COCA Conference Call: The Radiation Event Medical Management Web Portal - A Novel Resource for Health Care Providers
CAPT Judith L. Bader, MD and CDR Jeffrey B. Nemhauser, MD
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Coordinator: Welcome and thank you for standing by.

At this time all participants are on a listen-only mode until the question and answer session. At that time, if you'd like to ask a question, press star 1 on your touch-tone phone.

Today's conference is being recorded. If you have any objections, please disconnect at this time.

Now I'll turn the meeting over to Ms. Alycia Downs. You may begin.

Alycia Downs: Good afternoon and thank you for joining us for today's COCA conference call on the Radiation Event Medical Management Web Portal, A Novel Resource for Healthcare Providers.

We are very pleased to have Captain Judith L. Bader, MD and Commander Jeffrey B. Nemhauser, MD present.

Participants will want to have an internet connection available for this call as we will explore the REMM Web Portal together.

That URL is http:// www.remm.nlm.gov, and we'll give you that Web site again momentarily.

The PowerPoint Presentation posted for this call can be used as a resource but will not necessarily be required for today's call.

Captain Judith L. Bader MD is the Managing Editor of the REMM Web

Portal. Dr. Bader also serves as the Scientific Program Manager in the National Center - in the National Cancer Institute at the National Institute of Health.

Dr. Nemhauser is the Associate Managing Editor of the REMM Web Portal. He also serves as the Senior Medical Officer in the Radiation Studies Branch at the National Center for Environmental Health here at the Centers for Disease Control and Prevention.

In compliance with continuing education requirements, all presenters must disclose any financial or other relationships with the manufacturers of commercial products, suppliers of commercial services or commercial supporters as well as any use of unlabeled products or products under investigational use.

CDC, our planners, and the presenters for this seminar do not have financial or other relationships with the manufacturers of commercial products, suppliers of commercial services, or commercial supporters. This presentation does not involve the unlabeled use of a product or product under investigational use. This presentation does not involve the unlabeled use of a product or product under investigational
So now I will turn the call over to Dr. Nemhauser.

Jeffrey B. Nemhauser: Thanks Alycia and good afternoon to everybody on the call. I want to welcome you all today. I'll be spending the bulk of our time giving you a tour of the REMM or Radiation Events Medical Management Web Portal.

I've divided my presentation today into a variety of objectives which I'll review with you. But really what I want to state at the outset is the primary goal for today's presentation. If there was one overriding goal for the lecture, it's simply that you remember REMM.

Certainly we cannot teach you everything that there is to know about radiation or radiation response in the short time that we have today. And the reason that we created REMM was precisely so that first responders and first receivers would not have to learn everything that there is to know about radiation or radiation response.

Fortunately this is not a common occurrence. And it's not something that most clinicians or providers would need to know about on a daily basis.

And so we wanted to create a tool that people could turn to that they could trust and that would provide them with the information that they would need in times of a critical need.

Now there may be those of you on the call who are already knowledgeable about radiation response. And you may still get something out of this session by learning a little bit about REMM and how it is organized.

So the objectives for today's presentation are seven in number. And the first is to identify the various types of radiation mass casualty events.

There are several different ways that people might come into contact with radiation. And so we'll be discussing that at the outset.

Next is to distinguish between radiation contamination and radiation exposure -- a very important distinction to make. And we'll be talking about that.

Third, I'm going to describe how we are - how we can help you to rapidly locate resources needed to assist in the diagnosis, quantification and treatment of radiation contamination.

Then I will describe the recommended procedures for external decontamination or at least show you where to go to get that information.

Next, I will describe how you can rapidly locate resources needed to assist in the diagnosis, quantification and treatment of radiation exposure.

Then I will show you where to go to find isotopes of concern that could be potentially used in a radiation mass casualty event so that you know what you're dealing with.

And then last to identify available medical counter measures for use in victims of a radiation mass casualty event.

Now I like to start my presentations by giving folks the big picture. In other words, I've sort of told you what the objectives are, but really what is it that I want you to get out of this lecture today?

And as I said, if there's one thing that you get out of it, it's certainly that you remember REMM as a source for information.

But when we talk about - when we go to groups and we talk about radiation, one of the big questions that comes up and one of the important distinctions that needs to be drawn is what is the difference between radiation contamination and radiation exposure? And I'll show you that on our lecture today.

Then once you understand the difference between contamination and exposure, the next question is, is your patient contaminated? And if so, with what?

And once you've determined that somebody's been contaminated and what they've been contaminated with, then you - that drives the management of that person down a certain path.

The next question that you would ask yourself when you're confronted with somebody who may have been involved in a Rad event is has your patient been exposed to radiation? And if so, how much?

And then finally and probably a very important consideration for both the first receiver and first responder audience, it's important when we're dealing with radiation events that performance of life-saving tasks occur before management of radiation problems.

So - and this is a concept that is - maybe foreign to some people who are used to dealing with chemical hazards where decontamination is primary before treatment of victims.

But when you've got a radiation event, the overriding concern should be to save lives where possible. And that should be taken into consideration before management of any radiation problems -- either decontamination or treatment of radiation exposure.

So now that I've spent a little bit of time going through those, what I'd like for the folks on the call to do to please go to the REMM Web Portal. And I will give you that URL again.

It's REMM, R-E-M-M, dot nlm dot gov. And I'll give you all a moment or two to get to that site.

Again it's remm.nlm.gov.

And what I'd like for you to do is to spend just a few seconds -- a minute or so -- looking or clicking around at the Home Page and get a feel for the layout and see how it's organized.

And you can see that in the upper-left corner there is the REMM logo. Just

below the banner you can see five different links starting with “What Kind of Emergency?” followed to the immediate right, “Initial Event Activities” followed by “Patient Management,” then “Management Modifiers,” and “Tools and Guidelines.”

And as you scroll across, you can see that there are various links that you can then drop to off of those primary headings.

The other thing that you can see is that on the page itself, those same links are duplicated, those same headings are duplicated. So “What Kind of Emergency?” and then the various links to the topics underneath that.

And as you scroll down to the bottom of the page, you can also see that there are some other links and sites on the page that are not on that banner that go across the top. But the ones that are across the top are all duplicated there.

To the far right you can see our “Features” links that link to current topics that are dealing with radiation event medical management.

And then as you scroll down the page on the far right, you can see “Quick Links” and a variety of links to important information that are abstracted from other places on the page, and then beneath that, “Other Web Resources.”

And so except for links away from the site, if you get lost at some point today, you can always get back to the Home Page by scrolling back up to the top and clicking on the REMM logo. That’ll take you back to the Home Page.

Or there’s a REMM Home Link in the upper-right corner that you can see. And that’s another way of getting back to the Home Page.

And if you’ve got the slide stack, you should be able to follow along and hopefully reorient yourself.

So what I'd like for you to do now is to either go to the far right where it says About REMM -- it's above the diagram of the atom there -- or alternatively you can scroll down the page to - on the far-left side where it says "About This Site."

And you can see the first link under "About This Site," it says "What Are the Goals of This Site?"

And if you click on "What Are the Goals of This Site?" scroll down and you can see there that the goal of REMM as I had said, is to provide guidance for healthcare providers. It says here primarily physicians.

But I think that as we've developed REMM we've gotten a broaden audience to include first responders, nurses and others who are involved in providing healthcare, about the clinical diagnosis and treatment during mass casualty, radiological or nuclear abbreviated as Rad/Nuc events.

It's designed to provide just-in-time evidence-based information to folks who don't necessarily have formal Rad medicine expertise.

And it's to provide web-based information that is down-loadable in advance. And I'll talk about - a little bit more about that at the end of the presentation, but it is important for you all to realize that this is available to you not only off of the live site, but it can be downloaded and then accessed from your computer.

So our first objective for today is to identify various types of radiation mass casualty events.

So what I'd like for you to do now is to go back to the Home Page if you will, and where it says "What Kind of Emergency?" I'd like for you to scroll down

to where it says “Discovering an Event.” And click on that.

And you should have a diagram there that says “Discovering an Event – How Do You Know a Radiation Event Has Occurred?”

And what I’d like for you to then do if you want to spend a second or two just sort of looking at that diagram, but the very top box, it’s a gray box with a radiation warning symbol. And it says “Radiological/Nuclear Event” as a hyperlink.

If you’ll click on that hyperlink you’ll see a pop-up that says “Radiological Versus a Nuclear Event.”

And as I said, one of the important things to distinguish is what is a radiological event versus a nuclear event?

Well a radiological event as we’ve defined it and as commonly accepted, does not involve a nuclear explosion. So this would be not an atomic bomb or an improved nuclear device.

As a result of a radiological event, victims can have either contamination or exposure. They may have both. And several examples are listed there: an RDD with an explosion, an explosive RDD -- that’s commonly known as a dirty bomb. RDDs can also be non-explosive -- hidden radioactive source, a nuclear reactor accident or a transportation accident involving radiological or nuclear material are all examples of radiological events.

In distinction, a nuclear event involves a blast detonation or explosion where fission or fusion occurs. And again, victims may have either contamination or exposure. And examples of these are again, a nuclear weapon or an improvised nuclear device.

So if you would now that you've taken a look at that, I'm going to ask you just to close that little pop-up that describes a radiological or a nuclear device.

And then going back to our diagram, "Discovering an Event – How Do You Know a Radiation Event Has Occurred?" I'd like for you to now scroll down to the bottom where it says more details.

And if you would click on that hyperlink you will see a chart titled "Identify Types of Radiation Events."

And one of the ways that we have of helping us to think about radiological events versus nuclear events is whether they are obvious in real-time or not obvious in real-time.

And if we look to the left where it says "Obvious in Real-Time," examples of these include a nuclear explosion.

If you see a mushroom cloud, there aren't too many things that will result in that kind of an event or that level of destruction and devastation. So that's fairly obvious in real-time.

Certainly a nuclear accident at a reactor such as what happened at Chernobyl or potentially at 3-Mile Island would be recognized and would be obvious in real-time.

Or a nuclear accident either at a medical facility as a result of a transportation accident at an industrial radiography facility, those are all fairly - would be fairly obvious in real-time to the personnel. And proper alerts would go out as a result of that.

Now we may have a situation that is not so obvious in real-time. For example, an explosive RDD or dirty bomb, one may not know whether there was

radioactive material incorporated into the bomb. And it may take some time in order to make the determination.

Certainly if it's a non-explosive RDD where radioactive material is scattered about and people come into contact with this radioactive material that's either on the ground or in the environment somehow, it may be a while until people present to their healthcare providers with signs and symptoms consistent with exposure or contamination from radiation.

And then finally, a radioactive exposure device wherein you have a radioactive source that is releasing radiation and people are exposed to radiation, again, it may take some time before enough people present to their healthcare providers and astute clinicians or the public health community is able to identify that there has been an exposure to radioactive material.

And then as you scroll down, you can see again information that talks about how it may or may not be discovered. There may be clinical observation. And there may be different types of radiation effect.

And if you look at the very bottom of that table, you can see exposure or contamination. You may in cases of the explosion of a dirty bomb, see patients injured with radioactive shrapnel.

You may have internal contamination as opposed to external contamination. Or you may have exposure.

And so it will be important for the healthcare community to make those distinctions. And we'll talk a little bit more about that.

Well actually now what I'd like to do is to distinguish between contamination and exposure. And so what I'd like for you to do is once again scroll up - go back - I apologize. Go back to the table that we had before, hit your Back

button and go back to where it says “Discovering an Event – How Do You Know a Radiation Event Has Occurred?” That was the diagram that we saw at the outset.

And again, go back to the top where it says “Radiological/Nuclear Event” and click on that link.

And you’ll see that same pop-up box that we saw before where we distinguished a radiological event versus a nuclear event.

But what I’d like for you to do now please is in the second hollow bullet under radiological event it says “Victim can have contamination and/or exposure.”

And if you would please, click on the “Contamination” hyperlink. And what you should see is an animation. And if you click on Replay you will see contamination coming out from that source and covering the cartoon figure that’s there.

And the definition of contamination is a situation where a radioisotope, either a gas, a liquid or a solid is released into the environment and then is either ingested, inhaled or deposited on the body surface.

And this can be diagnosed by means of 1) a radiation detection meter, 2) if necessary by swabbing orifices or 3) by using whole body scanners.

Now what you’ll see is on the left side of the page under where it says “Contamination” in red, it then says “External Contamination.” And then underneath that it says “Full Body.”

And if you’ll click on “Full Body” which is now highlighted in red, you can see an example through the animation of a full body external contamination.

And the entire person is covered with radioactive material but not necessarily homogeneously.

If you click on the next link underneath “Full Body” where it says “Partial Body,” and you can see there’s a brick wall there that serves as a barrier or some means of protection for the individual. And it serves as a shield.

And then the last one under external contamination, “Wound contamination with radioactive shrapnel,” shows a piece of shrapnel or some sort of high velocity explosive wherein trauma occurs to the victim.

And you can see that the wound is then contaminated with the radioactive shrapnel. The fragments are then embedded into the body in the skin. And the contamination is then taken internally.

Now if you keep going down the page on the left there to where it says “Internal contamination,” you can see that here’s an example of somebody inhaling some radioactive material. And internal contamination is when radioactive material is taken into the body either by inhalation, ingestion or open wounds.

And so you can click on the next link down where it says “Via Respiratory Tract.” And you can see there again, the inhalation of the radioactive material into the lungs.

Next link down “Via Digestive Tract”– you can see the radioactive material entering into the stomach and then the intestines and then again “Via Radioactive Dust in Open Wounds.”

If you click on that link, should a wound already exist and then radioactive material gets on to or into the wound, then you see an example of internal contamination by the open wound.

And then finally the last link on that column on the far left side where it says "Incorporation." Incorporation occurs when the radioactive material – after it's been inhaled or ingested – is then carried by the blood supply to the various target organs whether it be the bone or the liver or the thyroid gland, maybe the spleen.

So a variety of our organs do serve as targets for the radioactive material. And once the material then gets bound up into those target organs, it is said to be incorporated into the body.

Now I'd like you to just take a look at but don't click on it yet, you'll see a blue box that says "Contamination Only Management Algorithm." And we'll be taking a look at that in a little bit. I just wanted to draw your attention to that for future reference.

Now the next thing I'd like for you to do please is to hit your Back button. And keep going back until you get back to where it says "Radiological Versus Nuclear Event."

And I'd like for you to just briefly to close that down if you will. And then I want you to ultimately end up on the Home Page.

Because now that we've spent a little bit of time talking about contamination, I'd like to talk a little bit about decontamination.

So if you will, please go to the Home Page. And under the section that says Patient Management - oops, I'm sorry. I take it back. I apologize. I misspoke there.

Go back to the Home Page. And actually what I'd like for you to do now is scroll down the page to - and find where it says "Reference Data Center."

That is the - you can find that at the very bottom of the page. It's immediately to the right of where it says "About This Site" and immediately to the left of where it says "Other Web Resources."

And where it says "Reference Data Center," click on where it says "Animations, Illustrations and Photos."

The other way of getting there is from the "Quick Links" which I showed you earlier. Again, scroll down. It's the fourth link from the bottom. It says "Animations, Illustrations and Photos."

And if you'll click on that link you'll come to a page that says "Animations, Illustrations and Photos."

And what I'd like for you to do now, it says under the line it says "Radiation Concepts," "Letter A – Radiation Concepts," "Learn the Basics."

And there is - the first solid bullet there, it says "Video Radiation Principles parenthesis HHS/CDC."

And what I'd like for you to do now is I'd like for you to all click on that video. And it takes about a minute and a half to 2 minutes to watch.

And it sort of will talk again about the concepts that we've just been reviewing. So if you'll click on that now and we'll come back in a couple of minutes to talk about that.

Okay, so I beg your pardon, where it says "Watch the Video" you have to click on where it says "Windows Media Player."

Okay, so hopefully you've all had an opportunity to watch that video. And

that again does a very nice job of distinguishing for you the difference between contamination and exposure.

And so what I'd like to do now is to move on to the third objective which is to help you to identify resources - rapidly identify resources needed to assist in the diagnosis, quantification and treatment of contamination.

So if you'd go back to the Home Page at this point and click - go to where it says "Patient Management." And the first link under "Patient Management" says "Choose the Appropriate Algorithm: Evaluate for Contamination or Exposure."

You can also get there through the "Quick Links" where the second link there says "Patient Management Algorithm."

So if you click on either of those - and if you - actually if you use the "Quick Links" you need to then click on where it says "Choose Appropriate Algorithm: Evaluate for Contamination or Exposure."

But either way, you should come to a page, a diagram that says "Choose Appropriate Algorithm: Evaluate for Contamination and/or Exposure."

And the first box, "Radiological/Nuclear Event," the first one will describe the difference as we saw earlier.

The next one, "How Do You Know a Radiation Event Has Occurred?" That's the table that I had shown you earlier.

Then the next box down says "Initial Onsite Activities, Ensure the Safety of Responders." So make sure that the people who are responding to the event have appropriate information and knowledge and personal protective equipment to respond safely.

“Establish patient handling flow.” And then in red and in bold, “Perform life-saving tasks before managing radiation problems.”

So as I said very early in this presentation, that is really paramount when - a paramount consideration when you’re dealing with victims of a Rad/Nuc type event.

And then as you’ll go down, you’ll see a Venn diagram. The blue on the left, “Has your patient been contaminated by radiation?” And on the right – it’s in yellow – “Has your patient been exposed to radiation?” In the middle it says “Both.”

So if your patient has been both exposed and contaminated, we give you an option for that as well.

But what I’d like for you to do now please is to go to the blue rectangle at the very bottom where it says “Contamination Only” and to please click on that link.

And you should come to a page that says “Contamination: Diagnose/Manage.” And what I’d really like you to focus on for the next couple of minutes or so is the “Contamination Only” algorithm.

The first box is titled “Assess External Contamination.” It gives you a variety of options as to how to do so including assessing a contamination pattern with a radiation survey meter, evaluating for the presence of radioactive shrapnel, documentation of a contamination pattern on a body diagram.

And if you click on that link, you’ll see an example of a body diagram that can be downloaded and used in your response.

The next large box is titled “Decontaminate the Whole Body.” We’ll come back to that in a moment.

And what you see is that the general guidance at this point is – if you look in the box that says “Decontaminate the Whole Body” – the goal is to repeat decontamination until the radiation reading is less than twice background radiation level, but not to exceed three decontamination attempts.

And if you are successful in your decontamination and there are really no other signs of physical injury and there’s no indication of high dose radiation exposure, then people can be sent home.

Alternatively, if you can’t clear somebody medically and if you can’t ensure that they haven’t been exposed to radiation, then those folks need to be admitted into a medical facility. They need to be assessed for the presence of internal contamination.

There are a variety of ways of doing so which we describe in the algorithm there for you.

Ultimately patients will either recover or not recover. And we give guidance along those lines as well.

Now what I’d like for you to do is to please scroll back up and come to the second large box in the contamination only algorithm titled “Decontaminate the Whole Body.”

And what I’d like for you to do now is to go to the first hyperlink in the box. It’s the second bullet where it says “Follow decontamination procedures.” And if you will, click on that link.

You should come to a page that says “Decontamination Procedures.”

Now our fourth objective is to describe recommended procedures for external decontamination.

So one of the things that I'd like for you to do is to under where it says "Decontamination Procedures," the second bullet says "Photos And Illustrations." And if you will, please click on that link.

And you will see a list of resources that we've provided. And if you look at the third bullet, it says "Radiation Decontamination: 6 part audio-video demonstration (REAC/TS)." And if you will, please click on that link.

What that does is that will take you - in fact, that takes you away from the REMM Web Portal. It takes you to the Radiation Emergency Assistance Center and Training Site, one of our resources that we use.

We try to borrow heavily on REMM from reputable resources. And REAC/TS is one of them. They're part of the US Department of Energy.

And they have put together a very nice page of information about how to put on personal protective equipment, how to prepare the area, how to remove contaminated clothing, survey for radioactive contamination, how to do wound decontamination and decontaminate intact skin.

We're not going to look at those today on this call. But certainly that's available to you to spend some time looking there.

So I'm going to ask you to then close down the link to the REAC/TS site, but just wanted to make you aware of that.

I then want you to scroll back up to the top of the page under "Decontamination Procedures" and look at the link right under "Photos and

Illustrations" it says "Protecting Responding Personnel." And please click on that link.

And you'll see there where it says "Protecting Responding Personnel," there are a variety of references and resources there.

And if you look at the very top there where it says "Use appropriate personal protective equipment or PPE" and then letter "a," it says, "Use basic PPE (Level D) plus respiratory protection," et cetera, et cetera.

And there are some footnotes there or some endnotes there. And if you will, just click on any one of those -- 1, 2 or 3.

And what that does is that will then drop you down to the references at the bottom of the page.

And the reason why I wanted to bring this up is we have tried very hard on REMM to make sure that any recommendations that we make are backed up and substantiated by references in the peer-reviewed literature.

And you can see that we have made extensive use of the peer-reviewed literature and of sources like REAC/TS.

And where possible, we try to provide the users of REMM with the actual documents themselves so that if you click on one of those links, it should take you to the source, the actual source for the information.

In instances where we can't provide you with the actual information itself, if you look for example at Citation Number 9 where the first author's last name is Dainiak, you'll see that at the end of the citation it says PubMed Citation.

And if you click on the link it will take you to PubMed which will provide

you again with the complete link for that article that will allow you to hopefully order that article from your institution if it's got information in there that you're particularly interested in.

What I'd like for you to do now is then scroll all the way back up to the top of the page. Again it should say "Decontamination Procedures." And then go to the links. It's entitled "Gross Whole Body Decontamination." It's the fifth link from the top.

And click on that. And here again you can see step by step instructions, not quite an algorithm but certainly step by step instructions as to how to provide or how to conduct gross whole body decontamination of a victim with external contamination from radiological material.

Removing clothing as you heard on the CDC animated video there, you can remove up to 90% of the radioactive contamination -- really very, very critical act right there.

We talk about how to bag the property, to store the property, how to perform a whole body radiation survey.

And then if you go down to Number 4, the order in which to perform a whole body decontamination including removal of radioactive shrapnel, decontamination of open wounds, body entrance cavities, et cetera.

And then we talk about the two times background radiation level as being a goal for decontamination, et cetera, et cetera.

And I'm not going to read all of that to you. It's certainly fairly comprehensive and I commend that to you when you have the opportunity.

What I'd like for you to do now if you will, is to again go to the top of the

page and then click on the REMM link that will take you to the Home Page. because we're going to go back to the Home Page at this point.

And I'd like for you to go to the - where it says "Patient Management." And click on where it says "Exposure" or again you can click on the "Quick Links" under "Patient Management Algorithms."

And click on where it says "Exposure: Diagnose/Manage the Acute Radiation Syndrome."

And that will take you to a new algorithm that should look somewhat the same as the last one. Only now what's highlighted is the yellow "Exposure Only" branch of this algorithm, how we're going to take care of victims.

And you can see that this is a slightly more complex algorithm than the one that I showed you earlier, the "Contamination Only" algorithm. Because management of exposure is going to be a little bit more difficult.

And if you look at the first branch or the first decision tree to make under where it says "Exposure Only," you have the choice of estimating the dose initially if possible.

And the reason why is because if you are able to estimate a victim's dose of radiation exposure, that's really going to help drive your management.

And if you look along the left side there, scroll down, depending on whether a person has a dose of greater than two gray – and I'm not going to describe what a gray is right now (and certainly we have the resources there for you to find that) – but just use it as a threshold there.

If a dose is greater than 2 gray, that will drive you one way. If you have a dose of less than or equal to 2 gray at the very bottom, that will drive you another

way.

And then in the middle, if you have a dose of less then or equal to 2 gray but you've got superimposed trauma injuries or burns, that's going to take you in a whole different direction.

And so - and that will drive you as the higher dose of more than 2 gray over to the right. And that will take you over to the "Clinical management of acute radiation syndrome (ARS)."

So but before we go into the clinical management of the acute radiation syndrome, how do we estimate an exposure dose?

And REMM does a good job of helping providers determine exposure dose. And what I'd like for you to do is to look at the yellow box. It's the top yellow box on the far left side that says "Estimate Exposure Dose."

And if you will please, click on the first link. It should say "Lymphocyte Depletion Kinetics." And click on that link.

And you should get a table that says "Dose Estimator – Lymphocyte Depletion Kinetics."

Now you may only have one blood specimen available to do that. Or depending on the size of the event, you may be able to draw two blood specimens from a victim in order to help do this.

But let's say you've only got one blood specimen available and you want to make a decision as to what a person's radiation exposure dose is.

And if you go to where it says "Number 1. Current Absolute Lymphocyte Count," and let's say we put in there the number "1." And we say that the time

interval since exposure to radiation, let's say it's zero days. Let's say - let's make it 48 hours.

And then click on where it says "Calculate Exposure Dose." And you can see where it says Number 3, that the estimated whole body radiation dose is 3 to 4 gray. So that's in excess of that 2 gray threshold. And that will drive your management in a certain direction.

So if you're able to draw a blood specimen and get an absolute lymphocyte count and enter that information into this calculator, that will help drive you in a certain direction in terms of management of the individual.

Certainly if you have two blood specimens, all the more - all the better in terms of defining your lymphocyte depletion curve and having a more accurate estimate of a person's dose.

All right, what I'd like for you to do is go back to our algorithm, our yellow algorithm, the "Exposure Only Algorithm." And let's stay in that "Estimate Exposure Dose" box. But instead of using laboratory data, let's use historical data.

And the first one there is "Onset of Vomiting." So if you'll click on the link that says "Onset of Vomiting," you'll see another calculator.

And you can make a decision as to dose and estimate of dose based on when somebody vomited.

And you can see if you - where it says "Patient Vomited," select onset time, you've got choices ranging from less than 30 minutes up to more than four hours and 4-1/2 hours at the very bottom there.

So let's say somebody vomited within let's say an hour and 15 minutes, and

we calculate their exposure dose, and we can see that their estimated whole body radiation dose was 5 gray which is a very large dose and that the percent of victims with vomiting at this dose, 86%.

So not necessarily everyone with an exposure of 5 gray will be vomiting but a good percentage of them will. And that makes that a more reliable estimate at - to their level of exposure.

So let's go back. Let's hit your Back button please and go back to the "Exposure Only," the yellow Algorithm.

And so we've given you a couple of ways there with the built-in calculators of figuring out what an individual's exposure dose might be.

And then as you go down, depending on what that dose is, we've given you some suggestions as to how you might manage that individual.

And you can see where it says for "Dose greater than 2 gray," the very last bullet in that box, "Proceed to Clinical Management."

So let's move over to the right-hand side of that algorithm where it says "Clinical management of acute radiation syndrome (ARS).".

And there's a lot of information on that side as well including definitions of the acute radiation syndrome and again, drawing blood to estimate the dose.

But what I'd like for you to do now is to look at the box that says - actually what I'd like for you to do is click on what it - where it says "What is ARS?" Sorry about that. And a little pop-up should come up.

"Acute Radiation Syndrome (ARS) – Also Known as Radiation Sickness." And it says people are exposed to radiation, people who are exposed to

radiation will develop ARS only if all of the following are true:

The radiation dose was high. And implied in that is that it's greater than 2 gray; the radiation was penetrating; the person's entire body or most of it received the dose; and that the radiation was received over a short period of time, usually within minutes.

And then it goes on to talk about the four acute radiation subsyndromes – hematopoetic, gastrointestinal, cutaneous and neurovascular.

And I realize as I'm going through this, for those of you who don't have familiarity with radiation, the effects of radiation on the human body, some of this may be buzzing by quite quickly. And I appreciate that.

What - again, what I'm trying to do is give you sort of an overview of REMM that will then allow you to go back and look at each of these - each of the areas that I've talked about because we've got the backfill, we've got the information on REMM in order to help build in that knowledge.

So what I'd like for you to do now, the - along the right-hand side there where it says "4 Subsyndromes of ARS: Diagnosis and Treatment," if you'll click on that link you should come to a page that says "Manage Subsyndromes of Acute Radiation Syndrome."

And again, this is a calculation device that allows you to enter information for each of the four subsyndromes. "The Hematopoetic Subsyndrome." You can enter in the lymphocyte count, granulocyte count or platelet counts within the first one to two days.

Over the first three to seven days if you scroll down, you can see the - for the "Cutaneous Subsyndrome" whether a person has redness of the skin, increased sensitivity, itching, blistering, et cetera. The "Gastrointestinal

Subsyndrome," whether they've got diarrhea, abdominal cramping or vomiting.

And then, excuse me, at the bottom, if they've got the "Neurovascular Subsyndrome."

And you can put in, in this very comprehensive table, the signs and symptoms that an individual may have.

And we won't go through the calculator now, but it will come up with a degree of toxicity. And then it will give you recommended or suggested treatment along the far right side.

And when you get a chance after this call or at some point you may want to go back and play with that a little bit and see what kind of recommendations or guidance may come up depending on the degree of severity of the syndrome.

All right, what I'd like for you to do now is to go back one to the "Acute Radiation Syndrome" or "Exposure Only" algorithm.

And in that same box that says "4 Subsyndromes of ARS: Diagnosis and Treatment," the very last bullet says, "Plan for evolution of ARS over time."

And if you'll just click on that link you will see a table that comes up that says, "Symptoms/signs for Dose Range 5.3 to 8.3 gray in Free Air."

Now along the left side you can click on a variety of the dose ranges in gray. But you can see there that what this table will do for you is depending on when the patient presents and what the signs and symptoms are that they're presenting with, that will give you a - an ability to determine based on their dose where they're likely to fall in terms of the clinical syndrome that they may be presenting with.

And I don't want to spend a whole lot more time. But again, that gives you an opportunity to sort of see where somebody may fall along the spectrum of disease.

And the only other thing I want to say is if you scroll to the very bottom you can see that it was adapted from the NATO handbook.

So again, a reliable source for information that REMM has borrowed from.

So what I am going to ask for you to do now is to go back to the Home Page please. And very quickly, if you'll look at the "Quick Links," the fourth link on the right-hand side where it says "Isotopes of Interest," I'm going to ask you to click on that link. And you'll come to a table that says "Isotopes of Interest: Properties, Treatment, and Fact Sheets."

And if you will for example, look at "Cesium" which is the third isotope down, Cesium-137, there's a row there of information.

And if you look at the last two columns, you can see that it gives information about treatment. For example, the treatment of Cesium-137 is with Prussian blue.

And if you go down the column, you'll see a variety of recommended treatments for the isotopes listed.

Some of those are FDA approved. Many of those are not. Some of them are available through the Strategic National Stockpile that's managed here at the CDC. Some are not.

But if you have someone who is contaminated, internally contaminated with a radioisotope, then there is definitive guidance available for treatment either

from REAC/TS that I had mentioned earlier.

Also the National Council on Radiation Protection and Measurements or NCRP, they have a Report Number 65 titled “Management of Persons Accidentally Contaminated with Radionuclides.”

That document was published in 1979. And it’s currently undergoing review. It should be available - currently undergoing revision and should be available shortly. That’s a definitive source for information about treatment of victims.

And then in the very last column in that table are fact sheets from the CDC from the Agency for Toxic Substances and Disease Registry, from the Environmental Protection Agency and from Argonne National Labs that can provide additional information for healthcare providers about the different radioisotopes.

The last table that I’m going to share with you before we end today, I’m going to ask for you to once again click on the home, go back to the Home Page and look under “Quick Links”.

And just under “Isotopes of Interest” is a link for “Countermeasures.”

And if you’ll click on that link, what this does - what this table does where it says “Countermeasures for Treatment,” this provides you with a list of medications in alphabetical order that can be used to treat a variety of radioisotopes.

So not quite the inverse of the table above, but it presents the information in a slightly different way.

And if you will for example, look where it says “Calcium-DTPA and Zinc-DTPA” in the same box, it provides a list of isotopes, Plutonium and

Americium, Yttrium, et cetera. It gives you routes of administration and dosage, the duration of treatment and how it works.

But also if you click on “Calcium-DTPA,” that will take you to a page that has information specific about DTPA and much more comprehensive and thorough than what we were able to fit into that table. So again, gives you a better source for information.

And if you can, if you’re able to just click Back and under where it says “Countermeasures for Treatment,” it says “See also ‘Hematopoietic Countermeasures for Acute Radiation Syndrome’.” And that gives you examples of drugs that can be used to treat people with Acute Radiation Syndrome, specifically with the hematopoetic subsyndrome where they have bone marrow damage.

These various drugs that are listed here can be used to help stimulate the bone marrow to produce white blood cells. {*Please note: The colony stimulating factor Neupogen® (filgrastim) is not approved by the FDA for use of the treatment of Acute Radiation Syndrome. It would be used following a radiation mass casualty event under an Investigational New Drug application or under an Emergency Use Authorization.*}

Well we’re really over time at this point. And as I say, this was quite a whirlwind tour of REMM for you.

I’d like to encourage you all to spend some time reviewing the web site. And actually one last thing I’d like for you to do since I’ve got you here, go back to the Home Page. Go to the very bottom of the Home Page.

And in the lower left corner where it says “About This Site,” I’d like for you to look at the last several bullets on there.

The first bullet that I want you to note is, it says “Join the REMM Listserv.” So that as we update the site – which we are doing continually – you will be notified of any updates, any new information. As new things are put out and we become aware of it, we like to incorporate that into REMM and we like to make our audience aware of that.

So if you join the REMM Listserv, this is an excellent way of finding out about new information that gets on there.

Certainly those of you may remember the polonium-210 incident that occurred last year with the Russian spy in London, England.

And as soon as that happened, all kinds of new information about polonium came up and we were able to incorporate that and build that into the REMM web site. And we were sort of a one-stop shop for information about that.

So as things occur, we pride ourselves in being able to make that information available to you.

You can also contact us so that if you have any questions about REMM either today – from today’s presentation – or as you review REMM in the future or as you do preparedness activities in your own community and you have questions that come up, please feel free to contact us. Please look on us as a resource.

As I said before, you can download REMM to your computer so that in the event of a radiological and nuclear event and loss of Internet capability, you would have it loaded on to your computer.

And the other thing that I want to mention is that REMM will soon be available for a variety of mobile platforms -- so PDAs, Palms, Blackberries

and the like. We are working on that right now. That's not yet currently available. But we are well underway in the planning for that and should be able to announce that relatively soon.

There's a lot there that I haven't discussed, certainly a lot there that I did discuss and fairly quickly.

But if you have any questions, I'd be more than welcome to entertain them now. My colleague, the Managing Editor Dr. Bader is on the line. She has a tremendous resource of information both in terms of the creation of the Web site itself as well as in management of radiological and nuclear injuries.

And so she is a tremendous resource for all of us and in fact, would be among the first people to respond to you if you contacted us for questions.

So it doesn't get put into a box somewhere. In fact, we respond to you directly.

So thank you again for your time. I appreciate it. I know it's getting late. If anyone has any questions, I'm happy to entertain them now.

Coordinator: Thank you. If anyone would like to ask a question, press star 1 on your touch-tone phone.

You will be prompted to record your name. Your name is required so that we can introduce your question. Again that is star 1 if you would like to ask a question.

And we have a question.

Question: This is won…

Jeffrey B. Nemhauser: I lost the call there.

Coordinator: Okay, the line is still open.

Question Cont'd: Hello?

Coordinator: There you go.

Question Cont'd: There. Hello?

Jeffrey B. Nemhauser: Hi. We're here.

Question Cont'd: Hi. I just wanted to say this site is just wonderful.

But we are just now starting with radiation training. We're a rural hospital.

My question is would we be able to get a copy of your lecture today so that we could pass this on to our healthcare providers?

Alycia Downs: The PowerPoint which can be used as a resource which also highlights the Web site as well as the audio for this conference call will be posted to the COCA Web site…

Question Cont'd: Oh okay, great.

Alycia Downs: …as well as a Word file of the transcript. And to get to that information you would go to www.emergency.cdc.gov/coca.

And if you go to our conference call information site we'll have the PowerPoint, the audio, and hopefully not too long from now we will also have the Word file transcript.

So please we hope that you share this call with anybody who you think might benefit from this.

Question Cont'd: Thank you so much.

Coordinator: And our next question is coming up.

Jeffrey B. Nemhauser: Hello sir.

Question: Yes. What I was asking about was a possibility that - has the CDC or would you recommend a field kit to use for, you know, radiation detection for triage in patients, something that, you know, I could give to a team to carry out to the field that they could use, you know, in a go bag?

Does the CDC recommend or do you recommend a specific provider or manufacturer that would have something out there or a list of them?

I was looking on the site and I didn't see anything on there about field gear.

Jeffrey B. Nemhauser: Right. As a federal agency, we - there's not a specific provider or purveyor that we can recommend.

But what I would recommend to you is CDC, a colleague of mine in the radiation studies branch, a health physicist recently published the Population Monitoring Guide.

And if you look on the REMM Web page on the front page of REMM, it's the first link under features where it says Population Monitoring in Radiation Emergencies, A Guide for State and Local Public Health Planners, excuse me.

And that will give you a tremendous amount of information about what the -

would be expected of people in the field. As to a specific counter or a specific meter that we recommend, there's not a specific brand or a type that we would use right now.

Certainly there are a variety of them available out there. But I can't recommend a specific one.

Question Cont'd: Well I was just wondering if you might have a list, you know, not necessarily recommending one specific, but, you know, a list of something that we could look at.

Because I mean you go hit or miss on this and you could end up with something that doesn't work, especially in a field situation. And you all would know more about it than I would…

Jeffrey B. Nemhauser: Right.

Question Cont'd: …in terms of picking one out.

Judith L. Bader: This is Judy Bader. Let me just add something in parenthetically here.

Teams that would be responding to this kind of emergency would have a radiation safety officer or a radiation physicist. And those are the people who are most equipped to purchase, maintain and use this equipment.

So it probably isn't the medical doc who's going to make those decisions. They cost money. They require training. They require upkeep.

We do have three resources on the site tools and guidelines section, the bucket from the Home Page, develop a medical response team, develop a state hospital plan, equip an emergency department.

You were really asking for field gear. But that's the HAZMAT team, usually not the docs and the radiation safety teams.

Every state has a radiation safety coordination group. Sometimes the local HAZMAT people do.

So docs are absolutely correct to ask for this equipment. But the purchase and maintenance need to be done in association with radiation safety.

Question Cont'd: Thank you, appreciate it.

Jeffrey B. Nemhauser: Yes, just to follow-up on what Dr. Bader said, she's absolutely right. And one of the questions that we get is, is there something that we can just sort of keep in a go bag?

And the answer is for that is actually no because this equipment needs to be calibrated regularly in order to ensure its - the reliability of the readings that it provides.

So to store something and leave it in a bag for a year or two or five or ten until something actually does happen would not be good. So it does need to be kept in the hands of radiation safety professionals who are capable of making sure that the equipment stays properly charged and calibrated.

Judith L. Bader: And one final point -- not to parse this too finely -- is that what's good for detecting some gamma is not good for detecting beta may not be good for alpha.

So it depends on the absolute function of the person going out. And it depends on what you think might be the problem. It also depends on your local budget because these are expensive pieces of equipment.

Alycia Downs: Okay, we're ready for the next question.

Coordinator: Your line is open sir.

Question: Hello. How are you?

Jeffrey B. Nemhauser: Well. How are you?

Question Cont'd: I'm - the email I got was - said it was from 1:00 to 2:00. And I'm in Central Standard Time so I just caught the last 10 minutes of this presentation.

I'm a student at Texas State Technical College. And [my professor] asked me to sit in on this because she wants to download the information and give it for some of her classes.

The question I have is there's not a actual in our area, a actual radiation response team as far as I know.

I'm a Health Physics Technician and a Senior Decontamination Technician. I've been working in a nuclear power plant since '91. And I just stopped what I was doing to come back and get my degree.

So what would we need to do in order to establish an actual response team for this type of emergency?

Jeffrey B. Nemhauser: I think that's an excellent question. But I think really the - what I would encourage you to do is to get in touch with your county or your state planners because they are the ones who are going to be overseeing the local response.

And it would be through - under their auspices that it would be the - that these kinds of response teams would be created.

So I can't give you anymore specifics than that other than to get in touch with the public health planners in your county and in your state who are responsible really for overseeing the response and the management to these kinds of events.

They're also going to be the people who are in contact with the CDC and the Strategic National Stockpile so that if resources need to be brought in, they have the means and the mechanisms whereby they would contact the CDC for those kinds of things.

So this isn't the kind of thing that somebody can do from scratch on their own. It really is a larger group effort.

And so I would encourage you to make contact probably initially with your local county and then state planners who are doing work in this area already to find out what's been done and if there's a need in your particular area which it sounds like there may be.

Then you may be able to work with those people in order to help put together the team. But beyond that, I don't have the specifics.

Certainly having the knowledge that CDC and REAC/TS and REMM can provide I think is of critical importance.

But in terms of creation of a response team, I think that that's something that you need to work with your local people on.

Question Cont'd: That's great.

Judith L. Bader: This is Judy Bader again. I just have one other thing that the caller might want to do on the Home Page. At the bottom-right of the Home Page there's

something that says Other Web Resources.

There's a link there. The fourth link in the left column CRCPD. That's the Conference of Radiation Control Program Directors. It's a national organization.

Go to that page. On the left you click Map and then you'll get an opportunity to click on your state. And your state's contact information is there.

In some states these are the primary people. In some states they're something like homeland security or some other name.

But there - every single state is represented on this CRCPD Web site. And that is a place to start. Over.

Question Cont'd: Can I ask one last really quick question?

Judith L. Bader: Sure.

Question Cont'd: Does your company come and give additional training for continuing education or whatnot to colleges? And if so, would y'all be interested in coming down here?

Jeffrey B. Nemhauser: We're not a company. But certainly there are links to places on REMM. So for example, REAC/TS will come out to different communities if there's a large enough group who's interested in gaining this kind of information, be able to come out and help you with putting together that kind of a program.

Question Cont'd: Okay.

Judith L. Bader: REMM has on its - on the main Home Page in reference to data center at the bottom on the right its training and education links. You could start there.

Question Cont'd: Okay, thank you.

Alycia Downs: One last question please.

Coordinator: And as a reminder, if you would like to ask a question, please press star 1.

Question: Yes. I was the DHS's Senior Medical Advisor till May of '06. And we were working with Interagency Development for IND. And I just can't believe how far this is coming. I think you all deserve an awful lot of compliments for a well done job.

Jeffrey B. Nemhauser: That's very kind. Thank you sir.

Judith L. Bader: Thank you sir.

Alycia Downs: Okay, well I'd like to thank Dr. Nemhauser and Dr. Bader. This was a very informative presentation. And I wanted to remind everyone that the recording, the audio file, of this call will hopefully be posted to our Web site by tomorrow and as well as the PowerPoint for which you can use a reference.

And again, our Web site is www.emergency.cdc.gov/coca.

Also as a reminder we do offer continuing education credits for our COCA conference calls in the form of CMEs, CNEs, CEUs and CHES credits.

And all continuing education credits for COCA conference calls are issued online through the CDC Training and Continuing Education Online system. Their Web site is www2a.cdc.gov/tceonline.

If you have any questions, please remember that there's the "Contact Us"

function on the REMM Website. And you can also email COCA at coca@cdc.gov. That's coca@cdc.gov if you have any specific questions relating to the continuing education credits.

So again, I would like to thank our speakers for this wonderful presentation and I hope everyone has a wonderful day.

Coordinator: Thank you and this concludes today's conference. You may disconnect at this time.

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