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Wyoming's Lab Loop

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Chronic Kidney Disease and *e*GFR

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In the world of medical technology, we are always throwing around abbreviations; CBC, CMP, HCT, BUN… It's time to add a new abbreviation to our list: *e*GFR = Estimated Glomerular Filtration Rate. GFR is important in helping early detection of Chronic Kidney disease (CKD). In the United States, CKD affects around 1 in 9 adults. With the mean age of "Baby Boomers" increasing, we can also expect CKD to increase. 1in 9 Adults, or approximately 20 million people, are afflicted with CKD with another 20 million at risk for developing the disease.

Chronic Kidney Disease is any condition that causes damage to your kidneys and/or the kidneys' ability to function properly. Hypertension (high blood pressure) and diabetes are the two main causes of CKD but other conditions such as repeat urinary tract infections, kidney stones, autoimmune diseases such as Lupus, and glomerulonephritis can also lead to CKD.

Symptoms of CKD develop slowly over time, and can include poor appetite, trouble sleeping, leg cramps and increased urination, swollen ankles and feet, dry itchy skin, morning eye puffiness, loss of concentration, and less energy. Not all patients experience all symptoms. These symptoms are not solely caused by CKD, but are caused by a variety of different conditions making early detection difficult. Early detection can often keep CKD from developing into kidney failure.

Patients with certain risk factors should ask their healthcare provider about their risk of developing CKD. Patients are at higher risk if they have diabetes, high blood pressure, a family history of CKD or are descendant of African Americans, Hispanic Americans, Asian Pacific Islanders and American Indians. As a person ages the risk of developing CKD increases.

Glomerular Filtration Rate (*e*GFR) is the volume of fluid filtered from the renal glomerular capillaries into the Bowman's capsule. *e*GFR is the best test to measure kidney function and determine the different stages of kidney disease. *e*GFR can be calculated by using the patients creatinine result, age, race and gender.

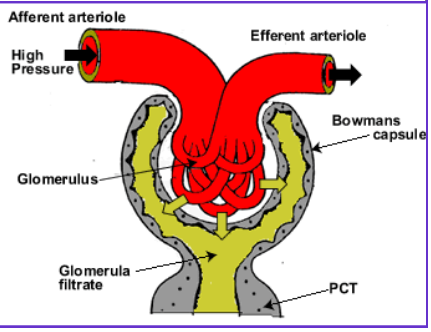
Inside this issue:

Over the years there has been several different formulas used to calculate *e*GFR. The Cockcroft and Gault formula was developed in 1973 and does not adjust for body surface area, and has a relatively small sample pool of only male patients. The Modification of Diet in Renal Disease Study (MDRD) equation was first developed in 1999 using data from more than 1,600 patients with CKD who all had a GFR between 5 to 90 mL/min/1.73 m^2.

Continued Pg 3

Bowman's capsule

Click4biology.com



Wyoming Public Health Laboratories Move into a New Facility

After participating in the ground breaking on May 20, 2009, then watching the structure slowly take shape over the following months, Wyoming's new public health labs began moving into their new facility on November 1, 2010. Now known as *Combined Laboratories Facility*, the Department of Criminal Investigation (DCI), Department of Environmental Quality (DEQ), Public Health Laboratories, (Microbiology, Bioterrorism Response, and Chemical Testing) are housed under one roof. We are located on the south edge of Cheyenne at 208 South College Drive. Even though we have a new Fed Ex/UPS zip code, our contact information remains the same.

Combined Laboratories comes equipped with comprehensive security systems, which is necessary to ensure sample chain of custody in Chemistry and DCI, restrict access to select agents in the Biosafety Level III Lab, and to protect laboratory employees. All employees have access to general areas, such as offices, training areas, administration, and break areas.

The Public Health Laboratories (Chemistry, TB/BSL III, & Micro) are now occupying approximately 40,100 square feet. In many areas, we have expanded our spaces making the laboratories very user friendly with an open floor plan that allows for generous work areas and lots of natural light; but, as with any laboratory facility, our storage areas have filled up quickly!

Every laboratory is under negative pressure and is monitored by electronic displays at each laboratory entrance. State of the art security systems are installed and allow for 24-7 monitoring of the entire facility.

General Microbiology, Serology, STD Testing, Molecular Testing, Pulse Field Gel Electrophoresis, and Water Testing are all functioning at full capacity. The BSL III Select Agent Lab, has yet to move from the old facility at the Hathaway Building located downtown next to the state capitol.

The new BSL III facility has been designed with secure doors, with biosecurity entrances requiring pass codes and hand print identification. The area also boasts of pass-through autoclaves, and a shower-out exit. All of this is in place to protect the technologist and the facility, but cannot be utilized until the facility passes commissioning, then inspection by the Centers for Disease Control and Prevention (CDC) Select Agent Program. All of this takes time and patience. The BSL III hopes to be functioning at the new facility within the next 3 to 6 months.

Last but not least, the Combined Labs Facility has a new training lab! The lab is shared by Microbiology, Select Agent, and Chemical Testing and will function as a wet lab outfitted with a biological safety cabinet, sinks and supplies, and all the AV equipment needed to hold training classes. The training possibilities are endless, and in the future the training laboratory will hopefully be used to educate not only partners in law enforcement and the lab, but expanded into the community to promote preparedness education.

Front entrance to the new Combined Laboratories Facility

Wyoming's Lab Loop

Wyoming Combined Laboratories

Public Health Lab
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http://www.health.wyo.gov/PHSD/lab/index.html

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CKD & eGFR continued pg 1...

The most common calculation used today is the equation updated in 2005 and uses a standardized serum creatinine. The equation is:

GFR = 175 x (Standardized S_{cr})$^{-1.154}$ x (age)$^{-0.203}$ x (0.742 if female) x (1.210 if African American)

GFR is reported in mL/min/1.73 m^2, S_{cr}: serum creatinine in mg/dl and age is in years.

CKD is defined in 5 stages. As noted in the chart below, the GFR decreases as the kidney disease progresses. New guidelines from the Centers for Medicare & Medicaid Services (CMS) for diagnosing CKD require documenting the stage of disease for proper diagnoses codes.

Glomerular Filtration Rate (GFR)	Stage	Risk factors for kidney disease (e.g., diabetes, high blood pressure, family history, older age, ethnic group)
Greater than 90	1	Kidney damage (protein in the urine) and **normal** GFR
60 to 89	2	Kidney damage and **mild** decrease in GFR
30 to 59	3	**Moderate** decrease in GFR
15 to 29	4	**Severe** decrease in GFR
Less than 15	5	**Kidney failure** (dialysis or kidney transplant needed)

The National Kidney Disease Education Program encourages laboratories to automatically report *e*GFR when serum creatinine is ordered. The NKDEP recommends reporting eGFR values ***above 60 mL/min/1.73 m^2*** simply as >60 mL/min/1.73 m^2. For values ***60 mL/min/1.73 m^2 and below***, the report should give the numerical estimate rounded to a whole number.

Is your laboratory reporting *e*GFR? If not, you should be. It's easy, and does not incur any cost to your lab. Testing can detect early stages of CKD before the other signs and symptoms start and it is the right thing to do to provide quality care to patients in your facility.

A free GFR calculator can be found at the following website: http://www.kidney.org/professionals/kdoqi/gfr_calculator.cfm or http://mdrd.com/.

Courier Exercise Held in 2009

As part of the agreement made between the Northern Plains States, (North Dakota, South Dakota, Montana, and Wyoming) an exercise was conducted in August of 2009 to analyze the use of these states' courier systems. The exercise was designed to analyze the feasibility and function of the courier systems' abilities to deliver samples across state lines in the case of air travel being unavailable. Please refer to the poster on **page nine** of this publication, which outlines the process and describes the exercise results.

Is there anyone out there who has researched a topic and would like to publish in the *Wyoming's Lab Loop*? Please consider sharing your research with your peers and submitting referenced articles, between 500 - 1,000 words, to the co-editors listed on page 2 of this publication.

CKD & eGFR References

1. Dr. Grace Kim, Montana Nephrology Associates, P.C.; 2411 Village Lane; Billings, MT 59102

2. The National Kidney Foundation; http://www.kidney.org/kidneydisease

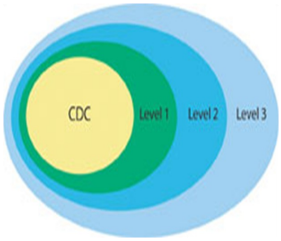
3. The National Kidney Disease Education Program (NKDEP), http://www.nkdep.nih.gov/labprofessionals

4. Wikipedia, The free encyclopedia: http://en.wikipedia.org/wiki/Glomerular_filtration_rate

5. LabCorp: http://www.labcorp.com/pdf/hs_TechReview_eGFR_kidney_disease_2402.pdf

Chemical Terrorism Laboratory Response Network (LRN-C)

The CDC has built a system of state laboratories called the Laboratory Response Network. State, territorial and metropolitan public health laboratories are members of the chemical terrorism component (LRN-C) of the network. The participating laboratories vary in their capability to analyze human clinical specimens for chemical agents and are therefore designated LRN-C Level-One, Two, and Three. The CDC laboratory I the highest complexity Rapid Toxic Screening (RTS) lab with 10 smaller RTS labs located in state public health labs and designated as a LRN-C Level-One laboratories; LRN-C Level-Two provides more limited RTS analysis in almost every state public health lab; All health labs are LRN-C Level-Three serving as a clearing-house for receiving and shipping clinical samples and data processing. WPHL is a Level-Three facility. All state public health labs are LRN-C Level-Three facilities. CDC directs the sample flow from Level-Three laboratories to appropriate laboratories for analysis. Because such analyses are complex and the number of trained personnel in each laboratory is limited, the sample load is spread throughout the country to solve the surge capacity problem and provide a reasonable turn-around time.



The Medical Facility's Responsibility to a CT Event

If the medical facility is informed or suspects that victims are presenting as a result of a chemical exposure event, call 911. The medical facility's immediate response will be to ensure the safety of its own first-receiver personnel. Contaminated clothing or off-gassing of the toxin from patients could incapacitate first-receivers, thus disabling the entire medical facility. Medical staff or first receivers must ensure that victims are decontaminated and are "exam ready" prior to entering a medical facility.

Planning on the part of the facility must address the following possibilities:

- The need to decontaminate large numbers of casualties.
- The need for extra staff or volunteers trained in phlebotomy, and transcribing and managing patient data.
- The need to keep staff and volunteers safe from possible contamination or off-gassing from exposed patients.

During a CT Event, symptomatic victims will receive treatment in accordance with professional medical protocol. CDC's RTS is not intended to be an immediate pre-treatment diagnostic. A cohort of 40 initial exposed-patient specimens should be tested at the CDC- RTS lab to determine what chemical caused the event. All other exposed and potentially exposed triaged patients would have specimens held for further exposure testing. Most agents can be detected up to 8 hours after exposure for blood and 4 – 8 hours for urine. An exception would be Thiodiglycol (a break-down product of mustard), which may be detected in the urine up to 2 weeks following exposure. The CDC-EOC consultation services (see phone numbers next page) can help determine when blood and urine samples should be taken (the sooner the better). All specimens must be properly labeled, in accordance with CDC instructional documents that can be found on the following website: http://www.bt.cdc.gov/labissues/pdf/shipping-samples.pdf . A Chain Of Custody (COC) form must be initiated (one COC is sufficient for the entire batch). ***Children*** *will have only urine specimens obtained.*. Blood is refrigerated (4 °C) and urine is frozen (-70 °C—dry ice temperature or -20 °C if -70 °C is not available) as soon as possible. Samples drawn outside the window of opportunity may cause a negative or erroneous result.

Wyoming PHL Responsibilities to a CT Event

WPHL will provide telephone consultation which can be initiated through our 24/7 hotline: 888-996-9104. The CT Coordinator's primary mission is to ensure that all clinical samples are properly collected, labeled, packaged, and shipped to the WPHL (LRN-C Level Three facility). The clinical samples will be transported using all strategies available (WPHL state-wide courier service (Action Cargo 307-266-2229, military, law enforcement, medical facility courier, WPHL staff, commercial courier…..)

When the clinical samples arrive at the WPHL, each sample will be entered into the WPHL database and shipped to the CDC or other laboratories for testing. When laboratory results are returned to WPHL, they will be made available to the medical facilities.

Sample Routing

In a chemical emergency event, and when the WPHL receives blood and urine specimens resulting from an exposure event, the blood specimens are refrigerated and the urine specimens are frozen before they are transported to the CDC or another laboratory. At the CDC's direction, 40 samples (maximum) will be sent to the CDC laboratory in Atlanta. This laboratory has the capability of identifying hundreds of chemical toxins with a very small sample size in a very short time. Once the qualitative assessment is made and the proper analytical method is determined, WPHL will be directed to send the remainder of the samples to various state (LRN-C Level One or Two facility) laboratories throughout the United States to provide quantitative results for each sample. This specimen routing scheme utilizes the vast laboratory resources available nationally, alleviating the surge capacity problem that would otherwise stifle the output of sample results. This scheme has been determined by CDC to minimize turn-around time for a maximum sample load.

911 - Not Your Only Option: Some Important Numbers

Our medical facilities are not alone in the event of a chemical exposure. Here are some important numbers to keep handy in case your facility ever responds to a chemical event:

Wyoming Public Health Emergency Preparedness 24/7 Hotline:
1-888-996-9104

Poison Control Center:

1-800-222-1222 (for medical consult)

Specimen handling and shipping consultation:(WY LRN-C)
24/7 main phone: 888-996-9104

CT Coordinator: Carrie Dornak 307-214-6426

Laboratory Preparedness Supervisor: Shawna Dereemer 307-631-6087

Laboratory Preparedness Program Advisor: Gale Stevens 307-631-9949

Agency for Toxic Substance and Diseases Registry (ATSDR):

For ATSDR consult, contact the CDC-EOC or link to comprehensive toxic substances information at: http://www.bt.cdc.gov/Agent/AgentlistChem.asp

CDC-Emergency Operations Center (EOC)-Activation of the Rapid Toxic Screening (RTS) Lab: 770-488-7100 -- Ask for the National Center for Environmental Health-Dr Jerry Thomas (770-488-7279) to consult or activate the CDC Rapid Response Team asset to fly in and transport specimens to the CDC Rapid Toxic Screening Lab.

http://www.bt.cdc.gov/emcontact/

http://www.bt.cdc.gov/

Types of Chemical Agents and their Symptoms

Agents that cause the most concern are **nerve agents**. Sometimes called nerve gas, a nerve agent actually does not disperse in a gaseous state, but is heavier than air and emits vapors. The most commonly known nerve agents are organophosphates and are available at any home and garden store. Insecticides are nerve agents. They are water and fat soluble and can quickly penetrate eyes, nares and mucous membranes, skin and clothing. Once in the body a nerve agent acts on the nerve system by inhibiting acetylcholinesterase. Nerve agents cause pupil dilation, drooling, choking, vomiting, loss of bladder and bowel control, and rapid heartbeat. When in contact with the skin, profuse sweating, muscle weakness, and flaccid paralysis can occur. Left untreated, death can result from exposure.

Choking agents, such as chlorine, cyanide and phosgene, were utilized as chemical weapons. These are lung-damaging and attack lung tissue directly. The mechanism is not readily understood, but the end result is pulmonary edema and even death.

In the case of phosgene, it emits an odor reminiscent of fresh mown grass. It is heavier than air and can accumulate in the body because the body does not detoxify it. If an exposure to phosgene is detected, it is most definitely purposeful because it is not a normal product of manufacturing, such as chlorine.

In small doses, this agent's symptoms can be delayed up to 3 hours. In a large exposure, the agent causes rapid death. Direct exposure to it in liquid form can cause blisters on the skin and corneal abrasions.

Metal agents, such as arsenic, can be used to produce arsine. Arsine is arsenic in its most deadly form and can also be used as a chemical warfare agent due to its "denser than air" properties.

Metal poisoning leads to massive hemolysis of red blood cells. Acute poisoning leads to nausea and vomiting, diarrhea, electrolyte imbalance, shock, kidney failure, coma and respiratory paralysis. If a victim of arsenic poisoning survives, they will most likely have permanent liver or kidney damage. Chronic exposure to arsenic can result in it being stored for long periods of time in the body where it binds to the liver, hair, skin, nails and kidneys.

Metals used as weapons have been discarded because other agents, such as blister and nerve agents are much easier to disperse and react with the human body more rapidly.

The most commonly known **blister agents** are the mustard agents. Historically, these agents have been used in warfare. These agents can cause particular problems because they are heavier than water and can stick around for long periods of time. They also can rapidly penetrate clothing and skin and if not treated rapidly will cause severe injury. These agents can be distributed either by gas or liquid. The mechanism of blister agents is not easily explained but once in the body can bind with nitrogen or sulphur containing molecules and will destroy large amounts of cellular structures. Blister agents can also destroy DNA. Because of their mutagenic properties, exposure to blister agents can lead to increased risk of lung cancer, bladder cancer and leukemia.

Last but not least, the **Blood Agents** involve hydrogen cyanide and carbon monoxide, amongst others. The cyanogens (CK) have been used in large quantities in World War II, and most recently in Iraq against the Kurds in the 1980's. The cyanogens are extremely lethal in large exposures and are toxic to the pulmonary system similar to chlorine or phosgene in lower exposures. These agents will cause death within 6 - 8 minutes of a lethal exposure.

CK is referred to as blood agents because they are disseminated through the body by being rapidly absorbed by the blood then distributed to the tissues. The poison interrupts the ability of the cells to utilize oxygen and damages oxygen dependant organs such as the brain and heart.

CK is an organic precursor in some mining and metalworking processes so an emergency department may see this presentation due to an industrial accident.

CK, including carbon monoxide, is also a byproduct of smoke inhalation caused from house fires or industrial fires.

Reference: medscape.com

Example of Pupil dilation. Bmj.com

The defense forces' top explosives ordnance disposal expert with some phosgene gas aerial bombs unearthed from a burial pit at Marrangaroo military base, Australia.

lithgowmercury.com.au

Example of chronic arsenic poisoning - deposited in skin. dmsachelation.com

Example of the affects of a blister agent. kcvs.ca

Cyanides are released as a byproduct when plastics, wool, or silk are burned.

medscape.com

CHEMICAL TERRORISM WORD SCRAMBLE

1. SESRLTIB _ _ _ _ _ _ _ _
2. ETAIDLD _ _ _ _ _ _ _
3. TOCATNNMEEDAI _ _ _ _ _ _ _ _ _ _ _ _ _ _
4. EAWOPN _ _ _ _ _ _
5. ESRPDSEI _ _ _ _ _ _ _ _
6. HDPEOEINGS _ _ _ _ _ _ _ _ _ _
7. IKNCHOG _ _ _ _ _ _ _
8. ENERV _ _ _ _ _
9. TYOTCIIX _ _ _ _ _ _ _ _
10. ACSEICLMH _ _ _ _ _ _ _ _ _
11. EATLM _ _ _ _ _
12. GOIIOPSNN _ _ _ _ _ _ _ _ _
13. NLOIDORG _ _ _ _ _ _ _ _
14. IYEDKN _ _ _ _ _ _
15. GIDBINN _ _ _ _ _ _ _
16. NTILONAINET _ _ _ _ _ _ _ _ _ _ _
17. APRDI _ _ _ _ _
18. LDOOB _ _ _ _ _
19. TORDUSITCNI _ _ _ _ _ _ _ _ _ _ _
20. FREWRAA _ _ _ _ _ _ _
21. EENSINRGC _ _ _ _ _ _ _ _ _
22. OYMMPSST _ _ _ _ _ _ _ _
23. MESOHLISY _ _ _ _ _ _ _ _ _
24. AEVYH _ _ _ _ _

HSEEP

The Homeland Security Exercise and Evaluation Program (HSEEP) is a capabilities and performance-based exercise program that provides a standardized methodology and terminology for exercise design, development, conduct, evaluation, and improvement planning.

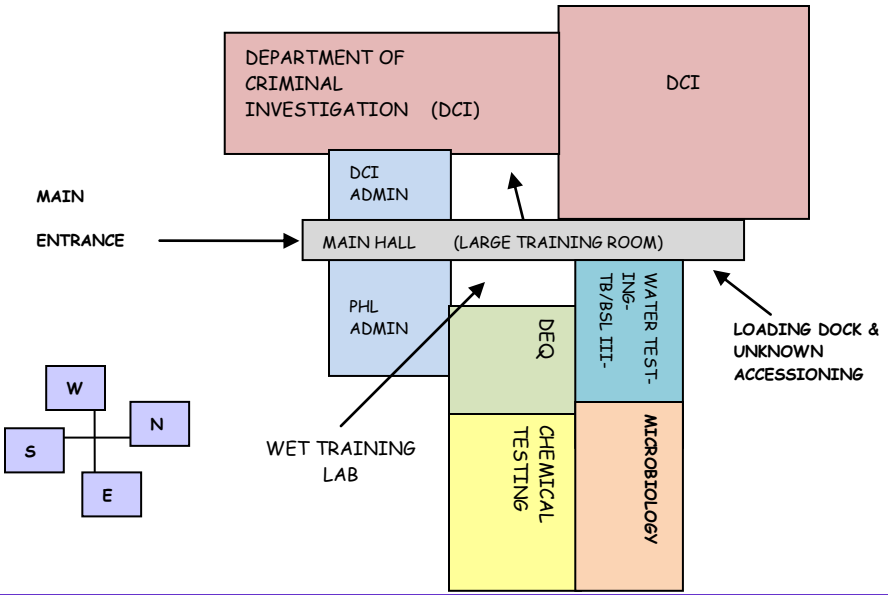
The HSEEP constitutes a national standard for all exercises.

Through exercises, the National Exercise Program supports organizations to achieve objective assessments of their capabilities so that strengths and areas for improvement are identified, corrected, and shared as appropriate prior to a real incident. Exercises allow homeland security and emergency management personnel, from first responders to senior officials, to train and practice prevention, protection, response, and recovery capabilities in a realistic but risk-free environment. Exercises are also a valuable tool for assessing and improving performance, while demonstrating community resolve to prepare for major incidents.

The HSEEP is maintained by the Federal Emergency Management Agency's National Preparedness Directorate, Department of Homeland Security.

CHEMICAL TERRORISM WORD SCRAMBLE KEY

1. SESRLTIB — b l i s t e r s
2. ETAIDLD — d i l a t e d
3. TOCATNMEEDAI — d e c o n t a m i n a t e
4. EAWOPN — w e a p o n
5. ESRPDSEI — d i s p e r s e
6. HDPEOEINGS — d i s p o s a b l e
7. IKNCHOG — c h o k i n g
8. ENERV — n e r v e
9. TYOTCIIX — t o x i c i t y
10. ACSEICLMH — c h e m i c a l s
11. EATLM — m e t a l
12. GOIIOPSNN — p o i s o n i n g
13. NLOIDORG — d r o p l i n g
14. IYEDKN — k i d n e y
15. GIDBINN — b i n d i n g
16. NTILONAINET — i n t e n t i o n a l
17. APRDI — r a p i d
18. LDOOB — b l o o d
19. TORDUSITCNI — d i s t r u c t i o n
20. FREWRAA — w a r f a r e
21. EENSINRGC — s c r e e n i n g
22. OYMMPSST — s y m p t o m s
23. MESOHLISY — h e m o l y s i s
24. AEVYH — h e a v y



Rough (not to scale) Schematic of Wyoming Combined Laboratories, Cheyenne, WY

Transportation of Samples Via Courier in the Northern Plains States

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NORTHERN PLAINS CONSORTIUM

ABSTRACT

The Northern Plains Consortium, comprised of state public health professionals in Montana, North Dakota, South Dakota and Wyoming, participated in a Food Emergency Response exercise to determine if samples could be transported via a courier between our four laboratories in case air travel was unavailable. This exercise was supported by Montana's 2008-09 FERN Cooperative Agreement.

The objectives of this exercise were:

1. Determine the feasibility of using ground transportation through an existing courier system to transport samples across state lines
2. Understand the specific challenges of using this method of transportation, and steps that are necessary to ensure success
3. Assess specimen integrity during the summer months when ambient temperatures may be high

Pre-planning through conference calls allowed the couriers and the states to work out logistics prior to the start of the exercise. Communication between the four state Public Health Laboratories, the courier system contacts and the courier drivers worked well. Having an existing system to contact each of the state Public Health Laboratories 24/7/365, and a listing of courier contacts also contributed to the success of this exercise.

By using temperature abuse indicators, it was determined that the amount of blue ice packs included in the cooler was not adequate during transit times of 12 - 14 hours during the summer months in the Northern Plains states, which would be noted for future shipments.

This exercise showed that it is feasible to use ground transportation through existing courier systems to transport samples across state lines. Because of cost, it would not be practical to do a four way exchange of samples because of the vast distances between the Northern Plains states. However, only sending samples one way to one state Public Health Laboratory could be workable.

EXERCISE DESIGN

Three identical Styrofoam boxes containing the same number and size of blue ice packs, frozen at -20°C, and a temperature abuse indicator were packaged at each state Public Health Laboratory and labeled for delivery to the other three Public Health Laboratories. The temperature abuse indicator was affixed to a small brown box in the center of the Styrofoam cooler.

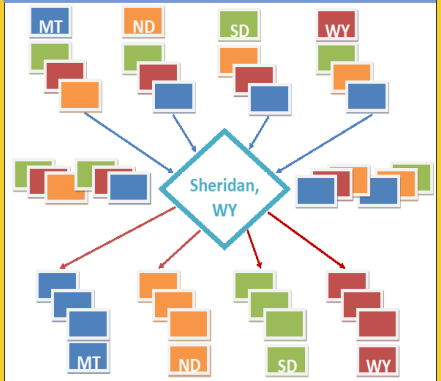
On the morning of the exercise, the courier serving that state Public Health Laboratory picked up the boxes and drove them to Sheridan, WY, the predetermined rendezvous point. At the time of pickup, each courier driver supplied contact information (name, cell phone number and the color and make of the vehicle). This information was forwarded to the Montana Public Health Laboratory who then provided that information to each courier. Tracking forms were provided to each courier driver to record the release time, the arrival time in Sheridan, WY, and the arrival time back at the originating state Public Health Laboratory.

When the packages were received, they were immediately opened and the condition of the temperature abuse indicator was recorded. Since the packages arrived after normal business hours, use of either the 800# 24/7 emergency system, or prior arrangement to have packages delivered to a certain home address was also exercised.

The four courier systems involved were:
Montana: Medical Logistic Solutions
North Dakota: Integrated Commercial Solutions
South Dakota: Avera Laboratory Network
Wyoming: Action Cargo Express/American Courier Corporation

Two conference calls were convened prior to the exercise between the courier system contacts and appropriate staff at each state Public Health Laboratory. These calls worked out the logistics, using the expertise of the courier system contacts, and decided on a plan of action.

PACKAGE EXCHANGE DIAGRAM



RESULTS

All courier drivers left the originating state Public Health Laboratories between 7:38 and 8:25 a.m., and arrived in Sheridan, WY within 30 minutes of the target 2:30 pm. Packages were exchanged at the following recorded times:

Exchange Times in Sheridan WY (all times Mountain Time)

Originating State	Time Exchanged with MT	Time Exchanged with ND	Time Exchanged with SD	Time Exchanged with WY
Montana		2:40 pm	2:15 pm	1:45 pm
North Dakota	2:30 pm		2:30 pm	2:30 pm
South Dakota	2:15 pm	2:30 pm		2:15 pm
Wyoming	1:45 pm	2:42 pm	2:15 pm	

Packages were received back at the destination state Public Health Laboratories at the following times, and transit hours were computed. In Montana and North Dakota, the courier drivers called the emergency 800# and contact was made with either the Lab Manager in charge (MT), the microbiologist on call (ND), or the Lab Director (SD) so that they could meet at the Public Health Laboratory. In Wyoming arrangements were made for the packages to be delivered to the BT Coordinator.

Receipt Time at Destination Public Health Laboratory

	Time Received in MT	Time Received in ND	Time Received in SD	Time Received in WY
	10:00 pm (MT)	10:15 pm (CT)	9:16 pm (CT)	7:51 pm (MT)
Hours in Transit	14 hrs 15 min	13 hrs 20 min	13 hrs 38 min	12 hrs 9 min

The condition of the temperature abuse indicator was assessed at arrival. Packages from ND, SD and MT had the indicator affixed to the top of the brown box, and all of these indicators showed moderate abuse. WY packages had the indicator affixed to the inside of the brown box in the cooler, more closely simulating where samples would be located, and in all 3 states receiving those packages, the indicator showed no abuse (SD), was slightly less compromised (MT), or showed moderate temperature abuse (ND, WY).

Costs were determined by the individual courier system and invoiced to the Montana Public Health Laboratory.

Costs

Originating State	Number of Miles, One Way	Total Cost
Montana	370 miles	$1101.00
North Dakota	475 miles	$1384.17
South Dakota	415 miles	$1511.10
Wyoming	325 miles	$ 520.80
	Total Exercise Cost	$ 4517.07

DISCUSSION

This exercise showed that it is feasible to use ground transportation through existing courier systems to transport samples across state lines. The contacts at the courier systems were able to work out the logistics and determine the best rendezvous point for all four systems.

This exercise was also useful in providing contact information for courier services in each state, since specimens near the borders may be better served with other courier systems in an emergency situation.

By using the temperature abuse indicators, it was determined that the four smaller blue ice packs that were included in the larger cooler were not adequate during transit times of 12 – 14 hours during the summer months in the Northern Plains states. If cold samples had been also present in the cooler, this would have aided in maintaining the temperature, but packaging with more or larger blue ice packs would be recommended.

There were challenges in using this method of transportation. This courier system is expensive, as it cost $4517.07 to transport the packages between the four state Public Health Laboratories. Even if the exchange was between only two laboratories, the most economical exchange would be between Montana and Wyoming, and that would have cost $1621.80. Maintaining communication between the courier drivers was also problematic, as cell phone service was not always available over the vast distances traveled.

There were steps taken that ensured the success of this exercise. The ability to pre-plan through the conference calls allowed us to work out all the logistics prior to the start of the exercise. Communication between the four state Public Health Laboratories, the courier system contacts and the courier drivers worked well. Having a system already in place to contact someone after hours at each of the state Public Health Laboratories also contributed to the success of this exercise.

CONCLUSIONS

Although this exercise shows that it is possible to exchange through ground transportation samples across state lines, it is not very practical, especially because of the vast distances between the Northern Plains states. Other means of transportation such as commercial air carriers or the U.S. Postal Service would most likely be more economical, as packages could leave in the late afternoon and arrive the following morning, providing just slightly longer transit time.

A follow-up exercise, transporting a cooler of samples from only one state to another using an existing courier pickup route, would be useful in determining the feasibility of this means to transfer samples for testing.

ACKNOWLEDGEMENTS

Information Available in this Issue

What's Coming Up?

Event	Location	Date
Decoding the CLSI M100-S21	Classroom: Cheyenne	April 19, 2011
CLCC	Red Lion Inn Denver, CO	April 28 - 29
111th General Meeting of the American Society for Microbiology	New Orleans, LA	May 20 - 24
Packaging and Shipping Infectious Substances	WY Combined Labs Cheyenne, WY	August 16 - 17

47th Annual Intermountain States Seminar
"Discover the Hidden Treasure"
September 7 - 10 in Jackson Hole, WY
http://asclsregionviii.org/wpi/

Combined Laboratories
WY Public Health Laboratory
208 South College Drive
Cheyenne, WY 82002