*[G], *Hygrophorus pseudopurpurascens*[E], *Ramaria schildii*[U], and *Tricholoma* sp.[U]	1	5	0	0.00	September 5, Sichuan
Lactarius spp.	2	4	0	0.00	July 16 and 21, Shandong, Sichuan
Lactifluus bertillonii	1	1	0	0.00	August 26, Heilongjiang
Lactifluus pseudoluteopus, *Russula punctipes*[G] and *Lactarius sordidus*[U]	1	2	0	0.00	June 23, Yunnan
Leucocoprinus cepistipes	1	1	0	0.00	May 6, Guangdong (eaten by raw)
Leucocoprinus sp.	1	2	0	0.00	July 21, Henan
Ligymnopus moseri	1	3	0	0.00	October 17, Sichuan
Marasmius maximus	1	2	0	0.00	September 12, Guangxi (2 students ate raw mushrooms)
Marasmius sp.	1	1	0	0.00	May 30, Hunan

Continued

Mushroom species	Number of incidents	Number of patients	Deaths	Case fatality (%)	Spatial and temporal distribution
Neoboletus venenatus	5	19	0	0.00	March 18, Shanxi (dried boletes, bought from Yunnan market); May 17, Guiyang (dried boletes); August 1 and 20, Sichuan (dried boletes)
Neoboletus venenatus, *Baorangia pseudocalopus*[G], *Neoboletus* sp.[U], and *Butyriboletus sanicibus*[E]	1	2	0	0.00	April 18, Hubei (dried boletes, bought from Yunnan market)
Neoboletus venenatus and *Boletus shiyong*[E]	1	2	0	0.00	July 24, Jiangsu (dried boletes)
Neoboletus venenatus and *Lepista nuda*[E]	1	6	0	0.00	October 18, Chongqing
Omphalotus guepiniformis	1	10	0	0.00	October 25, Guizhou
Pholiota multicingulata and *Hygrophorus flavoalbus*[U]	1	1	0	0.00	October 1, Yunnan
Rubroboletus flavus	1	2	0	0.00	August 14, Guizhou
Russula brevispora	1	3	0	0.00	May 22, Guangxi
Russula emetica, *Ganoderma leucocontextum*[M] and *R. cyanoxantha*[E]	1	3	0	0.00	July 30, Sichuan
Russula flavescens	1	2	0	0.00	October 26, Yunan
Russula foetens and *R.* cf. *lavandula*[U]	1	7	0	0.00	October 3, Guizhou
Russula aff. *japonica*	40	92	0	0.00	May 30 to October 2, Hunan, Chongqing, Yunnan, Guizhou, Zhejiang, Jiangsu
Russula laurocerasi	1	6	0	0.00	June 14, Guizhou
Russula pseudojaponica	6	28	0	0.00	June 24 to September, Hunan, Guizhou
Russula pseudojaponica, *R. insignis*[G], *Scleroderma venenatum*[G], *R. densifolia*[E], and *R. cerolens*[U]	1	2	0	0.00	June 30, Sichuan
Russula pseudojaponica and *R. niveopicta*[U]	1	3	0	0.00	July 2, Yunnan
Russula punctipes, *R. crustosa*[E], *Boletus bainiugan*[E], *Agaricus iranicus*[U], *Amanita pseudofritillaria*[U], *Tylopilus atroviolaceobrunneus*[U], *Russula* sp.[U], *Amanita* sp.[U], and *Strobilomyces* sp.[U]	1	2	0	0.00	July 22, Sichuan (bought from the market)
Scleroderma bovista	1	2	0	0.00	September 9, Hebei
Scleroderma cepa	4	18	0	0.00	July 5 to 14, Yunnan; October 15, Chongqing; October 22, Hebei
Scleroderma cepa, *Omphalotus olearius*[G], and *Lactarius cinnamomeus*[E]	1	2	0	0.00	October 8, Yunnan
Scleroderma cepa and *Termitomyces* sp.[E]	1	2	0	0.00	July 3, Yunnan
Scleroderma spp.	3	10	0	0.00	May 16 to October 25, Sichuan, Guizhou, Hunan
Suillellus flaviporus	1	3	0	0.00	October 2, Yunnan
Suillus huapi, *Entoloma* cf. *sinuatum*[G], *Lactarius akahatsu*[E], *Russula olivacea*[E], *Amanita chepangiana*[E], *Lactarius mirus*[U], *Helvella* sp.[U], *Agaricus purpureosquameus*[U], and *Russula shawarensis*[U]	1	2	0	0.00	July 15, Yunnan
Suillus huapi, *S. pinetorum*[G], *Tricholoma ustaloides*[G], *Amanita orientigemmata*[P], *Rugiboletus extremiorientalis*[E], *Thaxterogaster purpurascens*[E], *Armillaria cepistipes*[E], *Lactarius hatsudake*[E], *Russula cyanoxantha*[E], *R.virescens*[E], *Descolea quercina*[U], *Cortinarius subbalaustinus*[U], *Lactarius aurantiozonatus*[U], *L. spadiceus*[U], *Hygrophorus orientalis*[U], *Entoloma* sp.[U], and *Cortinarius* spp.[U]	1	2	0	0.00	October 28, Sichuan (dried mushrooms, bought from the market)

Continued

Mushroom species	Number of incidents	Number of patients	Deaths	Case fatality (%)	Spatial and temporal distribution
Suillus huapi, *S. pinetorum*[G], *Boletus bainiugan*[E], *Butyriboletus roseoflavus*[E], *Lyophyllum decastes*[E], *Naematelia aurantialba*[E], *Oudemansiella raphanipes*[E], *Phlebopus portentosus*[E], *Rubroboletus esculentus*[E], *Sparassis latifolia*[E], *Stropharia rugosoannulata*[E], and *Cantharellus* sp.[E]	1	3	0	0.00	October 10, Beijing (ate in restaurant)
Tricholoma highlandense	1	1	0	0.00	October 29, Sichuan
Tricholoma olivaceum	1	1	0	0.00	September 9, Yunnan
Tricholoma cf. *pardinum*	2	4	0	0.00	May 21 and June 21, Guizhou
Tricholoma sinopardinum	1	9	0	0.00	July 18, Qinghai
Tricholoma stans, *Suillus pinetorum*[G], *Pulveroboletus macrosporus*[G], *Russula rosea*[E], and *Lactifluus* cf. *vellereus*[U]	1	9	0	0.00	October 26, Yunnan
Tricholoma spp.	9	25	0	0.00	June 20, Yunnan; October 5 to 26, Yunnan, Qinghai
Tylopilus neofelleus	1	2	0	0.00	August 23, Guizhou
Tylopilus vinosobrunneus	1	1	0	0.00	July 15, Sichuan
Tylopilus sp.	1	1	0	0.00	May 15, Hunan
Psycho-neurological disorder					
Amanita concentrica and *A. virgineoides*[G,P]	1	1	0	0.00	August 5, Yunnan
Amanita sepiacea, *Russula crustosa*[E], *R. delica*[E], *Termitomyces* sp.[E], *A. lignitincta*[U], *A. pseudofritillaria*[U], *Lactifluus sinensis*[U]	1	1	0	0.00	June 6, Hunan
Amanita sepiacea, *Boletus bainiugan*[E], *Russula zhuzuijun*[E], *Tricholoma qiaomianjun*[E], and *Agaricus thiersii*[U]	1	1	0	0.00	October 5, Yunnan
Amanita melleiceps	1	5	0	0.00	April 2, Hunan
Amanita orientigemmata	2	4	0	0.00	April 30, Chongqing; August 12, Guizhou
Amanita parvipantherina	1	3	0	0.00	June 22, Yunnan
Amanita siamensis	4	18	0	0.00	July 12 to 25, Chongqing, Hubei, Sichuan
Amanita siamensis, *Lactarius trivialis*[G], and *L. vividus*[E]	1	2	0	0.00	July 27, Sichuan
Amanita siamensis, *Russula* sp.[U], and *Lactarius* sp.[U]	1	3	0	0.00	July 25, Sichuan
Amanita sinocitrina	1	4	0	0.00	April 20, Jiangxi
Amanita sinocitrina, *Suillus granulatus*[G], and *Lactarius vividus*[E]	1	2	0	0.00	July 16, Sichuan
Amanita subglobosa	11	29	0	0.00	April 23 to 30, Hunan; June19 to October 18, Sichuan, Chongqing, Hubei, Guizhou, Inner Mongolia
Amanita subglobosa, *Inocybe bulbinella*[U], and *Collybiopsis clavicystidiata*[U]	1	2	0	0.00	April 27, Hunan
Amanita subglobosa, *Lactarius hatsudake*[E], and *Ticholoma* sp.[U]	1	1	0	0.00	April 27, Hunan
Amanita subglobosa and *Lactarius subhirtipes*[G]	1	3	0	0.00	July 17, Sichuan
Amanita sychnopyramis f. *subannulata*	6	20	0	0.00	April 15 to May 4, Guangxi and Hunan; May 30 to June 17, Sichuan, Zhejiang
Amanita sychnopyramis f. *subannulata*, *A. fritillaria*[P], and *Russula* sp.[U]	1	5	0	0.00	May 7, Guangxi
Amanita sp. (maybe *A. concentrica*)	1	2	0	0.00	June 20, Yunnan
Anthracoporus nigropurpureus	9	18	0	0.00	June 17 to July 28, Sichuan, Yunnan
Anthracoporus nigropurpureus, *Agaricus atrodiscus*[G] and *Lactarius chrysorrheus*[G]	1	3	0	0.00	June 22, Guizhou

Continued

Mushroom species	Number of incidents	Number of patients	Deaths	Case fatality (%)	Spatial and temporal distribution
Anthracoporus nigropurpureus, *Tylopilus vinosobrunneus*[G], *Retiboletus sinensis*[E], and *Strobilomyces calidus*[U]	1	3	0	0.00	June 26, Sichuan
Candolleomyces candolleanus	1	1	0	0.00	May 31, Guizhou
Clitocybe sp.	1	2	0	0.00	October 30, Sichuan
Collybiopsis peronata	1	1	0	0.00	February 28, Hubei
Gymnopilus dilepis	7	12	0	0.00	April 22 to May 8, Sichuan, Guizhou, Hubei, Hunan; September 15 to October 16, Sichuan
Gymnopilus dilepis and *Termitomyces microcarpus*[E]	1	1	0	0.00	July 13, Sichuan
Gyromitra venenata	1	2	0	0.00	March 22 to 23, Yunnan
Inocybe amelandica	1	2	0	0.00	September 11, Ningxia
Inosperma hainanense	1	11	0	0.00	August 4, Yunnan
Lanmaoa asiatica	2	2	0	0.00	July 11 and October 12, Guangdong (bought from Yunnan)
Panaeolus cyanescens	3	10	0	0.00	April 28, Guizhou; July 27 and 30, Hebei
Panaeolus cyanescens and *Agaricus bisporus*[E]	1	2	0	0.00	May 4, Guizhou
Panaeolus subbalteatus	1	2	0	0.00	July 21, Shandong
Pseudosperma arenarium	1	1	0	0.00	September 7, Ningxia
Pseudosperma umbrinellum	6	9	0	0.00	September 5 to 26, Ningxia
Pseudosperma umbrinellum and *P. arenarium*[P]	1	4	0	0.00	August 18, Ningxia
Psilocybe cubensis	3	5	0	0.00	April 19, Guangxi; July 3, Yunnan; August 5, Guizhou
Hemolysis					
Paxillus obscurosporus, *Suillus luteus*[G], *Russula aeruginea*[E], *Leccinum* sp.[E], and *Russula dryadicola*[U]	1	5	0	0.00	July 26, Chongqing
Photosensitive dermatitis					
Cordierites frondosus and *Auricularia* sp.[E]	1	3	0	0.00	Middle June, Yunnan
Unclassified					
Agaricus bitorquis[E]	1	2	0	0.00	August 15, Ningxia
Agaricus pseudopratensis[U]	2	4	0	0.00	September 7 and 12, Ningxia
Agrocybe dura[E]	1	1	0	0.00	April 15, Hubei
Albatrellus ellisii[E]	1	1	0	0.00	July 19, Guizhou (bought from Yunnan)
Alloclavaria orientalis[E]	1	1	0	0.00	April 28, Sichuan
Amanita cf. *princeps*[E], *Amanita caojizong*[E], *Russula* cf. *sanguinaria*[E], *Russula rosea*[E], *Boletus bainiugan*[E], *Scleroderma yunnanense*[E], *Morchella sextelata*[E], *Phallus echinovolvatus*[E], *Lyophyllum decastes*[E], *Cordyceps militaris*[E,M], *Macrocybe gigantean*[E], and *Amanita* sp.[U]	1	2	0	0.00	January 24, Shanxi (dried mushrooms, bought from market, 2023)
Amanita caijizong[E], *Amanita* sp.[U]	1	1	0	0.00	August 2, Sichuan
Armillaria mellea[E]	1	1	0	0.00	November 4, Sichuan (dried mushrooms, given by friends from Heilongjiang)
Clitocybe sp.[U]	1	2	0	0.00	October 11, Sichuan
Clitopilus piperatus[U], *Agrocybe flexuosipesv*, and *Lepista* sp.[U]	1	2	1	50.00	October 21, Sichuan
Collybiopsis orientisubnuda[U]	1	4	0	0.00	October 13, Guizhou
Cordyceps chanhua[E,M]	1	6	0	0.00	June 25, Zhejiang

Continued

Mushroom species	Number of incidents	Number of patients	Deaths	Case fatality (%)	Spatial and temporal distribution
Cortinarius sp.[U]	1	2	0	0.00	October 24, Yunnan
Cyclocybe chaxingu[E]	1	2	0	0.00	May 19, Sichuan (bought from Yunnan)
Entoloma sp.[U], *Lactarius betulinus*[U], and *Russula decipiens*[U]	1	8	0	0.00	November 12, Liaoning
Favolus sp.[U]	1	3	0	0.00	April 16, Sichuan (eaten raw)
Inocybe latibulosa[U]	1	4	0	0.00	June 7, Guizhou
Lactifluus pseudohygrophoroides[U], *Hydnum berkeleyanum*[E], and *Lactarius volemus*[E]	1	8	0	0.00	August 27, Yunnan
Lepista cremeoinvoluta[U]	1	2	0	0.00	October 17, Yunnan
Lepista sordida[E]	1	1	0	0.00	June 19, Zhejiang (eaten raw)
Leucoagaricus barssii[U], *La. croceobasis*[U], *Coprinopsis* sp.[U], and *Inocybe amelandica*[P]	1	2	0	0.00	September 8, Ningxia
Leucoagaricus rubrobrunneus[U], *Leucoagaricus* sp.[U], and *Lactarius vividus*[E]	1	2	0	0.00	July 22, Sichuan
Leucoagaricus sp.[U]	1	2	0	0.00	July 14, Sichuan
Morchella sextelata[E]	1	1	0	0.00	June 19, Zhejiang (1 patient ate a half dried raw mushroom)
Russula brunneocystidiata[E]	1	1	0	0.00	August 22, Guangxi
Russula cf. *densifolia*[E]	1	1	0	0.00	June 30, Fujian
Russula crustosa[E], *Amanita* sp.[E], *Calvatia holothurioides*[U], *Russula acrifolia*[U], and *Descolea* sp.[U]	1	4	0	0.00	July 24, Sichuan
Russula decipiens[U] and *Russula* spp.[U]	1	1	0	0.00	August 3, Sichuan (bought from market)
Russula delica[E]	1	7	0	0.00	August 23, Guangxi
Russula indocatillus[U], *Strobilomyces latirimosus*[U] and *Russula* sp.[U]	1	2	0	0.00	June 28, Yunnan
Russula sp.[U] and *Coprinellus radians*[M]	1	2	0	0.00	September 3, Guizhou
Russula succinea[U] and *Lactarius hygrophoroides*[E]	1	8	0	0.00	June 25, Guizhou
Scleroderma yunnanense[E]	1	1	0	0.00	October 1, Guizhou
Scleroderma yunnanense[E], *Lactarius aurantiacus*[E], *Russula* spp.[U], *Lactarius* sp.[U], and *Suillus* sp.[U]	1	1	0	0.00	September 12, Yunnan
Sutorius sp.[U] and *Tylopilus pseudoballoui*[E]	1	1	0	0.00	June 1, Yunnan
Thelephora ganbajun[E]	1	10	0	0.00	August 25, Yunnan
Trametes sanguinea[M]	1	1	0	0.00	November 19, Jiangsu
Tricholoma matsutake[E], *Sarcodon imbricatus*[E], and *Floccularia luteovirens*[E]	1	10	0	0.00	August 12, Sichuan (bought from market, ate in a restaurant)
Tricholoma terreum[E]	3	14	0	0.00	July 15 to October 22, Yunnan
Macrolepiota dolichaula[E]	1	2	0	0.00	June 24, Yunnan (1 student ate raw mushroom)

Abbreviations used for mushroom poisoning incidents involving more than two species: ALF=Acute liver failure; ARF=Acute renal failure; G=Gastroenteritis; P=Psycho to neurological disorder; M=Medicinal; U=Toxicity unknown; E=edible.