

This unedited transcript of a continued webinar is provided in order to facilitate communication accessibility for the viewer and may not be a totally verbatim record of the proceedings. This transcript may contain errors. Copying or distributing this transcript without the express written consent of continued is strictly prohibited. For any questions, please contact customerservice@continued.com

The ReSound M&RIE Receiver: Best Practices
Recorded September 14, 2021
Presenter: Julie Bridges

Hello. I think we'll go ahead and get started. As Melissa said, it's the top of the hour. My name is Julie Bridges and I work in the global audiology training and education team at ReSound. I've met several of you before in my previous roles, a then private practice provider, US ReSound field trainer, and spent many years in clinical diagnostics and hearing aids at the VA healthcare system in Iowa City as well. Like Melissa said, you will use the Q&A function if you want to put in questions about the topic, the presentation, and I will hopefully have enough time at the end to answer those, as well as I can possibly do. Also the chat function then is open but I'm trying to reserve that when I ask for participation and answers to questions and such things. I think we'll go ahead and begin. I'm glad you're all here and I'm happy to be here talking to you after it's been over a year since launching our groundbreaking M&RIE technology. Let's see, I'm going to go ahead and not distract you with my video for now.

Well, it's been many years in the making. We continue to learn new ideas for fitting and using M&RIE with our users. Now that we've had a chance to see many of the successes and inventive ways of incorporating M&RIE into daily practice, I want to share some tips for success with you. We'll start off with talking a little bit about M&RIE, it just makes sense. It's really that simple. Think about it. We run real ear measurements because we know that there are individual variances between ears that can affect the amount of gain needed to address their needs. In other words, we have come to the point where many of us do not do a fitting based on average ear canal resonance. If given the choice, why would we want to fit to the average pinna? In this industry, we've talked for years about our RIE devices with microphones at the top of the ear. Now with M&RIE, we have a third mic in the ear canal. It's easy to understand why placing microphone in the ear would provide such great benefits because we know the uniqueness of our own ears provides important cues that our brain uses for spatial awareness and localization. By utilizing the individual's own ear, we take

advantage of hearing organically as nature intended, with less need to process or manipulate the sound to create a revolutionary hearing experience for our users.

M&RIE technology has been in the field for over a year and we continue to see the benefit and hear from many happy users and hearing care professionals who've been using it. Over the last year, we've been able to complete some more research proving the benefits and learning from our experts in the field on how they're finding the most success and incorporating M&RIE into their daily practice. Today, I'll be sharing some of this with you. You'll walk away from today's session recalling the M&RIE benefits, hearing some, great testimonials from users and audiologists in the field. You'll be understanding more of the research that highlights these benefits and you'll learn some specific tips for determining candidacy for the M&RIE receiver, and successfully fitting M&RIE on your users. But first, let's get an idea of this group's experience with M&RIE. I would like you to answer the following poll question. You'll see that pop-up on your screen there, please choose the statement that best describes you from those statements there. Just I believe do just click the one that describes you best. I see. We have many who have already given M&RIE a try and some who have tried it. A quite a few of us with some questions remaining and then some of you who just want more information and are ready to hear more. All of you have come to the right place. There we go.

We already established that some of you have fit M&RIE and you're probably aware of some of the benefits it provides, but I want you to see if you can recall any of those. I would like to have you enter in the chat, I can find it myself. There we go. Enter in the chat any benefits of M&RIE that you know or that you can think of from what you've read or heard previously or experienced yourself. If you could please write in the chat, type in there any. Yeah. You want to be sure to use the all panelists if you want everyone to see it, or if you just want me to see it, you can specify those things as well. But so far we're hearing people say things like hearing more natural and the sound

quality can be more natural as well. There will be more specific about noticing that yes, you could have better performance in noise, we'll have some research to show you about that in a little bit. Yeah, when noise reduction is a big one because of where we're putting that mic. Now in addition to the other mics on the receiver or on the instrument. It's no surprise that people mentioned things like, reducing wind noise, sound quality. You guys are right in there with my slide. One thing I haven't seen yet, unless you're in the process of typing it is enhanced localization. We have a few studies showing some improvements evidence for that, and also reduction in listening effort. We'll touch on the evidence for all of these in a bit. But first, well, you may know that M&RIE benefits, we've read about them, we've heard about them. It's probably more exciting to see and hear what it's like in the real-world. We have a few hearing care professionals and users from around the world who've been kind enough to share their experiences. We've collected some of the things that they've said. Let's take a look at what they're saying. We see that clarity has been great. They don't necessarily need to use their app. This person said that it adapted better. Things sound less processed. Hearing is fun again, I love that one. With the microphone at the ear canal there's no need to reposition when using the phone at the ear. It's a good thing. I did not think they could improve the spatial perception, but they've gone and done that. The natural sound is coming up again, especially with music in that case. What are the hearing care professionals saying then. These are some quotes from some of those people across Germany, the UK, and the US. We'll give you a second to look at some of those.

Really, we can see that hearing care professionals and users alike are really noticing the difference with M&RIE and the acoustic benefits, just the clarity of the sound quality and the wind noise, all of those things. We're really proud to keep going with that over a year later.

We've seen that there are many benefits of ReSound 1, and you've helped me identify those quickly, but testimonials then have also shown that these benefits are realized by many people.

In the next section, we're going to dig deeper into the latest research which is in support of course, of the benefits we just mentioned, related to sound quality, listening effort, wind noise, and localization.

I know this is a really busy slide. It's busy on purpose, but it shows that we've been busy at ReSound, busy collecting evidence about the benefits of M&RIE in terms of those facets I mentioned: sound quality, localization, listening effort, wind, noise reduction.

You are expected to read all this, the so-called wisdom from this slide. The next section of information will highlight and explain the claims that you see here.

But in the interest of time, I'm not going to present the nitty-gritty of all of those research studies down to the finest detail. But I'll present the main points and the methodology, and the finer details can be found in the ReSound publications.

There are three of those in your download section for you to access when you have a chance. We'll begin with the sound quality aspect because of its universal importance to patients and the role it plays in patient satisfaction.

First, a study that compare the sound quality of M&RIE with traditional technology. This is going to show the results of an internal proof of concept or proof of benefit that we do, which our colleagues in research and development tested whether the concept of M&RIE, in other words, placing a microphone inside the ear canal of each person

indeed provides a more natural experience for a sound. These were people with normal hearing, and this was done for two reasons.

People with normal hearing may be more sensitive to nuances and sound quality, and therefore make more detailed judgments. The main purpose of our organic hearing philosophy is to provide a listening experience that is as close as possible to the natural hearing process.

In this way, normal hearing people can help us identify the potential benefit of our solution and a reference value in further experiments involving then people with hearing loss.

A specific set of filters for each listeners right and left ears was determined for the M&RIE microphone placement, and for RIE traditional microphone placement above the pinna.

Then these filters were placed in the signal path between the sound stimulus and the headphones, along with the correction for the headphone response.

That makes the result of true reproduction or stimulation of the naturally occurring sound pressure levels in their ears for each condition.

Participants wore a pair of headphones and listened to simulations corresponding to two conditions. Pinna compensation, where the participants listened with a pair of virtual ears stimulating the normal, traditional, microphone placement, and that's represented in the picture with the green ears up there.

Let's see. Can I circle that? I can't annotate. I was trying to circle that for you, but you see the guy with the green ears pretty well obviously there. Then M&RIE, where the

ears are represented in a tone that matches the person because they are simulating hearing with their own ears.

For the listening test, the participants evaluated overall sound quality. Sorry, I'll go back here. Overall sound quality and spatial sound quality, these things were recordings of an office scene, a cafeteria, and jazz music.

The test was simple, they listened to the sounds and provided a rating on a scale according to whatever that particular attribute was. For overall sound quality, they were to listen for clarity, timber, and naturalness.

These were the results. You can see that when participants listen to sounds with pinna restoration or pinna compensation, that is with pair of virtual ears, again shown in green here, their experiences were very diverse.

Some people were not very pleased, whereas others had a fairly good experience. However, when the participants listen to the sounds with their own ears or the M&RIE filter, that was calculated for their ear, the results showed a unanimous preference for M&RIE, with most of them very clustered in their judgments.

Our overall quality rating and the average overall spatial quality rating for M&RIE was twice as high as for pinna compensation on average. What's most striking is the lack of variability in the M&RIE rankings versus the pinna compensation.

[NOISE] Moving on, the group, overall average for sound quality was a rating of 48 for listening to sounds with the pinna compensation and an impressive 96 when listening to sounds through the M&RIE.

That is when participants listen through a simulation of their own ears, they perceived it as a much higher sound quality and it gets even better.

They also judged the spatial sound quality, where they had to focus on their ability to localize sounds as well as spaciousness of the room. Again, the group average in this case was 53 for sounds with pinna restoration and an impressive 99 when listening to sounds with M&RIE.

In other words, the relationship between consistently rated high sound quality and own ear characteristics is very strong and clear, and M&RIE allows for patients to use their own ear characteristics to collect sound.

You're probably thinking these are great results, but they correspond to people with normal hearing, so what's the experience for people with hearing loss? That's a great question.

Let's look at the next study here. This looked at normal hearing, listeners with hearing aids programmed to a very low 10 dB flat linear gain. Then listeners with hearing loss were fitted with the gain prescribed according to their audiograms by the ReSound audiogram plus fitting rationale.

The hearing aids were fit with three different programs: omni, spatial sense, which is the pinna compensation, and then the new M&RIE. Feedback management was on, but other advanced features were off. Sorry.

Participants listened to these three different soundscapes shown here, cafeteria, traffic noise, and train station noise. We found that the listeners with normal hearing showed a strong preference over omnidirectional, and for M&RIE over spatial sense in all three listening scenarios.

The cafeteria with the talker, the traffic, and the train station, these results have been merged for all three conditions here. The reasons reported by the normal hearing listeners were things like best feeling of noise reduction and best with speech.

Or clear without too much sharpness or speeches clearer in the cafeteria sound scenario, less background noise, good spatial perception, things like that.

The listeners with hearing loss, like the listeners with normal hearing, showed a preference for M&RIE over omni and for M&RIE over spatial sense in all three conditions.

Therefore, we're just showing you the merger of all of those conditions here. The 70 percent of the hearing impaired listeners preferred M&RIE over omni, and 57 preferred M&RIE over spatial sense.

The hearing loss cohort said that the differences between the programs were sometimes small, the reasons given for preferring M&RIE were that speech is more distinct, background noise is less distinct, less disturbing, sounds coming through, less listening effort, more comfortable, better localization, less noise, and things of that sort.

In conclusion on that section, the results with M&RIE showed that nine out of 10 people actually prefer the natural sound quality that they get from the microphone and receiver placement in the ear canal, and there was a strong preference for M&RIE over omni mode and over spatial sense in various listening conditions. These are things we like to see.

One of the many benefits of the new M&RIE is that it improves sound localization as well. We'll move on to see the result of two experiments looking at that attribute next.

The new M&RIE allows people with hearing loss to hear the world with their own ears, and we think that should help them localize sounds more accurately. This study gives us some evidence for that.

We compare the ability to localize sounds with M&RIE, with our previous technology and against four of our main competitors. This was done in this actual 3D lab, and the listener's task was to identify the speaker location in the horizontal plane where the signal originated.

They were asked to represent those locations as the numbers on the clock that they see there ahead of them for reference, and this identifying which speaker the sound came from.

You'll notice that the listeners have the best performance in the unaided condition, and the worst performance in the omnidirectional condition. You'll also notice that along with the best performance in unaided condition, these results were very similar for the M&RIE condition.

The key points that you can take from these results are that M&RIE was the only condition not significantly worse than unaided. M&RIE resulted in significantly less localization error than omni.

Spatial sense resulted in significantly less localization error than omni also. M&RIE and spatial sense both resulted in significantly less localization error than the other brands tested for normal hearing listeners.

Next, as part of an ongoing study, we evaluated the localization of users fit with ReSound One and M&RIE. First localization performance was evaluated at the initial

fitting and then that test was repeated after four months of where time. This was again done in the same lab. Research revealed something interesting about localization. We knew in the beginning that M&RIE increase the individual's ability to localize. We measure that error was reduced by 31 percent at the time of the fitting.

That's great. We're very happy with that. But what we didn't know what the time was that that ability would improve even further, with time increasing by 57 percent after four months of use. Pretty fun to see that that content that benefit continued to grow after they wore the hearing aids for four months. The conclusions we can see here are that first ReSound One fit with M&RIE assists in better front-back localization compared to those fit with a solution that uses the traditional microphone placement. That localization performance for those wearing ReSound One with M&RIE improves as they gain experience in using the hearing aids.

We've also been digging a little deeper into the listening effort required with M&RIE. We know that listening fatigue is a real issue for people with hearing loss, and so we want to see if we can make it any easier for them. As far as listening effort, actually this was an independent study in Germany. It did evaluate listening effort in speech shaped noise and confirm that M&RIE does reduce listening effort compared to traditional microphone placement. The overall listening effort with M&RIE was 2.6 dB better than the perceived benefit with traditional mic placement.

Additionally, speech recognition in noise testing then showed a significant improvement in speech reception thresholds for our participants fit with ReSound One and M&RIE compared to traditional mic placement. This is likely due to the natural directional effect of the pinna that the M&RIE placement preserves. For comparison here, which shows the results without hearing aids as well. Conclusions with this or that the study showed that listening effort is significantly reduced with M&RIE and there's a clear trend with ReSound One and then the trend for additional benefit with

M&RIE over the traditional placement of the mics. Then also we showed that speech recognition in noise is slightly but significantly better with M&RIE compared to traditional mic placement due to preserving those natural directional cues with the pinna.

A different study we have fit people with ReSound One hearing aids with the standard receiver and then M&RIE receivers. They were programmed to the ReSound proprietary audio gram plus fitting targets. Feedback calibration was performed, gain adjustments made to preference. They were asked then to call into a local weather hotline and hold the phone, as they would best to hear it by their ear. Seventy percent found M&RIE effortless to use on-demand in a non-dedicated phone program, just in the normal program, with 100 percent satisfaction and no feedback.

Ninety-five percent of users found M&RIE during phone calls either effortless or only very little effort. That bodes well for just picking up the phone and going on with your natural phone placement as you go along with your day. We showed that 2.6 dB averaged listening efforts benefit. That's hard to say very fast. The 20 percent percentage point increase in speech recognition in noise with M&RIE and the 95 percent reporting effortless or near effortless non-streamed phone call placement.

Then finally we looked at wind noise. I'm going to breeze through these a little bit in the interest of time. No pun intended. In this study, a M&RIE receiver was attached to a receiver in the ear hearing aid and mounted on pinna. Measurements of all three microphones were taken in the ear. Let's see the two microphones on the hearing aid located above the ear and the M&RIE and the ear canal. The measurements of the output was taken at varying angles of incidence and wind speeds. This was defined by a certain Beaufort wind scale.

This figure shows the average reduction in wind noise across all angles for the M&RIE microphone versus the front microphone location. You can see that wind noise was reduced by 14-19 dB with the M&RIE. If you just look at one of these for a gentle breeze of five meters per second. According to the scale, I'm able to put leaves and small twigs in constant motion. The reduction in wind noise level with M&RIE compared to Omni was 15 dB.

Another study looked at the effect of annoyance of wind noise. A subjective judgment of the annoyance of wind. Sixteen normal hearing people were evaluated in relation to the annoyance with the wind. Normal people with hearing aids program to a flat, very mild gain. We have the incidence angles of 0, 135, 270. The wind velocity corresponds to a gentle breeze again, and speech signal was played from a loudspeaker on the right. The results showed that M&RIE reduce subjective wind noise, annoyance compared to Omni of all of the tested angles. In conclusion there, M&RIE is effective in reducing subjective wind noise annoyance compared to traditional mic placement in the Omni mode.

We had a significant amount of natural wind noise protection and then better ratings of sound quality or lesser annoyance. You've heard me go on and on about the research, the evidence. You help me with the benefits first, although, and you've seen what users and hearing care professionals have to say, and then now you know how the research backs it all up. Imagine now that you have a colleague back at the office who remain skeptical about M&RIE. I want you to use the chat function, if you would, and convince them to give M&RIE a try on their next patient.

If you were to try to convince what is something, little statements that you might use in your spiel to convince that somewhat skeptical coworker to give it a try on his next patient? Give me a minute to type that in. Remember, you can choose all panelists and participants, I believe, depending on who you want to see your message.

Yeah, I've got one here that says [LAUGHTER] she named him Bob. You see a lot of golfers in this area Bob, the wind noise reduction won't really help them. Or we've got someone here that says it just has better localization, 20 percent improved speech and noise. You can't argue with that. This one says, I can demo the M&RIE on you, take a test drive, you'll be able to offer better sound quality, better enjoyment of music, less wind noise, better performance and noise. Very strong statements I think, more natural due to the pinna effect.

This one says we should give it a try if the person is a candidate with mild to moderate hearing loss. There are many benefits shown in the research studies. That's a good way to do it and then you could also refer them to the white papers some of which you have there to download so very good. Other things you could have said was less listening effort, easy phone placement. People were less annoyed with wind and measurably had less wind noise. Good spatial perception was reported, things like that so very good everybody. I forgot to click there.

As we mentioned at the beginning of the presentation, we continue to learn about new and exciting ways. HCPs are, when I say HCP, I mean hearing care professional, I think you know that, are fitting these on their clients. We thought it might be helpful to compile some important factors about candidacy, dome selection, and fitting recommendations for you. We've broken down the steps needed to successfully fit a user from identifying their preliminary candidacy or we think they're going to be a candidate to sending them on their way to try it out.

You might notice that these steps are the exact same as with any other hearing aid fitting. There's really no difference. You're first going to look at their hearing loss, slope of their loss, their fitting range, their ear anatomy and determine if they might be a candidate. You're going to counsel them appropriately. You're going to say things that

set expectations. Maybe not oversell in this case, just because you don't know what they're going to be a candidate for after some measurements, which you do with the initial. You choose the initial dome or earmold to set yourself up for success and set them up for success using again, audiological best practices like you always do.

Of course you connect to the software, you calibrate the DFS. You adjust as needed. If you adjust anything physical about it, you would rerun the DFS calibration and then you confirm or the M&RIE candidacy or you decide that they're not a candidate for M&RIE and you go with the standard receiver and then you send them on their way to give it a try. You can see how these steps really closely mimic the process for fitting any hearing aids. It's really no different.

Let's first talk about step 1, how to determine the preliminary candidacy. We're going to look at the fitting range. We've learned it's helpful to break the full candidacy fitting range for M&RIE into two parts, indicated by the light and dark gray sections. In those the cutoff in between the two is about 40 in the lows and 70 in the highs. That's a good rule of thumb if you don't have this to look at at the time.

Let's take a closer look at what this is and what it means. The overall fitting range is based on the full potential of the hearing aid system components and doesn't necessarily take into account the real life usage of the system. The fitting range and suggestions that we have defined here are recommendations for best fit, best guidance for you. What this means is that we recommend that patients can have thresholds falling either entirely into the light gray area or entirely into the dark gray area but ideally not both. We'll look at some examples in a moment.

We also know that good candidates are comfortable with a closed tulip or power dome. Because you'll hear me say it again here that we really almost never want to put M&RIE with an open dome because of the risk of feedback we have to manage

because of where that mic and receiver are so close in proximity there. Good candidates display an ear anatomy that's on here, it's straight, no bony growths, no crazy bends to their canals or anything like that. Not necessarily the best for steeply sloping hearing losses.

Good candidates have no more than 10dB of gain overlapping with the MSG curve, which you get from the calibration and we'll talk about that more in a minute. They have threshold falling either into the light gray area or the dark gray area but not both. Let's look at some examples together. Someone with a hearing loss sloping steeply into the highs is not a good candidate, like I was mentioning. Even if the thresholds are technically within the fitting range, they might not be a great candidate if it's very steeply sloping.

Take a look at these two fairly similar functional as far as their function audiograms. One is a better M&RIE candidate than the other. I'd like you to type in the chat A or B. I should have labeled those on the screen, shouldn't I have? But A is the one on the left, B is the one on the right. Which one is a better M&RIE candidate? A or B? I am unanimously getting all kinds of As coming through. Occasional B and I would say for those of you who said audiogram A, you are correct. I'm sorry I didn't give you a lot of time, I'm trying to get everything in here today. There's a lot of information.

Even though all thresholds are in the same gray section for both audiograms, audiogram B has a really steep slope to it and so it's dropping from, well 25-65, from 2-3K. That's what makes A the better choice in this case. Let's try another one. As we mentioned before, M&RIE is best fit on patients who have hearing threshold falling entirely into one sub fitting range. In other words, either the light gray or the dark gray, but not necessarily both. Based on that, which of these A or B would you say is the better M&RIE candidate? Again, I'll have you type that in the chat please.

Yeah, I'm getting lots of Bs in this case. Those of you who chose B, this time are correct. You can see that all of those thresholds, though they're near the more severe end of the fitting range, they're all within the dark gray section of that separated fitting range versus audiogram A where you see some are in the light gray, some are in the dark gray. We're going to have more challenges with that. Those are things we've learned over the course of this time that the M&RIE has been out in the world and being fit. Now, very good.

We've determined the preliminary candidacy audiologically, but before we throw a dome on a receiver and stick that in that ear to demo, you probably want to talk to the patient a bit about what you're doing with them. You'll do many other things you already do when counseling a patient through a demo. You'll restate some of their concerns being relevant specific to their stated difficulties. You will recommend a product. Of course, you will recommend a ReSound ONE. [LAUGHTER] You'll begin by talking about the benefits of the hearing aid in general, and then you can talk about the things you always do that we will determine the model of the device.

We'll determine if it's going to be rechargeable or replaceable batteries, which tech level they need, which hardware they need. In this case, we're talking mostly about the hardware that will be determined whether it's M&RIE or a standard receiver. Then you're going to set realistic expectations for the user. M&RIE is a new technology, may or may not be appropriate for them. The specifics of their unique ear anatomy will be effector, and it's possible that we will find out they aren't a candidate for M&RIE, but we're going to think of it as not so much determining whether they're a candidate for M&RIE, but rather determining which receiver you will use when fitting them with ReSound ONE.

In other words, don't frame M&RIE as the only good option. You're really talking about ReSound ONE and you're choosing which receiver will be best for their needs, and

their measurements, and their ear shape. Then, of course, you're going to send them out into the world keeping in mind that the benefits of M&RIE are not necessarily going to be heard as well in an office as they are out in the real-world because spatial perception benefits, well, we need space in order to perceive the benefits of what that can bring us. To perceive the benefits of wind noise reduction, we need some wind to appreciate that.

We've determined their preliminary candidacy based on their hearing loss and their anatomy, now here's the point where we'd want to begin to counsel them on their potential options and then move forward to selecting the appropriate physical properties. Let's take a closer look at the physical properties. We already know that the technological advancements that were needed to develop the M&RIE receiver were not easy because of the proximity of having the mic and the receiver so close together and the inherent risk for feedback that that presents. We've come up with some simple guidelines that can help with that initial dome selection, the dome you'll put on there, the coupling that you'll use to give it a try on that ear. You can clearly see that there are two different fitting ranges.

Again, indicated the same is a dark gray and light gray before. Now, it's navy blue and turquoise, but within those fitting ranges, you can see the type of dome that we recommend beginning with. Something to note is that the tulip and closed dome contain the same occlusion properties, roughly a 10 dB vent effect of 500, and both provide an increase of stable gain by about three dB relative to the open dome. They are considered pretty close as far as the risk of feedback, either to loop or closed.

As we move into the lower fitting range and the turquoise tone there, we recommend starting with at least a power dome. If enough occlusion cannot be obtained with this, then an earmold, micromold would be used to customize to the patient. Of course, this is just the initial coupling suggestion. The MSG curve will provide additional fitting

guidance and we'll discuss that in a little bit. Here, I think I have a poll for this one. Let's look at some sample audiograms and tell me what you'd start with, either tulip or closed, or power an earmold. You'll see this poll come up here. Which one would you start with for this audiogram? I'm getting a unanimous result for a tulip or closed dome.

I've made it easy for you because I left that up in the middle there with the guidance, but you can see that all the thresholds in this audiogram fall within that top darker blue section, and then therefore a tulip or closed dome is recommended to start with, whereas normally you might look at that audiogram and automatically think open dome in the case of other more standard receivers. Let's then look at another one. Which one would you start with here with that audiogram on the right? I think you guys are going to unanimously pick the right answer here because all those thresholds fall into the more turquoise area of that fitting range and because it's the other choice than what I had you answer before.

Very good. We'd want to start with a power dome or an earmold on that audiogram on the right. Once we select the physical properties, of course, we're going to connect them, the hearing aids, run the calibration, and then evaluate the MSG curve. Let's see what we mean by that. As you know, with M&RIE, we introduced that third microphone in the ear canal. It's in really close proximity to the receiver and increases the possibility for artifacts. The system was engineered to specifically handle this new design in order to provide maximum M&RIE benefit without artifact, but it means we also need to cautiously consider that these fittings may have that risk and use the MSG curve carefully in order to be more successful.

First, I'll remind you that ReSound always recommends calibrating for feedback. In fact, when fitting a M&RIE if you have already, you'll know that the software will require you to do that before saving this fitting in the case of M&RIE. Let's just orient ourselves to the MSG curve you see in the software. The red shaded area that you see is the

unstable gain area determined by the calibration process, the dark red dotted line is what we refer to as the MSG curve or maximum stable gain curve. All the white area between this and the target curve is considered the stable gain area. The MSG curve tells us how much room we have to increase the gain before we risk getting artifact.

In an ideal world, there would be plenty of space between the gain and that curve. As an example, if the gray curve is overlapping the gain curves more than 10 or 12 dB like we see here, this is an indicator that the coupling to the ear is far too open for a successful fitting and the HCP should close up the ear with a more occluding dome and run the calibration again to get a better result. If this is not possible due to occlusion or limited sizing options, an earmold then would be the next step and would be recommended. Learning how to manipulate the fitting to avoid this overlap is a key factor in fitting any product really, but specifically M&RIE.

To demonstrate how much more sensitive the system is with the M&RIE, take a look at the following examples. Illustrating that with the standard receiver versus the M&RIE receiver and the same dome type, observe how much more the MSG curve tends to overlap in the scenario with the M&RIE receiver. Though we would still be able to fit and consider this an acceptable result because it's not more than 10 or 12 dB overlapping between the gray curve and the gain parameters, we just want to know that that's an expected result to see after you calibrate. What we've learned is that the clinicians who've had the most success with this are using this information very carefully to confirm or rule out M&RIE candidacy. Those that recognize these factors can adjust their fittings and provide more success with M&RIE.

Let's see. I'm just going to breathe pass that in the interest of time. If you thought we might be looking at some examples together, you'd be correct. We've learned that a great predicting factor is how much that gain curve overlaps with the MSG curve. General rule is 10 dB, where your gain should not be overlapping the two by more than

10. Let's see what we mean. The first is here. What do you think? Is this an acceptable result of the calibration and the MSG curve or not? Yes or no in the chat, if you would. I'm not expecting too much difficulty with this. Yeah, we've got a few responses coming in that already say yes, that's an acceptable result. What about this one? You see that the shaded area is somewhat within the overlapping the gain. But I'm still seeing yeses, that this is an acceptable results. Yeah.

What do we see here? What do we think about this one? Is number 3 acceptable or would this one be? Yes, I'm getting unanimous nos, yes here, shaded area and it looks red here, but it actually should be gray, sorry about that. It overlaps the gain curve significantly, well over 10 dB. This would be one where we could increase the dome size and re-calibrate and see if we do better. If not, then maybe this person isn't a candidate for M&RIE. You might ask me, why wouldn't you fit everyone with just a really occluding dome? As we all know, it's a fitting patients is a science and an art. It's why we exist and haven't been replaced by robots yet.

Unbending any product, M&RIE or not, we're balancing the physical properties with the amount of occlusion needed to achieve the desired results. That combined with patient comfort or tolerance and also controlling for feedback makes our job a little challenging and presents us with decisions to make. Fitting the M&RIE is no different in that regard. Let's see. We're doing okay for time. That is our final activity. We're going to conclude by running through a few case studies together. If you did print the notes pages ahead of time, I don't want you to look at them right now, because the answers might be printed on there. We're going to look at three cases. I can't think of their names off hand. But actually Cheryl, Mark, and George. We're going to determine bad, better, best. In other words, which of these three is not a good candidate?

Which is a potential candidate or an okay, adequate candidate and which is a really good candidate for M&RIE. As you can see from Cheryl's case history, she has hearing

normal sloping to severe in both ears. She was diagnosed over seven years ago with her hearing loss. She finally tried hearing aids a couple years ago. Return them due to perceived poor sound quality. Very small ear canals, difficulty tolerating even the smallest earbuds when she's streams the audio, and she likes being outside, being active, gardening, tennis, beekeeping. We're going to put a poll up here for this. I want you to tell me whether Cheryl is a great M&RIE candidate, a potential candidate or not a good candidate at all. For this one, I'm seeing a variety of results coming. I'm going to see where it lands. Let's see. I don't know how to show the polling. Yes. I believe you're able to see the poll results now. I had about two thirds of you say that she is not a good candidate, and about a third of you saying she might be a pretty good candidate or a potential anyway candidate

I would say the answer is that she is a possible candidate, which good portion of you got correct. Though her hearing losses within the fitting range for M&RIE, she has high-frequency thresholds exceeding 70, which could contradict her candidacy. If you had the little gray areas next to this, you'd see that she has some thresholds in the light gray and some in the dark gray, so that's a little bit of a warning fine right there. But not too much overlapping into both. It's certainly benefit from the wind noise reduction in the outdoor situation and she'd appreciate superior sound quality. But her small ear canals might prevent her from being able to tolerate the M&RIE receiver within adequately fit or an adequately occluding dome. We might want to try to demonstrate the M&RIE, but be careful to set the right expectations as we may need to go to a standard receiver. She's an iffy one in between.

Very good. Let's try another one. Here we have Mark and he's an experienced hearing aid user, worn hearing aids for a long time. Currently, wears RIEs and strongly, strongly prefers open domes. He's one of those you've been round and round with maybe trying to include M&RIE for feedback with previous hearing aids. He's a lifelong musician, talking with his wife and his grandkids is a activity he likes. He also likes to

go on walks and nature. You're already answering that Mark is, I think majority of you are saying, let's see, can we show the polling? Looks like even more of you this time, were saying that, nope, he is not a good candidate. Let's see here what my slide says. Also agree with you that he is not the greatest candidate for several reasons, his hearing loss is within the M&RIE range but his high frequencies are well beyond 70.

The combination of these two factors and that he's got a steeply sloping loss between 23 Ks he doesn't tolerate closed domes really very well at all. Those things are going to contradict his candidacy quite a bit for the M&RIE receiver. Fortunately, the ReSound 1 with a standard receiver was to offer excellent sound quality and provide benefit in all of his environments.

One more. Now we have George. He is a retired greens keeper. He likes cycling, golfing, social gatherings, gardening. His main complaint with any new hearing aids that he's had is usually sound quality and he's worn several pairs. Currently wears tulip domes with his RIEs. I've already got the answers coming in. We'll wait and see what we have here for your answer as to whether George is a great candidate, a potential candidate, or not a good candidate.

You guys are very fast responders. It looks like we have almost all of you think that George is in fact a great M&RIE candidate. Why is that? He'll appreciate a good sound quality and his hearing loss fits well within the fitting range. It's not steeply sloping and his high frequencies are better than 70. Additionally, he will really benefit from the wind protection and the spatial awareness and with all his outside time. Very good work. You've just correctly identified appropriate and not so appropriate candidates for M&RIE based on hearing loss and lifestyle information. What did we cover today? We're starting to get toward the end.

We covered a lot in a short amount of time. We started off by having you recap some of the benefits of M&RIE. Then we heard or saw the evidence of some user and hearing care professional testimonials, followed by the evidence supporting the benefits of M&RIE. Then we moved into some candidacy guidelines and best practices for counseling a perspective M&RIE user. Then selecting the appropriate domes and fitting M&RIE. Finally, you all demonstrated your knowledge in the case study activity. There's just one more thing I'd like you to do before you leave, or before we get to questions because we'll have a couple minutes for that, but you already said how you'd convince a colleague to try M&RIE. How would you say you would try to justify your recommendation?

Firmer on with M&RIE, your recommendation to try M&RIE to a patient, any different types of words you might use to convince a patient that this might be a good thing to try? You can write that in the chat as well. I see that all the chat responses are coming to all panelists and not to all participants and maybe I was incorrect that you have that choice. If you're not able to do that, I'm sorry it sucks, not a choice is I first mention. But yes, people say a fun new technology that might help you, but may not work for you, well, you just have to try it. Or more natural sound quality. You can expect these to sound more natural than what you've been wearing. With these, you'll know where you are in space.

You have a good feeling for where you're at, where other things are at. When noise protection. You could say that to somebody who's really voiced a problem with wind noise, or an extensive amount of time that they spend outside. Wind noise protection is the best with this. Sound quality is the best with this. Localization or knowing where things are coming from. Very good. The other thing is, I think you're really going to like this. This technology, this resound one technology, let's give it a try and we'll see what hardware is the best for your particular situation and measurements. Let's, let's do a little measurement here.

Very, very good. Now I can take some questions, let's see, we have a few minutes left for that. I see questions coming into the chat, and then I see one in the Q&A. Let's see. I have one in the Q&A here, I don't know if you can all see these or not, but at the question I'll restate this is that, is the M&RIE supposed to be picked in drop-down menu of advanced settings for all M&RIE patients? I would say that it depends which program you're in, but in the all around program, where you have all access directionality, you do not need to pick M&RIE in the drop-down for your directionality choices of advanced settings because M&RIE is already incorporated into all access or into all access directionality when the environment is going to choose omni, omni for both sides of the head.

If you just choose M&RIE, it's like before M&RIE when you just show a spatial sense, you would get only M&RIE. In that situation, only omnidirectional limit would not switch into the other very useful settings of all access directionality. Let's see. What about, with the mic placement in the canal versus behind the ear. Oh, no, this isn't a question. This is a thing to say to a patient, sorry. It helps create a much better sound quality, much like a bell horn on and on. Much like I've said in the past when I fit the microphone in helix customs. Very good. I feel like I saw some other questions in the chats. I'm just going to go back here. Let see.

If anybody has a question, they can actually type it in the chat and I'll find it there as well. The question is the MSG curve doesn't suppress the gate when it comes down into the fitting? No. It depends. That answer to that question is yes or no. In the resound software, you can choose something that we now call feedback guard. It used to be called safe fitting. If you enable the feedback guard it will, I want to make sure I'm saying this right, it will suppress the gate. It will limit your gate and act as a barrier or a deterrent.

But if you disable the feedback guard, it will still show, which is a nice new feature of the software. But it will not restrict and it will allow that game to go into that curve area. That's when you would watch it like we demonstrated in the examples. Any other questions before we wrap up? Again, if I don't see any questions, you have the slides to download and the white papers to refer to. I believe this was recorded and so you can revisit it. You will have the questions to answer in the quiz in order to get your CEUs. Based on your answers to all the other poles and discussions, I don't think you'll have any trouble with it. I thank you for participating today and good luck with your successful fittings of ReSound ONE with M&RIE.