Methamphetamine Contamination on Persons Associated with Methamphetamine Laboratories

By

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Introduction:

Concerns regarding chemical contamination associated with the clandestine production of methamphetamine have been realized for some time among law enforcement and public health officials. [1 – 10] In a number of cases, injuries to law enforcement, medical and other first responders have occurred due to contamination associated with these laboratories.[6 – 10] Work conducted by National Jewish Medical Center Researchers has documented a number of contaminants generated at clandestine laboratories that may pose a threat to emergency services personal entering these laboratories.[11] In response to this information, law enforcement officers have continued to improve upon personal protective equipment and have begun to wear respirators routinely when entering suspected clandestine methamphetamine laboratories.

Research conducted by our group has indicated that the contamination associated with these clandestine methamphetamine laboratories does not end when the laboratory ceases operation.[11,12] Simulated methamphetamine cooks conducted by our group have demonstrated that a number of compounds may persist after the cook has been completed. Initial testing revealed that shortly after a clandestine cook, levels of iodine, hydrogen chloride, and methamphetamine were found at the site even though the bulk chemicals may have been removed. The largest contaminant was found to be the drug, methamphetamine, itself. Methamphetamine was found to aerosolize during the salting-out phase conducted during all current production methodologies. It is released as an aerosol and can contaminate most surfaces within a structure.[11] Our research also indicated that the methamphetamine continues to be present within the structure for some period of time (months to years).

The levels of methamphetamine found within a structure after clandestine cooks is a factor of the type of cook and the number of cooks conducted. Red phosphorous cooks appear to result in a higher concentration of methamphetamine release than do anhydrous ammonia cooks and multiple cooks will result in a higher contamination level.[11] Surface wipes for methamphetamine were collected at suspected methamphetamine laboratories during law enforcement actions. A total of 14 suspected laboratories were sampled with all of the laboratories having at least one sample positive for methamphetamine. The levels of methamphetamine found ranged from a low of 1.0 µg/sample to a high of 16,000 µg/sample. The overall mean methamphetamine contamination level in these suspected laboratories was 511 µg/sample with a median contamination level of 28 µg/sample. Considering this level of contamination, it is not surprising that individuals entering these laboratories may become contaminated with methamphetamine.

Additional research conducted by the National Jewish Research Center has determined that, not only is a clandestine methamphetamine laboratory contaminated with methamphetamine but it is possible for individuals entering the structure to also become contaminated.[12] We found that any activity allowed methamphetamine accumulated on surfaces to be re-suspended into the air and to contaminate the clothing of individuals present in the structure. This report was designed to elucidate the level of contamination

that may be expected for individuals entering clandestine methamphetamine laboratories as well as the expected contamination on individuals removed from these laboratories.

Methodology:

Wipe samples were collected on the surface of protective clothing worn by individuals during a number of the simulated cooks that were conducted by National Jewish Medical and Research Center as a part of a previous methamphetamine project. The wipe samples were typically collected on the outside of impermeable, smooth, protective clothing worn by individuals that were either participating or observing at the controlled methamphetamine cook. An attempt was made to sample an area of approximately 100 cm^2 but many surfaces (arm, neck, etc.) are irregular in shape and do not conform to the use of a template.

Samples were collected using a 4" x 4" gauze wipe provided by the laboratory. The wipe was wetted with methanol or isopropanol and then used to wipe the portion of the body in question. Generally, two portions of the body were wiped, an area to the front of the body that may be influenced by splashes and contact as well as the back or neck which is primarily influenced by airborne exposures. Individuals were usually wiped as they came into the decontamination area by personal staged in that area. Wipes were frequently taken prior to and immediately after decontamination.

Immediately after the individual was wiped with the gauze wipe, the wipe was folded and inserted into a centrifuge tube that had been labeled with the identifying information. The tubes were then shipped to the laboratory for analysis by overnight mail.

In some cases, centrifuge tubes were given to fire departments to use at the scene of clandestine methamphetamine laboratory investigations. These samples were collected in the same manner as were the prior samples but then brought to National Jewish for packaging and shipping. These samples would normally be sent to the laboratory within a day of being used by the fire department.

All of the samples were sent to Data Chem Laboratories for analysis using a draft NIOSH Method 9106. The results of the sampling efforts are given in µg/sample.

Results:

A total of 227 samples were submitted for analysis to the laboratory. Of those samples, 154 were found to be above the limit of detection which was generally 0.02 µg/sample. A total of 66 samples were collected on individuals after decontamination in order to determine the effectiveness of decontamination. Of the samples with a detectable amount of methamphetamine, the mean contamination level was 11.2 µg/sample with a median contamination level of 0.80 µg/sample. The range of contamination went from 0.04 µg/sample to a high of 580 µg/sample.

Sixty-nine wipe samples were collected prior to decontamination from individuals involved in a simulated clandestine methamphetamine laboratory cook. The results of this sampling effort were as follows:

Pre-Decontamination Personal Wipe Samples - Cook Only

Date	Cook Type	Description	Location	Results (µg/sample)	Notes
Broomfield Cook	Red P	Todd	Front	ND	Cook Only
Broomfield Cook	Red P	Todd	Head	ND	Cook Only
Broomfield Cook	Red P	Steve	Front	ND	Cook Only
Broomfield Cook	Red P	Steve	Head	ND	Cook Only
Broomfield Cook	Red P	Ashleigh	Front	ND	Cook Only
Broomfield Cook	Red P	Ashleigh	Head	ND	Cook Only
Broomfield Cook	Red P	Rum	Front	ND	Cook Only
Broomfield Cook	Red P	Rum	Head	ND	Cook Only
Broomfield Cook	Red P	Jim	Front	ND	Cook Only
Broomfield Cook	Red P	Jim	Head	ND	Cook Only
Broomfield Cook	Red P	Ashleigh	Front	ND	Cook Only
Broomfield Cook	Red P	Ashleigh	Hands	ND	Cook Only
Broomfield Cook	Red P	Eric	Front	ND	Cook Only
Broomfield Cook	Red P	Eric	Head	ND	Cook Only
Broomfield Cook	Red P	Tyrone	Front	ND	Cook Only
Broomfield Cook	Red P	Tyrone	Head	ND	Cook Only
Broomfield Cook	Red P	Shawn	Hands	ND	Cook Only
Broomfield Cook	Red P	Brian	Hands	ND	Cook Only
Broomfield Cook	Red P	Brian	Front	ND	Filtering
Broomfield Cook	Red P	Ashleigh	Front	16.7	Filtering
Broomfield Cook	Red P	Todd	Front	43.6	Filtering
Broomfield Cook	Red P	Todd	Hands	580	Filtering
Broomfield Cook	Red P	Russ	Front	10.3	Filtering
Broomfield Cook	Red P	Jim	Front	6.43	Filtering
Broomfield Cook	Red P	Harry	Front	10.2	Filtering after decon
Broomfield Cook	Red P	Shawn	Front	0.81	Filtering after decon
Broomfield Cook	Red P	Harry	Hands	0.48	Filtering after decon
Broomfield Cook	Red P	Sandra	Front	10.3	After salting
Broomfield Cook	Red P	Sandra	Back	6	After salting
Broomfield Cook	Red P	Amy	Front	9.09	After salting
Broomfield Cook	Red P	Todd	Front	8.13	After salting
Broomfield Cook	Red P	Harry	Front	14.5	After salting
Broomfield Cook	Red P	Harry	Back	2.54	After salting
Broomfield Cook	Red P	Brian	Back	4.91	After salting
Dallas Ammonia Cook	Anhydrous	Billy	Front	ND	
Dallas Ammonia Cook	Anhydrous	Billy	Back	ND	
Dallas Ammonia Cook	Anhydrous	Greg	Front	0.77	Wet Decon
Dallas Ammonia Cook	Anhydrous	Greg	Back	0.41	Wet Decon
Dallas Ammonia Cook	Anhydrous	Greg	Neck	0.06	Wet Decon
Dallas Ammonia Cook	Anhydrous	Greg	R Arm	0.15	Wet Decon
Dallas Ammonia Cook	Anhydrous	David	Front	1.9	Wet Decon

Dallas Ammonia Cook	Anhydrous	David	Back		1.3	Wet Decon
Dallas Ammonia Cook	Anhydrous	David	R Arm		0.3	Wet Decon
Dallas Ammonia Cook	Anhydrous	David	neck		0.1	Wet Decon
Dallas Ammonia Cook	Anhydrous	Martyny	Back		0.5	Wet Decon
Dallas Ammonia Cook	Anhydrous	Martyny	Front		0.4	Wet Decon
Dallas Ammonia Cook	Anhydrous	Gerhardt	Front		1.1	Dry Decon
Dallas Ammonia Cook	Anhydrous	Gerhardt	Back		0.6	Dry Decon
Dallas Ammonia Cook	Anhydrous	Jim	Back		0.2	Wet Decon
Dallas Ammonia Cook	Anhydrous	Jim	Front		0.3	Wet Decon
NM Anhydrous	Anhydrous	Dave			1.2	Cook
NM Anhydrous	Anhydrous	Lynn			58	Lynn End of Day
NM Anhydrous	Anhydrous	Dave			150	Dave End of Day
NM Anhydrous	Anhydrous	Lynn			6.5	Lynn - 1PM After Cook
Scienturfic Cook	Red P	Elinor	Front		0.04	Cook only
Scienturfic Cook	Red P	Lynn	Front		0.14	Cook only
Scienturfic Cook	Red P	Shawn	Front	ND		Cook only
Scienturfic Cook	Red P	Robin	Front	ND		Cook only
Scienturfic Cook	Red P	Shawn	Front		16	Salting Out
Scienturfic Cook	Red P	John	Front		8.1	Salting Out
Scienturfic Cook	Red P	Robin	Front		18	Salting Out
Texas Hypo Cook	Hypophosphorous	Angie	Front		3.7	Days End
Texas Hypo Cook	Hypophosphorous	Angie	Back		1.1	Days End
Texas Hypo Cook	Hypophosphorous	Tamara	Front		1.8	Days End
Texas Hypo Cook	Hypophosphorous	Tamara	Back		0.16	Days End
Texas Hypo Cook	Hypophosphorous	David	Front		6.4	Days End
Texas Hypo Cook	Hypophosphorous	David	Back		4.6	Days End
Texas Hypo Cook	Hypophosphorous	Scott	Front		9.4	Days End
Texas Hypo Cook	Hypophosphorous	Scott	Back		1.6	Days End
			Count		**46**	
			Mean		**22.1**	
			Median		**2.22**	
			Minimum		**0.04**	
			Maximum		**580**	

Twenty-three of these samples were below the lower limit of detection. However, 21 of the individuals with contamination levels below the limit of detection were sampled at two simulated laboratories just after the cooking phase. Since the majority of methamphetamine release occurs during the salting-out phase in all but an anhydrous ammonia cook, the contamination at that phase would be expected to be non-detect. The mean contamination level for the 46 samples with detectable methamphetamine levels was 22.1 µg/sample with a median contamination level of 2.22 µg/sample. The lowest level of contamination was 0.04 µg/sample and the highest contamination level was 580 µg/sample. The highest level of contamination was found on the hands of an individual participating in the filtering of a red phosphorous cook and was likely due to spillage.

Although some individuals did test negative with respect to methamphetamine contamination, with the exception of the individuals sampled just after the cook phase,

most (46/48 or 96%) of the individuals tested positive. In general, the level of observed contamination was not high but, due to spills or other anomalies, may be quite high (580 µg/sample).

In most cases, law enforcement officers do not enter suspected methamphetamine laboratories when they are actually cooking. In addition, individuals that are arrested at suspected methamphetamine laboratories are normally not manufacturing methamphetamine at the time of arrest. We collected a number of wipes that would be representative of simply entering a clandestine laboratory or living in a laboratory. These sample results are as follows:

Pre-Decontamination Personal Wipe Samples - Investigation Only

Date	Cook Type	Description	Location	Results	Pre Decon	Notes
AD CO Meth Lab	Red P	Police	Hands	0.5	x	Investigation
AD CO Meth Lab	Red P	Juvenile	Clothing	1.18	x	Investigation
AD CO Meth Lab	Red P	Child	Face	0.2	x	Investigation
AD CO Meth Lab	Red P	Juvenile	Face	ND	x	Investigation
AD CO Meth Lab	Red P	Juvenile	Hands	0.4	x	Investigation
AD CO Meth Lab	Red P	Dog	Back	1.89	x	Investigation
AD CO Meth Lab	Red P	Police	Chest	ND	x	Investigation
AD CO Meth Lab	Red P	Police	Hands	0.93	x	Investigation
AD CO Meth Lab	Red P	Suspect	Face	2.35	x	Investigation
AD CO Meth Lab	Red P	Suspect	Hands	3.46	x	Investigation
AD CO Meth Lab	Red P	Juvenile	Hands	0.55	x	Investigation
AD CO Meth Lab	Red P	Suspect	Hands	2.98	x	Investigation
AD CO Meth Lab	Red P	Suspect	Pants	11.6	x	Investigation
AD CO Meth Lab	Red P	Suspect	Face	0.94	x	Investigation
AD CO Meth Lab	Red P	Suspect	Face	8.09	x	Investigation
AD CO Meth Lab	Red P	Police	Gloves	ND	x	Investigation
AD CO Meth Lab	Red P	Police	Gloves	ND	x	Investigation
AD CO Meth Lab	Red P	Suspect	Hands	9.22	x	Investigation
AD CO Meth Lab	Red P	Police	Knee	ND	x	Investigation
AD CO Meth Lab	Red P	Police	Hands	0.5	x	Investigation
AD CO Meth Lab	Red P	Suspect	Face	0.94	x	Investigation
AD CO Meth Lab	Red P	Suspect	Hands	17.4	x	Investigation
AD CO Meth Lab	Red P	Suspect	Hands	4.78	x	Investigation
AD CO Meth Lab	Red P	Suspect	Hands	10.33	x	Investigation
Ad CO Meth Lab2	Red P	Police	Hands	ND	x	Investigation
Ad CO Meth Lab4	Red P	Suspect 1	Hands	11	x	Investigation
Ad CO Meth Lab6	Red P	Suspect 2	Hands	11	x	Investigation
CO Spr Cook	Red P	Fire Fighter 1	Arm	0.59	x	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 1	Neck	0.61	x	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 1	Foot	49	x	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 2	Foot	15	x	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 2	neck	0.46	x	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 2	Arm	0.7	x	High Contaminatin

CO Spr Cook	Red P	Shawn	neck	0.62	x	Medium Contamination
CO Spr Cook	Red P	Shawn	Arm	0.32	x	Medium Contamination
CO Spr Cook	Red P	Shawn	Foot	2.3	x	Medium Contamination
CO Spr Cook	Red P	Mike	Arm	0.36	x	Medium Contamination
CO Spr Cook	Red P	Mike	Foot	11.7	x	Medium Contamination
CO Spr Cook	Red P	Mike	Neck	0.3	x	Medium Contamination
CO Spr Cook	Red P	Fire Fighter	Seat	1.3	x	Medium Contamination
CO Spr Cook	Red P	Fire Fighter	Hands	56	x	Medium Contamination
CO Spr Cook	Red P	Crawler	Neck	0.54	x	Medium Contamination
CO Spr Cook	Red P	Crawler	Neck	1	x	Medium Contamination
CO Spr Cook	Red P	Crawler	Hands	29	x	Medium Contamination
CO Spr Cook	Red P	Shawn	Foot	1.7	x	Low Contamination
CO Spr Cook	Red P	Shawn	Neck	0.69	x	Low Contamination
CO Spr Cook	Red P	Shawn	Arm	0.075	x	Low Contamination
CO Spr Cook	Red P	Nicola	Neck	0.19	x	Low Contamination
CO Spr Cook	Red P	Nicola	Arm	0.45	x	Low Contamination
CO Spr Cook	Red P	Nicola	Foot	0.78	x	Low Contamination
CO Spr Cook Invest	Red P		R Arm	4.3	x	Investigation
CO Spr Cook Invest	Red P		R Back	5.7	x	Investigation
CO Spr Cook Invest	Red P		Neck	8.3	x	Investigation
CO Spr Cook Invest	Red P		R Arm	12	x	Investigation
CO Spr Cook Invest	Red P		R Back	230	x	Investigation
CO Spr Cook Invest	Red P		Neck	9.1	x	Investigation
CO Spr Cook Invest	Red P		R Arm	7.4	x	Investigation
CO Spr Cook Invest	Red P		R Back	26	x	Investigation
CO Spr Cook Invest	Red P		Neck	ND	x	Investigation
CO Spr Cook Invest	Red P		R Arm	14	x	Investigation
CO Spr Cook Invest	Red P		R Back	23	x	Investigation
CO Spr Cook Invest	Red P		Neck	5.8	x	Investigation
North Metro Invest	Red P	Police	R Arm	0.31	x	Investigation
North Metro Invest	Red P	Police	R Foot	0.25	x	Investigation
North Metro Invest	Red P	Police	Neck	ND	x	Investigation
North Metro Invest	Red P	Police	R Arm	ND	x	Investigation
North Metro Invest	Red P	Police	R Foot	0.11	x	Investigation
North Metro Invest	Red P	Police	Neck	ND	x	Investigation
North Metro Invest	Red P	Police	R Arm	0.23	x	Investigation
North Metro Invest	Red P	Police	R Foot	0.19	x	Investigation
North Metro Invest	Red P	Police	Neck	0.14	x	Investigation
North Metro Invest	Red P	Police	R Arm	0.39	x	Investigation
North Metro Invest	Red P	Police	R Foot	0.1	x	Investigation
North Metro Invest	Red P	Police	Neck	0.2	x	Investigation
North Metro Invest	Red P	Police	R Arm	0.38	x	Investigation
North Metro Invest	Red P	Police	R Foot	0.37	x	Investigation
North Metro Invest	Red P	Police	Neck	0.055	x	Investigation
North Metro Invest	Red P	Police	R Arm	1.3	x	Investigation
North Metro Invest	Red P	Police	R Foot	0.58	x	Investigation
North Metro Invest	Red P	Police	Neck	ND	x	Investigation
North Metro Invest	Red P	Police	R Arm	1.6	x	Investigation
North Metro Invest	Red P	Police	R Foot	1.4	x	Investigation
North Metro Invest	Red P	Police	Neck	0.059	x	Investigation

Count	**72**
Mean	**8.7**
Median	**0.97**
Minimum	**0.055**
Maximum	**230**

A total of 83 samples were obtained from law enforcement officers, firefighters, suspects, and a pet involved with suspected methamphetamine laboratories or who entered a simulated methamphetamine laboratory after the manufacturing process had been discontinued for at least 12 hours. Seventy-two of the 83 individuals (87%) tested positive for methamphetamine. The mean contamination level was 8.7 µg/sample with a median contamination level of 0.97 µg/sample. The lowest contamination level observed was 0.05 µg/sample and the highest level was 230 µg/sample. The highest contamination level was observed on a law enforcement officer who had participated in an actual clandestine laboratory bust in Colorado Springs, CO. In general, the observed contamination level for individuals simply entering a laboratory were relatively low but some high contamination levels may occur, likely due to contact with the manufactured product.

Pre-Decontamination Personal Wipe Samples

Residents of suspected methamphetamine Laboratories

Date	Cook Type	Description	Location	Results
AD CO Meth Lab	Red P	Child	Face	0.2
AD CO Meth Lab	Red P	Dog	Back	1.89
AD CO Meth Lab	Red P	Juvenile	Hands	0.4
AD CO Meth Lab	Red P	Juvenile	Hands	0.55
AD CO Meth Lab	Red P	Juvenile	Clothing	1.18
AD CO Meth Lab	Red P	Juvenile	Face	ND
AD CO Meth Lab	Red P	Suspect	Face	0.94
AD CO Meth Lab	Red P	Suspect	Face	0.94
AD CO Meth Lab	Red P	Suspect	Face	2.35
AD CO Meth Lab	Red P	Suspect	Hands	2.98
AD CO Meth Lab	Red P	Suspect	Hands	3.46
AD CO Meth Lab	Red P	Suspect	Hands	4.78
AD CO Meth Lab	Red P	Suspect	Face	8.09
AD CO Meth Lab	Red P	Suspect	Hands	9.22
AD CO Meth Lab	Red P	Suspect	Hands	10.33
AD CO Meth Lab	Red P	Suspect	Pants	11.6
AD CO Meth Lab	Red P	Suspect	Hands	17.4
Ad CO Meth Lab4	Red P	Suspect 1	Hands	11
Ad CO Meth Lab6	Red P	Suspect 2	Hands	11
			Count	**18**
			Mean	**5.5**
			Median	**3.22**
			Minimum	**0.2**
			Maximum	**17.4**

A total of 18 samples were taken from individuals and a pet at three suspected methamphetamine laboratories. All but one of the samples were positive for methamphetamine (94%) with a mean contamination level of 5.5 µg/sample and a median level of 3.22 µg/sample. Samples taken from the dog and clothing were likely lower than the actual value since the ability to sample porous surfaces and obtain an accurate approximation of the total methamphetamine present is not possible. The highest contamination observed was 17.4 µg/sample obtained from the hands of a suspect involved with a suspected clandestine laboratory investigation. It is interesting to note that children had some of the lowest levels of contamination but it should also be noted that this sampling data is representative of only a few laboratories.

Individuals entering a building after the laboratory has been inoperative for several hours were also monitored for surface contamination. The results of this sampling are as follows:

Pre-Decontamination Personal Wipe Samples - Investigation Only

Date	Cook Type	Description	Location	Results	Notes
CO Spr Cook	Red P	Crawler	Neck	0.54	Medium Contamination
CO Spr Cook	Red P	Crawler	Neck	1	Medium Contamination
CO Spr Cook	Red P	Crawler	Hands	29	Medium Contamination
CO Spr Cook	Red P	Fire Fighter	Seat	1.3	Medium Contamination
CO Spr Cook	Red P	Fire Fighter	Hands	56	Medium Contamination
CO Spr Cook	Red P	Fire Fighter 1	Arm	0.59	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 1	Neck	0.61	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 1	Foot	49	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 2	neck	0.46	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 2	Arm	0.7	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 2	Foot	15	High Contaminatin
CO Spr Cook	Red P	Mike	Neck	0.3	Medium Contamination
CO Spr Cook	Red P	Mike	Arm	0.36	Medium Contamination
CO Spr Cook	Red P	Mike	Foot	11.7	Medium Contamination
CO Spr Cook	Red P	Nicola	Neck	0.19	Low Contamination
CO Spr Cook	Red P	Nicola	Arm	0.45	Low Contamination
CO Spr Cook	Red P	Nicola	Foot	0.78	Low Contamination
North Metro Invest	Red P	Police	Neck	0.055	Investigation
North Metro Invest	Red P	Police	Neck	0.059	Investigation
North Metro Invest	Red P	Police	R Foot	0.1	Investigation
North Metro Invest	Red P	Police	R Foot	0.11	Investigation
North Metro Invest	Red P	Police	Neck	0.14	Investigation
North Metro Invest	Red P	Police	R Foot	0.19	Investigation
North Metro Invest	Red P	Police	Neck	0.2	Investigation
North Metro Invest	Red P	Police	R Arm	0.23	Investigation
North Metro Invest	Red P	Police	R Foot	0.25	Investigation
North Metro Invest	Red P	Police	R Arm	0.31	Investigation
North Metro Invest	Red P	Police	R Foot	0.37	Investigation

North Metro Invest	Red P	Police	R Arm	0.38	Investigation
North Metro Invest	Red P	Police	R Arm	0.39	Investigation
AD CO Meth Lab	Red P	Police	Hands	0.5	Investigation
AD CO Meth Lab	Red P	Police	Hands	0.5	Investigation
North Metro Invest	Red P	Police	R Foot	0.58	Investigation
AD CO Meth Lab	Red P	Police	Hands	0.93	Investigation
North Metro Invest	Red P	Police	R Arm	1.3	Investigation
North Metro Invest	Red P	Police	R Foot	1.4	Investigation
North Metro Invest	Red P	Police	R Arm	1.6	Investigation
AD CO Meth Lab	Red P	Police	Chest	ND	Investigation
AD CO Meth Lab	Red P	Police	Gloves	ND	Investigation
AD CO Meth Lab	Red P	Police	Gloves	ND	Investigation
AD CO Meth Lab	Red P	Police	Knee	ND	Investigation
Ad CO Meth Lab2	Red P	Police	Hands	ND	Investigation
North Metro Invest	Red P	Police	Neck	ND	Investigation
North Metro Invest	Red P	Police	R Arm	ND	Investigation
North Metro Invest	Red P	Police	Neck	ND	Investigation
North Metro Invest	Red P	Police	Neck	ND	Investigation
CO Spr Cook	Red P	Shawn	Arm	0.075	Low Contamination
CO Spr Cook	Red P	Shawn	Arm	0.32	Medium Contamination
CO Spr Cook	Red P	Shawn	neck	0.62	Medium Contamination
CO Spr Cook	Red P	Shawn	Neck	0.69	Low Contamination
CO Spr Cook	Red P	Shawn	Foot	1.7	Low Contamination
CO Spr Cook	Red P	Shawn	Foot	2.3	Medium Contamination
CO Spr Cook Invest	Red P		R Arm	4.3	Investigation
CO Spr Cook Invest	Red P		R Back	5.7	Investigation
CO Spr Cook Invest	Red P		Neck	5.8	Investigation
CO Spr Cook Invest	Red P		R Arm	7.4	Investigation
CO Spr Cook Invest	Red P		Neck	8.3	Investigation
CO Spr Cook Invest	Red P		Neck	9.1	Investigation
CO Spr Cook Invest	Red P		R Arm	12	Investigation
CO Spr Cook Invest	Red P		R Arm	14	Investigation
CO Spr Cook Invest	Red P		R Back	23	Investigation
CO Spr Cook Invest	Red P		R Back	26	Investigation
CO Spr Cook Invest	Red P		R Back	230	Investigation
CO Spr Cook Invest	Red P		Neck	ND	Investigation
			Count	**54**	
			Mean	**9.8**	
			Median	**0.655**	
			Minimum	**0.055**	
			Maximum	**230**	

The samples obtained from the Colorado Springs Cook were obtained the day after a simulated cook had been conducted in that building. The contamination resulted from firefighters entering the house and participating in varying degrees of activity. The rest of the laboratories were actual clandestine laboratory operations conducted by law enforcement. A total of 64 samples were collected with 54 of the samples indicating some contamination (84%). The mean level of contamination was 9.8 µg/sample with the

median contamination level of 0.66 µg/sample. These levels are relatively low and represent only minimal contamination but a high level of 230 µg/sample was found on one officer, indicating that higher levels of contamination are possible.

We also collected wipe samples from firefighters entering a structure a day after conducting a simulated clandestine methamphetamine cook. The results were:

Activity Related Exposures

Date	Cook Type	Description	Location	Results	Notes
CO Spr Cook	Red P	Fire Fighter 1	Arm	0.59	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 1	Neck	0.61	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 1	Foot	49	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 2	Foot	15	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 2	neck	0.46	High Contaminatin
CO Spr Cook	Red P	Fire Fighter 2	Arm	0.7	High Contaminatin
			Mean	**11.1**	
			Median	**0.7**	
CO Spr Cook	Red P	Shawn	neck	0.62	Medium Contamination
CO Spr Cook	Red P	Shawn	Arm	0.32	Medium Contamination
CO Spr Cook	Red P	Shawn	Foot	2.3	Medium Contamination
CO Spr Cook	Red P	Mike	Arm	0.36	Medium Contamination
CO Spr Cook	Red P	Mike	Foot	11.7	Medium Contamination
CO Spr Cook	Red P	Mike	Neck	0.3	Medium Contamination
CO Spr Cook	Red P	Fire Fighter	Seat	1.3	Medium Contamination
CO Spr Cook	Red P	Fire Fighter	Hands	56	Medium Contamination
CO Spr Cook	Red P	Crawler	Neck	0.54	Medium Contamination
CO Spr Cook	Red P	Crawler	Neck	1	Medium Contamination
CO Spr Cook	Red P	Crawler	Hands	29	Medium Contamination
			Mean	**9.4**	
			Median	**1.0**	
CO Spr Cook	Red P	Shawn	Foot	1.7	Low Contamination
CO Spr Cook	Red P	Shawn	Neck	0.69	Low Contamination
CO Spr Cook	Red P	Shawn	Arm	0.075	Low Contamination
CO Spr Cook	Red P	Nicola	Neck	0.19	Low Contamination
CO Spr Cook	Red P	Nicola	Arm	0.45	Low Contamination
CO Spr Cook	Red P	Nicola	Foot	0.78	Low Contamination
			Mean	**0.6**	
			Median	**0.6**	

The firefighters were told to act as individuals in the house under three scenarios. The low contamination scenario involved simply entering the house and walking around. The medium contamination scenario included moving items and moving throughout the house. The third scenario involved significant movement, horseplay, and vacuuming in

the house. The data shows a general increase in the contamination levels depending upon the activity level. Mean contamination levels ranged from a mean of 0.6 μg/sample for low contamination to a mean of 11 μg/sample for individuals involved in more active activities. The highest contamination levels were observed on the feet where contact with the carpeting was high. Sampling within the house indicated that the carpeting had become very contaminated due to the simulated cook and therefore foot contamination would be expected.

Conclusions:

In this report we provide the results of 227 wipe samples taken from individuals who participated in simulated clandestine methamphetamine cooks or actual suspected methamphetamine laboratory investigations, or individuals who were suspects in a suspected laboratory investigation. Sixty-eight percent of those individuals were found to be contaminated with some level of methamphetamine. The level of contamination was generally low if the individual simply entered the laboratory while a cook was not being conducted and contamination increased as activity increased or if the cook was actually being conducted. The highest levels were generally found on individuals participating in the cook although one high level was detected on the hands of an individual investigating an actual suspected laboratory.

In the case of the simulated cooks, the amount of contamination observed was the result of 1 or 2 cooks. It is possible, therefore, that the amount of contamination on individuals could increase when entering structures with a higher degree of contamination. It is also possible for very large exposures if an accident occurs or if a chemical is inadvertently handled. It is likely that this is what happened in the instance of one officer contaminating his hands at a level of 230 μg/sample in an actual laboratory investigation.

This study does note, however, that general contamination to methamphetamine by simply walking into a clandestine methamphetamine laboratory is relatively low and likely is less than 1 μg/100 cm^2. The primary contamination will be on the feet and hands since these are the surfaces most likely to contact surrounding contaminated materials (carpeting, furniture, etc.). These results should be comforting to individuals that accidently enter a structure where methamphetamine has been manufactured and simply meet with the occupants. Child protective services and social services workers are not likely to become highly contaminated during normal visits.

In addition, contamination on individuals that reside within these laboratories, especially children, does not seem to be high. The possibility of these children contaminating school property or other children appears to be relatively low since the level of contamination on lab-associated children was found to be low. In addition, the contamination is most likely on porous clothing that will not release significant amount of methamphetamine contamination to other surfaces. This does not preclude a child that has become heavily contaminated due to an accident from entering a school but such contamination is more likely to be observed by teachers and staff due to the associated chemical odors.

The information contained in this report was obtained from only a few actual clandestine methamphetamine laboratories and a few simulated laboratories. Many of the samples from the simulated laboratories were obtained from chemical protective clothing that is smooth and impermeable, thus allowing much of the contamination to be removed by the wipe sample. Samples of actual clothing would likely be lower since not all of the methamphetamine would be removed. In addition, the only compound for which we tested was methamphetamine. Other compounds may have been present and may constitute a greater danger. We do expect, however, that the primary contaminant associated with these clandestine laboratories is methamphetamine.

This report should not be interpreted to suggest that law enforcement officers could enter suspected methamphetamine laboratories without proper personal protective equipment. Although many laboratories could be entered without danger, the potential for an exposure that would be capable of causing significant medical consequences is likely.[11] In fact, many officers responding to suspected methamphetamine laboratories have reported symptoms associated with those investigations.[6,9,10] In addition, we still do not have good information regarding long-term exposure to methamphetamine.

This report should also not be interpreted to suggest that decontamination of individuals involved with methamphetamine laboratories should not be conducted. Good public health practices require that exposure to hazardous chemicals be confined to easily manageable areas and that community spread of these chemicals be minimized. A number of significant medical events have occurred when contaminated individuals have been transported to medical facilities without proper decontamination.[6,7] The study may indicate, however, that inadvertent contact with individuals taken from a suspected methamphetamine laboratory does not result in a health emergency for the individual. This is especially true if the suspected contact is of short duration and there is no sign of a chemical accident.

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