

Singing Through Menopause: Reactions and Responses – Survey Results

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When a woman goes through menopause, does it affect her voice? None of the general medical advice about menopause mentions anything about vocal changes, yet we know that changes in hormones do affect the voice, during puberty, during menstruation, during pregnancy. While it doesn't seem unreasonable to expect that the hormonal changes of menopause would have some effect as well, there is very little information about this. Are there any therapeutic or preventative strategies that can help before, during, and after this major chemical transition period? Do Voice teachers or coaches know how to guide and advise older female students as they approach this time of life? Shouldn't we be warned and prepared that the voice might start to change in the years leading up to menopause and then possibly go over a cliff into unknown territory once menstruation stops, as mine did? My own experience began a journey, often frustrating and painful, yet also full of discovery that led to my creating the 2014 Singing Through Menopause Survey.

What I have found, in talking to female singers "of a certain age" and reading the survey responses is that a great many of us feel our voices changing throughout perimenopause and menopause. Some subtle changes may lead us into compensatory strategies that we are not even aware of until we get into more difficulty. Many of us feel frustrated and alone and don't know where to turn for answers and help. While there is

some information out there, it wasn't readily available or easy for me to find when I needed it. In an attempt to add to the not very extensive body of literature on the subject, this article will present the results of the Singing Through Menopause survey as well as other resources and information I have discovered along the way. What I have found most helpful in managing this transition has been connecting with other singers who have been down this path, sharing stories and learning that not only am I not imagining this, but more importantly, I am not alone.

Survey Procedures

The survey was approved by the Princeton University Institutional Review Board and supported by the Princeton Survey Research Center. It was launched by Qualtrics and sent to potential participants by email invitation. Participants were encouraged to forward the survey invitation and link to their friends and colleagues. The survey link was also featured on the NATS website for six months. I personally sent the survey to NATS members, as well as to voice teachers at major Music Schools and Universities in the US, UK and Australia, including classical, jazz and music theatre programs. The survey also circulated among several choruses. I brought the survey to the 2014 NATS Boston conference, where participants had the opportunity to take the survey in person or in private on their personal computers. Overall I collected 130 responses, with between 115-120 completed answers to most questions. All responses were completely anonymous. I tried to persuade singers who did not notice major changes in their voices to take the

survey, but it is possible that many of the participants were self-selected because they did experience some difficulty.

The survey questions covered age, voice range and type, some medical history in relation to menopause, vocal changes before and after menopause, practice, performing and teaching habits as well as questions relating to diet, alternative therapies and emotional responses. Most questions were presented as multiple-choice options, but in some cases, participants had opportunities to write longer explanations. Since most of the respondents were experienced voice teachers, many had a lot of very specific suggestions about issues of vocal technique, vocal hygiene and lifestyle. While I won't be able to include all their wonderful comments in this article, I will try to touch on some particularly interesting and helpful insights.

Profile

Subjects in the study were asked to describe the kind of singer they were by selecting all that applied to them from a list of voice categories. Most respondents chose multiple categories. Of the 130 subjects in the study, 78% were voice teachers, 72% professional singers, and 9% were amateurs. As to repertoire, 62% sang classical, 21% music theatre, 9% sang jazz and 15% selected "other", indicating that they sang rock, pop, country, blue grass, cantorial, choir or church music, or were a diction coach, singing voice specialist or former professional. In terms of voice range, 20% of the respondents were high sopranos, with ranges above C6, while the majority, at 45% were sopranos with ranges up to C6. High mezzos made up 25%, low mezzos 8% and 3% selected "other".

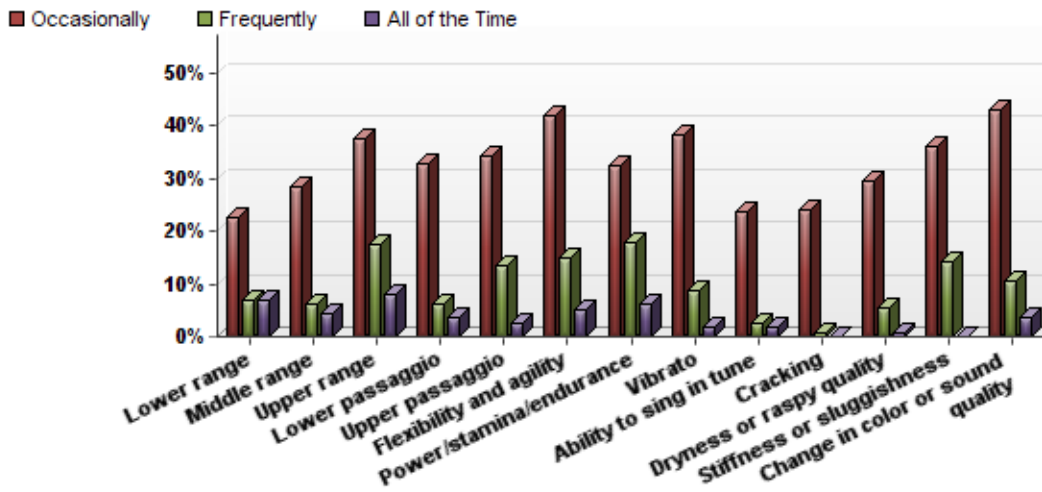
Current ages of respondents spanned from 47 to 79 with the majority between the ages of 55 and 65. Most respondents said they stopped menstruating between age 50-55, but some had early menopause in their 30s and 40s due to surgery, cancer treatment, or other special circumstances.

Vocal Symptoms

Study subjects were asked if they noticed any changes in the following areas of vocal production in both the five years before they stopped menstruating, and then in the five years after they stopped menstruating: lower range, middle range, upper range, lower passaggio, upper passaggio, flexibility/agility, power/stamina/endurance, vibrato, ability to sing in tune, cracking, dryness or raspy quality, stiffness/sluggishness, change in color or sound quality. (For the purposes of this survey, menopause was understood to be the cessation of menstruation.) In both “before” and “after” questions, they were asked to rate the degree of noticeable change for each vocal issue as never, occasionally, frequently or all of the time. In the “before”, or peri-menopause question, (see table 1 and graph 1) the most troublesome vocal areas seemed to be upper range, flexibility, color, power, stiffness, upper passaggio and vibrato, with between 50 – 60% of respondents noticing changes at least occasionally. Between 15-20% of respondents noticed frequent changes in these areas.

Before	Never	At least occasionally
Upper Range	36.84%	63.16%
Flexibility	37.72	62.16
Color	42.98	57.02
Power	43.24	56.76
Stiffness	49.55	50.45
Upper passaggio	49.55	50.45
Vibrato	50.89	49.11

Table 1: Most common vocal changes noticed before menopause



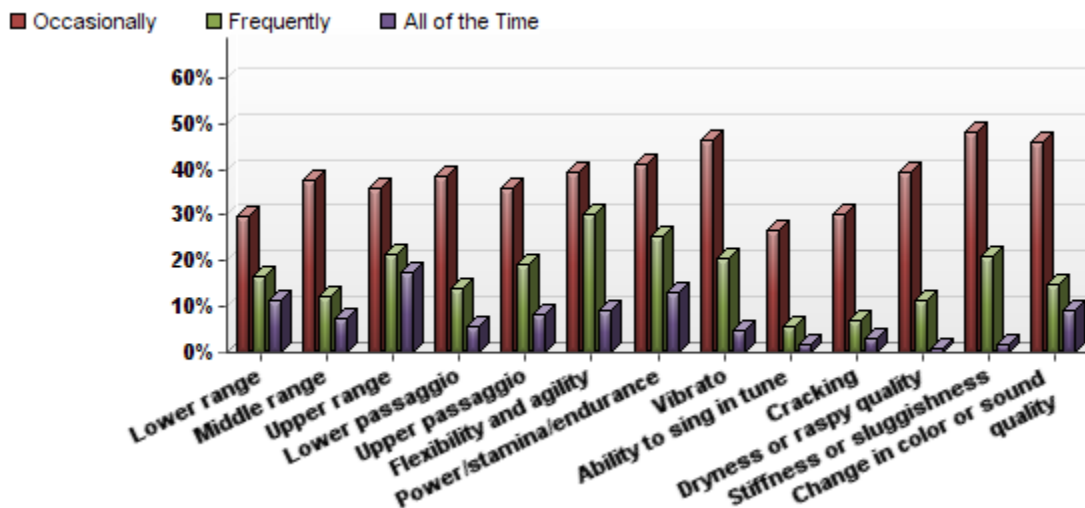
Graph 1. Vocal changes noticed in the 5 years before menstruation stopped

In response to the “after” menopause question (see table 2 and graph 2), the singers found the most troublesome areas were power, flexibility, upper range, stiffness, vibrato and color, with between 70-80% of respondents noticing changes to these areas at least occasionally, but now between 20-30% of respondents noticed changes to most of these

areas frequently. Between 10-15% noticed changes all the time in their upper range, flexibility/agility, power/endurance, and sound quality. 20-30% percent of respondents noticed frequent changes to their lower and middle ranges as well as a dry or raspy quality, and 15% noticed frequent changes after menopause to the lower range, lower passaggio and upper passaggio as well.

After	Never	At least occasionally
Power	20.56%	79.44%
Flexibility	21.10	78.90
Upper range	25.00	75.00
Vibrato	28.30	71.70
Stiffness	28.85	71.15
Color	29.91	70.09

Table 2: Most common vocal changes noticed after menopause



Graph 2. Vocal changes noticed in the 5 years after menstruation stopped

These responses are in keeping with findings in the published literature: menopausal vocal syndrome, as described by Dr. Jean Abitbol and his colleagues in a 1999 article in the *Journal of Voice*, includes increased vocal fatigue, decreased power, loss of the high range, loss of vocal quality, and changes in agility.¹ Yet, Dr. Abitbol and Yolanda Heman-Ackah, who has also written about the subject, indicate that only 20-30% of women report these symptoms, or seek treatment for them.² The results of the 2014 Singing Through Menopause Survey seem to indicate a much higher rate of women who experience these symptoms, at least occasionally.

Not surprising, higher sopranos reported more trouble with their high range and flexibility. This was also seen in the research of the Abitbols. Lower mezzos reported more trouble with their lower range and lower passaggio, but all voice types reported some changes in their high range, power and endurance, and flexibility. 50% of high sopranos noticed occasional changes to all areas except singing in tune, 20-30% noticed changes frequently or all the time to upper range, flexibility and power. For regular sopranos, between 40-50% reported occasional changes to all areas except singing in tune, cracking, raspiness, and lower range. This is slightly lower than the percentages for the high sopranos in the same areas. Between 15-25% of regular sopranos reported frequent changes to lower, middle and upper ranges, upper passaggio, flexibility, power, vibrato, and sluggishness. 30-40% of high mezzos noticed frequent changes to flexibility, power, vibrato and sluggishness. Only 20-30% of high mezzos reported occasional changes to most areas. 20-30% percent of lower mezzos noticed frequent changes to lower range, upper range, lower passaggio, upper passaggio and change in sound quality.

When asked to describe other vocal symptoms, both before and after menopause, respondents included problems with breath support and breath management, tongue tension, dryness, and the need for a longer warm up. Several also described a longer recovery time from sickness or time off, and the need for more diligence and consistent practice to stay in shape. Some found their voice quality was thinner and had less vibrancy or projection, while many said their voices were fuller or heavier, especially in the lower range. Some said their lower range was stronger and richer, while others found it was more difficult to control. Many mentioned problems with endurance and fatigue, as well as vibrato issues, and a few reported problems with onset. A few said their high range had actually gotten easier. Abitbol et al describe age related changes in the laryngeal nerves that can lead to vocal fold weakness resulting in all the above-mentioned symptoms. Heman-Ackah describes atrophy of the vocal fold muscles and a reduction in the thickness of the mucosa with estrogen loss during menopause, which can also contribute to the above mentioned symptoms.³ In a 2005 *Classical Singer Magazine* article, Joanne Bozeman related that she started to have vocal fold weakness during peri-menopause, which resulted in the development of “compensatory behaviors, notable jaw and tongue tension in an attempt to ‘help’ my voice work the way I was used to.”⁴

Of the participants who responded to the question about when they noticed these vocal changes start, (see table 3) the largest number, 27%, said within one to three years after beginning menopause. 17% said they noticed the changes start within 1-3 months, 17% said within 3-6 months, and 14% said within 6-12 months. Between 10-15% said 3-5 years, another 10-15% thought longer, but some participants explained that they had been on various hormones or medications for a period of time, and only after discontinuing

them, started to notice both vocal and non-vocal symptoms. Between 15-20% of respondents said the changes only lasted 1-5 years, but the majority, 51% said the vocal changes lasted longer than 5 years. Much of the existing literature acknowledges the difficulty of determining whether noticeable changes are due to menopause specifically or aging in general. It is also difficult to separate out specific health circumstances for each singer. Still, almost 50% percent of the respondents said they noticed vocal changes within a year of their last period. This seems to indicate a strong relationship between vocal changes and hormonal changes due to menopause.

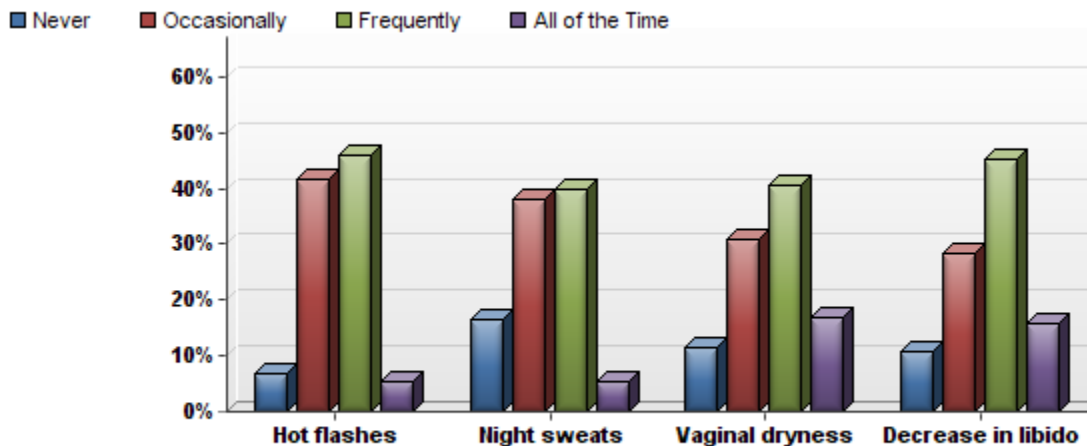
Answer	Response	%
1-3 months	16	17%
3-6 months	16	17%
6-12 months	13	14%
1-3 years	26	27%
3-5 years	11	11%
Longer	14	15%
Total	96	100%

Table 3: How long after you stopped menstruating did you notice vocal changes?

Non-Vocal Symptoms and Their Effects

When asked about non-vocal menopause symptoms, between 40-50% said they had experienced frequent hot flashes, night sweats, vaginal dryness and decreased libido. Over 15% had vaginal dryness and decreased libido all of the time. (see graph 3) 23% said they had experienced some kind of acid reflux at one time or ongoing. Other non-vocal menopause symptoms described included weight gain, dry skin and hair, mood swings,

depression and irritability, digestion and sleep disturbances and issues with fatigue and mental clarity. Of the respondents who said they had experienced vaginal dryness or low libido frequently or all the time, between 40-50% also noticed changes in their upper range and agility frequently or all the time. 35-45% of these respondents also reported frequent or ongoing problems with power and endurance, and 30-35% reported ongoing problems with vibrato. Of the reflux sufferers, 50% reported problems with upper range, upper passaggio, agility and endurance frequently or all the time. Between 35-45% reported frequent or ongoing problems with the lower and middle range as well as changes in color and sound quality. So problems with the upper range, upper passaggio, agility and endurance are reported more frequently by the women who also report more frequent vaginal dryness, decreased libido and reflux symptoms. The survey results show a statistically significant connection between decreased libido and changes in upper range, endurance and vibrato.



Graph 3: Non vocal menopause symptoms

Treatment

Medications and Hormones

About half of the study subjects, 48%, said they had consulted either a gynecologist or primary care physician, while the other half, 52%, did not. 33% said they consulted an otolaryngologist. Slightly more than half, 54% said they did not take any medications or hormones, while 46% said they did. Of those who did take medications, 70% said they took either an oral or patch form of Hormone Replacement Therapy (HRT), 15% used a topical hormone cream, and 15% took non-hormone medications for other conditions. Of the respondents who took HRT, some said they discontinued the medication after a period of time, several years or longer, due to concerns about cancer. Some switched to a topical or vaginal cream. Some said they have been on HRT for many years to preserve their voices. Even so, the percentage of respondents who reported difficulty with their upper range, agility/flexibility and power/endurance was remarkably similar for both those taking HRT and those not; 41% of both those taking HRT and those not taking medications reported trouble with their upper range frequently or all the time. 37% of the no medication respondents reported trouble with power/endurance frequently or all the time while 38% of those on HRT reported the same. Interestingly 37% of the no medication respondents reported trouble with flexibility/agility frequently or all the time while 47%, significantly more of the HRT respondents, reported similar trouble. Unfortunately, the questions on this survey were not detailed enough to determine the vocal benefits or risks of taking

specific HRT medications for specific amounts of time. More research on this needs to be done.

Alternative Treatments and Diet

30% of participants said they tried herbal or alternative treatments, while 70% said they did not. Popular herbs mentioned included black cohosh, evening primrose oil, dong quai and soy. Respondents also mentioned trying Chinese herbs and acupuncture in addition to yoga, meditation and basic vitamins. Some respondents tried hormone creams from the health food store. A number of respondents had discontinued these treatments because they didn't seem to work.

A slightly larger percentage of respondents, 44%, said they changed their diet, while 56% said they did not. Dietary changes described included eating less in general, eating less meat, less sugar, less fat, fewer processed foods, less coffee, less alcohol, less dairy, or less gluten. Many said they ate more vegetables and whole grains and made sure to drink more water. A number of respondents who indicated they were reflux sufferers mentioned avoiding both eating spicy foods and eating close to bed time. It is not clear if dietary changes helped with specific vocal symptoms or helped with general health and well being.

Voice Therapy and Vocal Technique

Nearly 60% of respondents said they worked with a current voice teacher, or teacher with whom they had worked in the past, at least occasionally. (see table 4) While

almost 40% said they worked with a new voice teacher at least occasionally. (see table 5)

Nearly 70% said they changed their technical approach at least somewhat. (see table 6)

Answer	Response	%
Never	47	42%
Occasionally	44	40%
Frequently	9	8%
Regularly	11	10%
Total	111	100%

Table 4. Did you work with a current voice teacher?

Answer	Response	%
Never	65	59%
Occasionally	35	32%
Frequently	2	2%
Regularly	8	7%
Total	110	100%

Table 5. Did you work with a new voice teacher?

Answer	Response	%
Yes	18	16%
No	31	28%
Somewhat	63	56%
Total	112	100%

Table 6. Did you change your technical approach?

Descriptions of these technical adjustments include body and core work, including yoga and Alexander Technique, to improve posture, strength and breath function. Some singers also mentioned adjusting vowel shape and placement to create a more vertical feeling in order to focus tone and manage the passaggio transitions. A number of

participants described working on head voice and a light mechanism to improve flexibility. They also recommended using a lighter action in general to compensate for a heavier action in the lower and middle voice. Some respondents talked about singing with less pressure and strain overall. They suggested using semi-occluded exercises for lightness, and vocal fry to help vocal fold closure. Singers also recommended the Stemple Vocal Function exercises, Ingo Titze's straw exercises, and exercises to help stabilize the larynx.

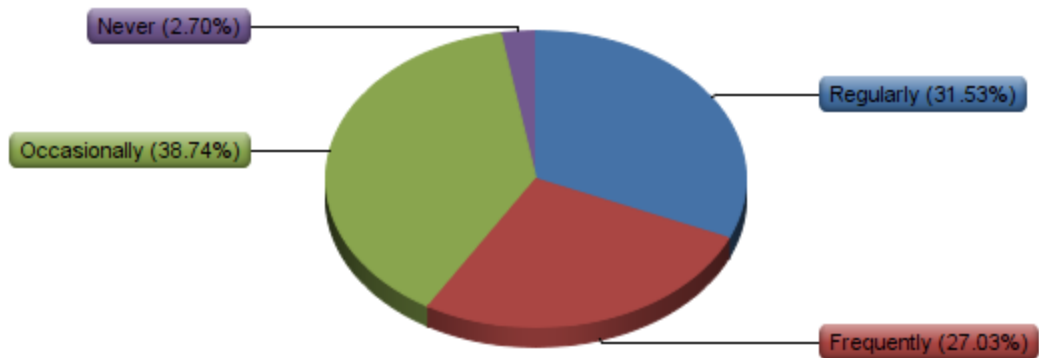
Emotional Response

Whereas close to 70% of respondents said they were disturbed by the non-vocal menopause symptoms they experienced, a slightly larger group, 76% said they were disturbed by the vocal symptoms they noticed. 63% said they felt like they were not the same singer anymore, in contrast to only 53% who said they felt a change in their sense of self. The most common emotions related included loss and sadness, fear, surprise and frustration. Respondents also described anger, grief, shame and embarrassment. Some expressed doubt in their technical ability and wondered if the problems they were having were due to poor technique or lack of ability, even though they had sung well during their earlier careers. Some expressed less interest in singing overall, perhaps because it wasn't as easy or comfortable as it used to be. Some described resignation at the loss of ability or change in sound. Some expressed a determination to recalibrate their instrument and find new repertoire. Some participants explained that they felt more confident and settled after menopause, but that they had re-evaluated their priorities and expectations. Some described relief from the emotional and physical ups and downs of their periods, as well as

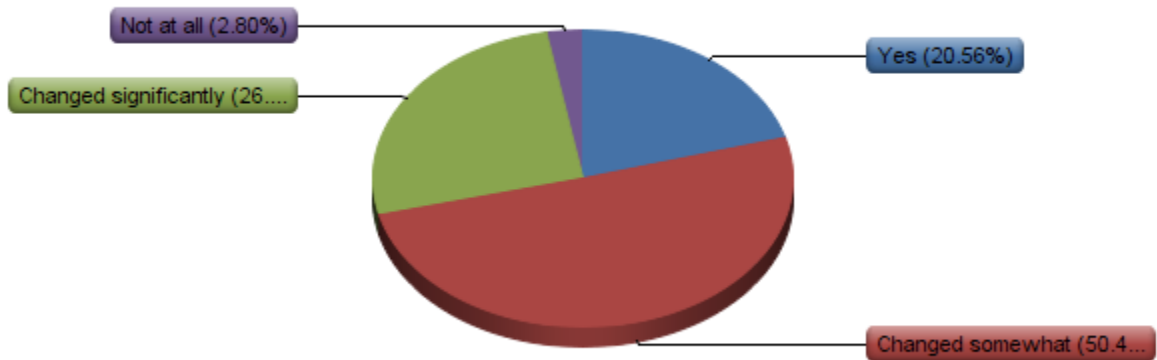
relief from the pressures of living up to certain personal or industry standards. A number of participants even said they felt better than ever, physically and vocally, using the wisdom of age to be a better singer and person overall. One singer mentioned having a sense of humor at sharing this time with her baby-boomer “sisterhood.”

Practicing, Performing, Teaching

The vast majority of respondents, 97%, practice at least occasionally, with about 30% who said they practice regularly, and 30% who said frequently. (see graph 4) Many written responses stressed the importance of regular practice, and a number of participants said they have to sing more in order to maintain function and ability – a classic “use it or lose it” situation. 21% of respondents said they still sing the same repertoire, while 75% said they had changed repertoire either somewhat or significantly. (see graph 5) Written comments described frustration at not being able to sing the same repertoire, but some singers said that accepting the limitations of their new instrument, and choosing more appropriate repertoire allowed them to continue performing and enjoying their voice.



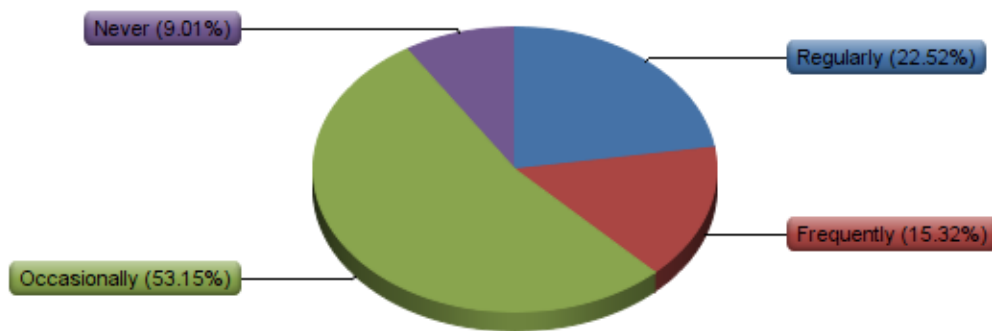
Graph 4: Do you still practice?



Graph 5: Do you sing the same repertoire?

Over 90% of respondents said they still performed in some way, with over 50% reporting occasionally, 15% frequently and 23% regularly. (see graph 6) Of the singers

who perform regularly, 48% said they took no medications or hormones, 40% said they were taking HRT and the rest were taking other types of medications. Of the singers who said they performed frequently or occasionally, 35% said they took HRT while 53% said they did not. (see table 7) So while singer comments indicate that the hormones helped preserve their voices, the statistics from this survey don't show that taking HRT and continuing to perform have a significant correspondence. More singers in this survey who continue to perform do so without the help of hormones. As mentioned earlier, more research needs to be done on this question. A more significant connection is seen between singers who have changed repertoire and those who continue to perform. (see table 8) Over 50% of those singers who still perform, even occasionally, have changed their repertoire at least somewhat.



Graph 6: Do you still perform?

	Still perform?		
Take medications?	Regularly	Frequently	Occasionally
No	48%	53%	53.45%
Yes	52	47	46.55
HRT	40	35	35

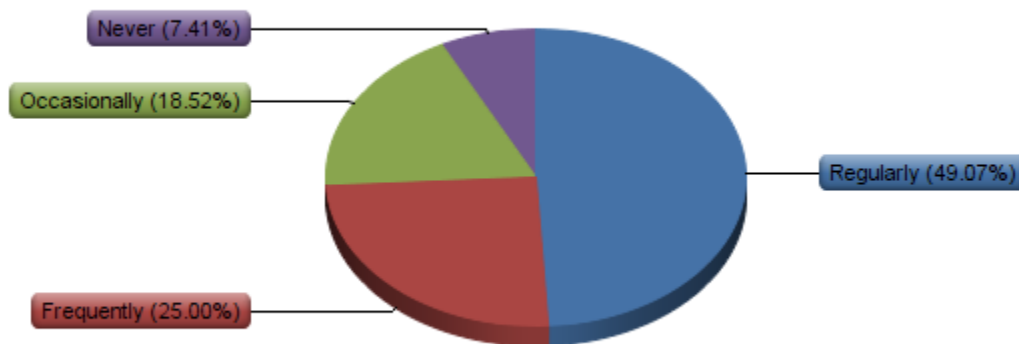
Table 7: Cross tab for performing and HRT

	Still perform?		
Sing same rep?	Regularly	Frequently	Occasionally
Yes	25.00%	37.50%	16.95%
Changed somewhat	54.17	43.75	52.54
Changed a lot	20.83	18.75	28.81

Table 8: Cross tab for performing and changed repertoire

Close to 80% of the participants in this survey said they were voice teachers. Well over 90% of those who answered the questions about teaching said that they did demonstrated while teaching, with almost 50% demonstrating regularly. (see graph 7) Over half of these respondents said they have not changed the way they teach, and 30% said they have. So while 70% of participants said they have changed their technical approach somewhat for their own singing, the majority have not changed their basic

approach to teaching. Some singers commented that they continue to learn new things as teachers and haven't necessarily changed their approach because of menopause, but rather from growing wisdom and life experience in general.



Graph 7: Do you demonstrate while teaching?

Recommended Resources

A small body of literature is available on this topic. The March 2005 issue of *Classical Singer Magazine* featured several articles on the subject by Tamara Bernstein, David Jones, Teresa Seidl and Joanne Bozeman.⁵ Several comprehensive DMA dissertations have covered the subject including “The Effect of Menopause on the Elite Singing Voice: Singing Through the Storm” by Barbara DeMaio Caprilli, which includes extensive references.⁶ Caprilli also had a piece in the Spring 2014 issue of *NATS inter nos* which also

lists recommended resources.⁷ The *Journal of Singing* has had a number of articles on the subject over the years including several pieces with general advice for the aging singer.⁸ Sangeetha Rayapati's recent book *Sing into your Sixties and Beyond*, also has general information for the aging singer.⁹ A search for menopause on Vocapedia results in three articles including Heman-Ackah's often cited article about HRT,¹⁰ an article about nutrition and alternative therapies,¹¹ and a general article on the effects of hormones on the voice.¹² Most of these resources include references to the work of the Abitbols including the 1999 *Journal of Voice* article on Sex Hormones, and the more recent book *Odyssey of the Voice*.¹³ The work of Robert Sataloff, in articles and text books, is also frequently cited.¹⁴

Most of the writers mentioned above advise singers to seek help with this transition before it becomes a problem, both from medical and voice professionals. In many cases, singers don't realize they are entering a transition, and don't seek help that could avert problems until they reach a crisis. More awareness and frank discussion is needed for the pre-menopause singer population to help prepare for the inevitable changes that will come. Voice teachers need to become more educated about the effects of peri-menopause, menopause and aging so they can help female students navigate gracefully through this potentially difficult time.

Summary

It seems clear from the survey results that many female singers experience changes to their voices as they transition through menopause. Some of these changes are quite troubling and cause vocal and emotional difficulties, especially if they are sudden and

unexpected. The findings from this survey confirm that the symptoms many singers experience are similar to what Jean Abitbol and colleagues called menopausal vocal syndrome: including decreased range, decreased strength and flexibility, decreased vibrancy and endurance, and changes to vibrato and sound quality. This data seems to indicate a much higher number of singers experience these symptoms, at least occasionally, than the 20-30% mentioned in previous articles. The respondents of this survey chose different approaches to managing these changes including adjustments in vocal technique, adjustments in repertoire, new practicing and performing habits, as well as changes in diet and use of medication including HRT and alternative therapies. A large number of survey respondents recommended working with a voice teacher, singing voice specialist or coach to help navigate the adjustment to their new instrument. Many singers recommended adjusting their expectations and attitudes towards what their changed instrument could realistically and comfortably accomplish. Most survey participants still perform at least occasionally.

It is not clear from this survey whether certain treatments help more than others, or whether the changes singers experience are caused by menopause specifically or by aging in general or other individual circumstances. It does seem noteworthy that many survey respondents noticed changes in their voices within one year of their last period. Certainly more research needs to be done in these areas. It does seem clear that as baby boomers get older, more and more female singers will go through this transition and be in need of assistance. Certainly female singers throughout history have gone through menopause, but not many have talked about the vocal ramifications openly.¹⁵ The general menopause literature rarely if ever mentions vocal changes as part of the experience.¹⁶ The 2014

Singing Through Menopause Survey gave singers an opportunity to share their stories of managing this important life transition. Once they started talking, they had a lot to say. Their stories were both heartbreaking and heartwarming, and always inspiring. I am deeply grateful to everyone who participated and I look forward to finding and sharing more information that can be helpful to older female singers.

¹ Jean Abitbol, Patrick Abitbol, and Béatrice Abitbol, "Sex Hormones and the Female Voice," *Journal of Voice* 13, no.3 (1999): 424-446; Yolanda D. Heman-Ackah, "Hormone Replacement Therapy: Implications of the Women's Health Initiative for the Perimenopausal Singer," *Journal of Singing*, 60, no.5 (May/June 2004): 471.

² Ibid.

³ Heman-Ackah, 471.

⁴ Joanne Bozeman, "One Singer's Experience with Perimenopause," *Classical Singer* 18, (March 2005).

⁵ Tamara Bernstein, "Is the Opera House Hot or Is It Just Me?," David Jones, "Vocalizing Through Menopause – Regaining Lost Function," Teresa Seidl, "Singing Forever –and Loving It!," Joanne Bozeman, "One Singer's Experience with Perimenopause" *Classical Singer* 18, (March 2005).

⁶ Barbara DeMaio Caprilli, *The Effect of Menopause on the Elite Singing Voice: Singing Through the Storm*, DMA Dissertation, Shenandoah Conservatory, 2013.

⁷ Barbara DeMaio Caprilli, "Use It or Lose It; Teaching Singers Who are 50+," *NATS inter nos*, vol. 47, no.1, (Spring 2014).

⁸ Yolanda Heman-Ackah, Robert Sataloff, Mary Hawkshaw, Venu Divi, "How Do I Maintain Longevity of My Voice?" *Journal of Singing* 64, no.4 (March/April 2008): 467-480; Robert Edwin, "Voice Pedagogy for Aging Singers (Including the Author)," *Journal of Singing* 68, no.5 (May/June 2012): 561-563.

⁹ Sangeetha Rayapati, *Sing into Your Sixties and Beyond!* (Delaware, OH: Inside View Press, 2012)

¹⁰ Heman-Ackah, 2004.

¹¹ Jole S. Erdman, Lauren B. Kondrad, Birgit Rakel, "The Use of Nutrition and Integrative medicine or Complementary and Alternative Medicine (CAM) for Sinners, Part 2," *Journal of Singing* 68, no.3 (January/February 2012):291-297.

¹² Sameep Kadakia, Dave Carlson, Robert Sataloff, "The Effects of Hormones on the Voice," *Journal of Singing* 69, no.5 (May/June 2013):571-574.

¹³ Jean Abitbol, *Odyssey of the Voice*, trans. Patricia Crossley, (San Diego, Plural, 2006).

¹⁴ Timothy Anderson, Dawn Anderson, and Robert T. Sataloff, "Endocrine Dysfunction," in R. T. Sataloff, ed., *Professional Voice: The Science and Art of Clinical Care* (San Diego: Singular Publishing, 1997): 537–549; John Rubin, Robert Sataloff, and Gwen Korovin, "The Larynx: A Hormonal Target," in Robert T. Sataloff, ed., *Diagnosis and Treatment of Voice Disorders* (San Diego: Plural Publishing, 2005): 392–417; Robert Thayer Sataloff, "The Effects of Menopause on the Singing Voice," *Journal of Singing* 54, no. 2 (1996): 39; Robert Thayer Sataloff and

Sue Ellen Linville, "The Effect of Age on the Voice," in *Advanced Assessment and Treatment*, vol. 2 of *Vocal Health and Pedagogy*, ed. Robert T. Sataloff (San Diego: Plural, 2006).

¹⁵ See Christa Ludwig, *In My Own Voice*, trans. Regina Domeraski, (New York, Limelight, 1999); see also Tamara Bernstein, *Classical Singer* 28 (March 2005).

¹⁶ See B. Schneider, "Voice Change is Overlooked Menopause Symptom," *Menopause* 11 (March/April 2004):151-158.

<http://www.webmd.com/menopause/news/20040316/voice-change-is-overlooked-menopause-symptom>

(accessed 11/28/14)