The Journal of Collegium Aesculapium

The Shoulders of Giants

FALL 2019

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In a troubled world, physicians and healthcare professionals who are members of The Church of Jesus Christ of Latter-day Saints have the benefit of spiritual insights as well as the art and science of medicine.

Collegium Aesculapium addresses the ethical and spiritual as well as the physical aspects of medicine. Thus, we invite qualified professionals to embrace the Collegium and take advantage of insightful meetings and seminars, newsletters, service opportunities, and the *Journal of Collegium Aesculapium*, all of which include this important expanded dimension, as well as the constantly changing body of scientific information available to us.

For more information, see http://www.collegiumaesculapium.org.

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SUMMER 2019

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Lift Up Thy Hands

For the Life of the Children

by **Elder Gary E. Stevenson**

Dear brothers and sisters, it is a pleasure to be with you. I am honored to speak to such talented and respected people, including medical professionals and others.

As a group, you inspire me with your dedication to raising people up from affliction. Whether healing comes through modern science or by faith, it is a miraculous and godly work! I have learned about you and your organization, and I am deeply impressed.

May I also express my appreciation for the humanitarian award just presented and indicate that I know I am a recipient only because I have been on the Lord's assignment, which resulted in the activities for which I have been recognized.

In 1842 the Prophet Joseph Smith said it is our responsibility "to feed the hungry, to clothe the naked, to provide for the widow, to dry up the tear of the orphan, to comfort the afflicted, whether in this church or in any other, or in no church at all, wherever [we find] them."[1] The year 1842 was not a time of ease and abundance in the Church.

Immigrant Saints, the fruit of missionary efforts in England and Europe, were pouring into Nauvoo. Energy and resources were being concentrated on building the Nauvoo Temple. Consequently, both the Church and the people were under severe financial constraint.

They were poor, and they were pressed. It did not seem like an opportune time to preach about sharing scarce resources with others who were poor—especially with the poor outside the struggling Church. But I find it evidence of Joseph Smith's prophetic calling that he would make this statement at just such a time.

Joseph Smith was teaching the truth that seeking out and caring for the poor is not a function of wealth or convenience; rather, it is an expression of our deep and abiding faith in the Lord, Jesus Christ, and a sincere desire to do what He would do—no matter the state of our particular resources.

During His earthly ministry, the Savior healed the blind, comforted the sick, and "went about doing good."[2] His Church and His Saints are under a covenantal charge to do the same.

I believe it is only now, in the twenty-first century, that we are seeing the real fulfillment of Joseph Smith's prophetic statement, as the Church is able to comfort the afflicted wherever they may be found.

Latter-day Saint Charities is the registered humanitarian organization of The Church of Jesus Christ of Latter-day Saints. Funded through the generous donations of Church

members to the Church's Humanitarian Fund, its mission is to save lives and relieve suffering at some of the most crucial crossroads of mortal life. Its work is organized to reach four of society's most vulnerable populations:

1. Those experiencing an emergency or disaster
2. Mothers and infants during the first 1,000 days of the infant's life
3. Children striving to succeed at primary school
4. Individuals with disabilities

These four groups are at high risk for disease, disability, and death, and practical interventions can do much to improve their chance of survival and their quality of life. This evening I would like to describe the humanitarian work of Latter-day Saint Charities with each of these four groups. As I do, I will refer to related principles from the Hippocratic Oath, which perhaps many of you recited when you were graduating from medical school.

EMERGENCY RESPONSE

The first group of particularly vulnerable people are those caught in an emergency or disaster. Here are just a few of the emergencies Latter-day Saint Charities has responded to during the last six months:

- Deadly fires in the western United States
- A super typhoon in the Philippines
- Hurricane Florence in the Carolinas
- Rohingya refugees in Bangladesh
- Severe flooding in Cambodia, Japan, and the central United States
- Volcanic eruptions in Guatemala and Hawaii
- Earthquakes in Indonesia and Japan

Part of the emergency assistance comes in the form of pre-positioned supplies of water, cleaning kits, tools, food, and blankets. Cash assistance is used to purchase supplies, reconstruction materials, health, and education equipment. However, perhaps the greatest assistance of all is simply the thousands upon thousands of volunteers. In the spirit of brotherhood and sisterhood, they haul away stinking debris and clean out moldy, water-logged homes. Their work is truly heroic, but it is the solidarity and cheer they exude that lift people's spirits and help them believe things actually will get better.

In 2011, I was the Area President in Tokyo when the fourth most powerful earthquake ever recorded rocked eastern Japan. In addition, I was serving as the Presiding Bishop in 2013 when Super Typhoon Yolanda devastated areas around Tacloban in the Philippines. My experience on the ground after very large disasters has taught me about the delicate art of balancing aid and self-reliance.

In the Philippines, there was a tremendous need to build housing after the typhoon, but I also knew a second disaster could occur when a culture of handouts and victimization creeps into a society.

Following self-reliance principles, the Church provided the housing materials and construction mentors, and the

Elder Stevenson helps with the Tacloban reconstruction

recipients provided the labor. Anyone who received one of those shelters also learned carpentry skills, got vocational certification, and worked on his or her own house and the houses of others. It was aid, but it was also skills training. In my experience, that combination does more than just restore communities; it restores optimism and confidence in the people.[3]

A corresponding line from the Hippocratic Oath states, "I will remember that there is art to medicine as well as science, and that warmth, sympathy, and understanding may outweigh the surgeon's knife or the chemist's drug."[4] Similarly, in the art of healing from disease or disaster, more is required of us than simply technical expertise.

THE FIRST 1,000 DAYS

The second group of vulnerable people are infants and their mothers. During the decades after the pioneers arrived in the Salt Lake Valley, the infant mortality rate skyrocketed. President Brigham Young and Sister Eliza R. Snow determined to send Relief Society sisters to attend medical schools in the East so that they could return to train others.

Dr. Ellis Shipp was one of these women. She attended medical school in Pennsylvania and Michigan, and upon her return to Utah, she and Sister Snow opened an obstetrics school, where she trained 660 midwives over her long career.[5] Experiences like that in our history as a Church make it natural for our humanitarian efforts to focus on the first 1,000 days of a baby's life.

For many women around the globe, giving birth to a baby is a life-threatening experience. In too many cases, there are complications, uncontrolled bleeding, infection, nonfunctioning equipment, and midwives or doctors who lack training or expertise in order to help a woman deliver safely and keep her baby healthy.

Latter-day Saint Charities' key initiatives include training master trainers in hospitals and medical schools who can then train others in the best practices of maternal and newborn care. Equipment is donated for hospitals and birthing centers, and technicians are trained to keep the equipment functioning. Parents are taught about nutrition and the importance of breast feeding, immunizations are administered, and many other measures are taken that will contribute to preserving the life of the mother and her baby from the time of pregnancy up until the baby's second birthday—the period of time when they are most at risk.

A birth attendant who was trained in late 2017 in one of the Latter-day Saint Charities' projects made this comment during the six-month evaluation of the training:

> *I [was able to] assist the delivery of a baby boy who was not breathing. We dried [him], cleared the airway, and stimulated the baby, but [he] was still not breathing. I proceeded to ventilate [him] while communicating with the family about the emergency situation and the need to transport the baby to a referral hospital two hours away. As taught in the [Helping Babies Breathe] training, we continued ventilating the baby [for two hours] until we reached the referral hospital, . . . where the medical team then took over to provide care. . . .*
>
> *Before [this] training, I would stop giving ventilation to a baby after 10 to 20 minutes. But [this] training taught me to continue ventilating until the baby gets to the referral hospital. If I hadn't taken the actions as [I was] taught, the baby wouldn't have made it.*

It may be a simple thing to hear this midwife say, "This one baby made it," but the impact of that one life on the parents, both sets of grandparents, the community, and the birth attendant cannot be overstated.

IMMUNIZATIONS

Immunization efforts are another area where tremendous progress is being made to save the lives of mothers and babies during the first 1,000 days after childbirth.

Latter-day Saint Charities has partnerships with UNICEF and others to provide vaccines and the logistical support needed in order to address outbreaks.

It also helps provide routine immunizations for diseases like measles, polio, rubella, maternal and neonatal tetanus, diarrhea, pneumonia, and yellow fever in countries where the health systems are not yet strong.

Tetanus is a good example of the progress of these efforts. Tetanus kills one newborn baby every nine minutes, and almost all of these babies are born into poor families living in hard-to-reach communities. The disease is transmitted when a child is born in unhygienic conditions and something unsterile, like a razor blade, is used to cut the umbilical cord. As medical professionals, you know that the symptoms of tetanus are excruciating, and death is painful for both the mother and the baby.

Fortunately, tetanus is easily preventable with a vaccine administered to the mother. With three protective doses that cost about $2, the mother and her future newborn are protected for five years.

Latter-day Saint Charities, UNICEF, and Kiwanis have teamed up over the last five years to tackle and eliminate maternal and newborn tetanus. Since 1999, 118 million women have been immunized in the 52 countries where tetanus is endemic. Annual deaths have dropped from 200,000 to 58,000![6] Isn't that incredible?

"I will respect the hard-won scientific gains of those physicians in whose steps I walk, and gladly share such knowledge as is mine with those who are to follow."[7]

HEALTHY AT SCHOOL

I am always moved by this passage from Lamentations, where the prophet Jeremiah exhorts God's people: "Lift up thy hands toward [the Lord] for the life of thy young children, that faint for hunger in the top of every street."[8]

That leads to the third group of vulnerable populations Latter-day Saint Charities works to affect: young children striving to succeed in primary school. Some basic factors can prevent that success—namely, lack of nutrition for their growing brains, the unavailability of clean water, and poor hygiene and sanitation.

There is a window of time during which a young child's brain develops rapidly. If during that time the child does not receive proper nutrition, cognitive limitations occur that are very difficult to overcome later in life. School gardens and healthy lunch projects where children and their families learn to grow and eat vegetables can significantly impact nutrition and health.

Placing clean water sources at schools allows children to bring water home from school, freeing them from the need to fetch water during the day.

Latrines, hand-washing stations, and facilities for feminine hygiene reduce disease and sickness in the community and help ensure that children can consistently attend primary school during this critical time of development.

Here is one example

These children attend school in southern Bolivia, where Latter-day Saint Charities and Water for People have partnered to build municipal water systems, install permanent clean water at the schools, build latrines and hand-washing stations, and create a school lunch program supported by parents.

Again, I found a statement from the Hippocratic Oath that related to this effort: "I will prevent disease whenever I can, for prevention is preferable to cure."[9]

INDIVIDUALS WITH DISABILITIES

The fourth vulnerable group that Latter-day Saint Charities focuses on are individuals with disabilities.

They can be some of the most marginalized people in society, but they can also be among the most active, if they have a strong organization that serves their needs.

Many disabilities are preventable or treatable. Our efforts to treat disabilities include providing wheelchairs and vision care.

The humanitarian efforts for this group include wheelchairs and vision care.

Oum Hieng from Cambodia is one person who has benefitted from these efforts. While serving as a solider for his country, Oum stepped on a land mine and lost both of his legs.

In 1994, he received his first wheelchair, which allowed him to move around on his own. Oum then began working as a paint sprayer and spoke tightener at a wheelchair factory where Latter-day Saint Charities sources wheelchairs. He is proud to work there and to help provide wheelchairs to others.

For Oum and his family, a wheelchair represents independence and self-reliance. The humanitarian mobility initiative manufactures quality wheelchairs, trains therapists in fitting and seating, and establishes repair shops that benefit 55,000 people each year.

Just as a wheelchair can profoundly improve the life of someone with limited mobility, there are several low-cost interventions that can greatly help people with poor vision or blindness.

According to the World Health Organization, "an estimated 180 million people worldwide are visually disabled." They estimate that around 80 percent of blindness in the world is avoidable through prevention efforts, glasses, or surgery.[10]

One of Latter-day Saint Charities' strongest eye-care partners is the LV Prasad Eye Care Institute in India. After a decade of improving eye care in rural India, LV Prasad and Latter-day Saint Charities collaborated on a project to strengthen the public eye-care system in Liberia, where avoidable blindness rates are high.

Sophisticated screening took place, surgical equipment was installed, and technicians in Liberia received training on high-quality eye care.

For the first time, eye-screening clinics were set up. But frustratingly, no one would come. It wasn't until a recently returned missionary volunteered to speak to his neighbors and the local community about the eye screenings that people began to attend.

The young elder was so effective in his volunteering that the Liberia Eye Clinic eventually hired him as their community outreach specialist. He understood that success hinged not on treating eye diseases but on considering the whole person—including his or her fears and talents.

Such compassionate care recalls this statement from the Hippocratic Oath:

> *"I will remember that I do not treat a fever chart, a cancerous growth, but a sick human being, whose illness may affect the person's family and economic stability. My responsibility includes these related problems, if I am to care adequately for the sick."*[11]

THE GREAT PHYSICIAN

Brothers and sisters, I appreciate the great good you do in the world and your personal ministries that lift and bless others in significant ways. I hope you will listen to general conference this weekend and experience a moment or two where you feel some inspiration about what the Lord would have you do next.

I testify that Jesus Christ is the ultimate Healer of men's and women's physical bodies, as well as their souls. He knows that our salvation isn't a technical process—it is a work of love so great that He willingly offered His back to the smiters[12] so that "with his stripes we are healed."[13]

He generously shares His birthright and makes us inheritors with Him in eternal glory if we will follow His example. His gospel prevents many missteps, and His Atonement heals many wounds, seen and unseen.

He sees us not as we are at this moment but as we can become—as beloved sons and daughters of God, full of potential and glory.

And I testify that when we serve each other, when we "lift up [our] hands toward"[14] the cause of the poor around us, we receive power to become more like the Savior in substantive ways.[15]

CONCLUSION

Brothers and sisters, administering to the relief of the poor and needy and the sick and afflicted is a God-given responsibility and privilege. As we seek the Lord's aid in our service, the Spirit will guide and direct our efforts.

May we each strive to uplift and strengthen those we serve in our professional life, as well as our personal ministry.

ENDNOTES

1 *Times and Seasons,* Mar. 15, 1842, 732, The Joseph Smith Papers, https://www.josephsmithpapers.org/paper-summary/times-and-seasons-15-march-1842/15.
2 Acts 10:38.
3 See "Mormon Volunteers Building Homes for Typhoon Haiyan Victims," Church Newsroom, February 21, 2014, newsroom.churchofjesuschrist.org.
4 Louise Lasagna, "A Modern Hippocratic Oath," aapsonline.org/ethics/oaths.htm.
5 See "Ellis Reynolds Shipp," Wikipedia, https://en.wikipedia.org/wiki/Ellis_Reynolds_Shipp.
6 See "Tetanus Eliminated in Over 30 Countries at High Risk—UN and Partners," UN News, May 15, 2013, https://news.un.org/en/story/2013/05/439762.
7 "A Modern Hippocratic Oath."
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9 "A Modern Hippocratic Oath."
10 "World Site Day: 10 October," World Health Organization, https://www.who.int/mediacentre/news/releases/pr79/en/.
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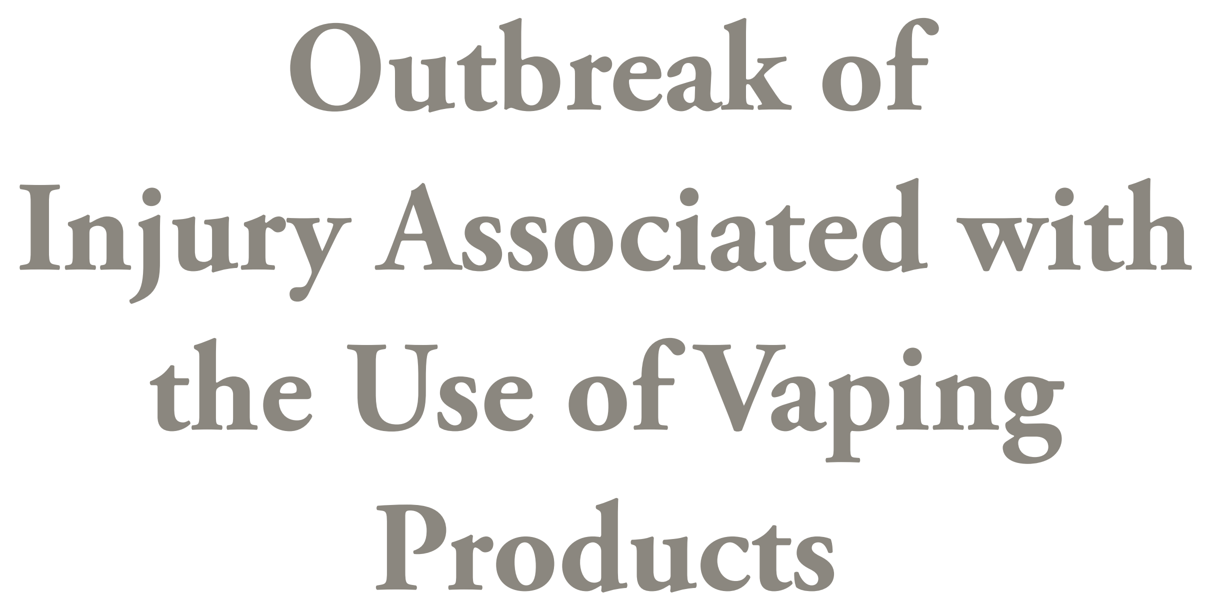
12 See Isaiah 50:6.
13 Isaiah 53:5.
14 Lamentations 2:19.
15 See Doctrine and Covenants 11:30.



Outbreak of Injury Associated with the Use of Vaping Products

by Bruce H. Woolley, PharmD

The Center for Disease Control and Prevention reported that as of November 13, 2019 2,172 cases of e-cigarette, or vaping, product use associated lung injury (EVALI) have been reported to CDC from 49 states (all except Alaska), the District of Columbia, and two US territories (Puerto Rico and U.S. Virgin Islands). Forty-two deaths have been confirmed in twenty-four states and the District of Columbia. During the first week of December 2019 Alaska reported their first death.

WHAT IS VAPING?

Vaping is the practice of inhaling and exhaling an aerosolized liquid from electronic cigarettes (electronic nicotine delivery systems [ENDS]). These nicotine-rich uncontrolled vape devices are battery powered and work by aerosolizing (the process of breaking down a physical substance into particles small enough to be carried on the air) and/or vaporizing (converting into vapor) a liquid for users to inhale deeply. The liquids contain nicotine, which requires additives (for solutions) and often emulsifiers to maintain surfactant administration thus requiring a significant number of chemicals in their formulations. A number of these additives have been designated carcinogenic. The liquid nicotine in e-cigs is addictive, can cause organ damage, and renders the vapor significantly different than water vapor.

The vaping device generally has five basic components: 1) A resevoir to hold the e-juice or vape sauce, 2) the sensor that detects when a person is trying to inhale triggering the battery to supply a charge to the atomizer, 3) the atomizer or heating element, 4) a battery to provide the spark for the atomizer, and 5) a mouthpiece to inhale the vapor.

INTOXICANT SUBSTANCES FOUND IN E-JUICE/VAPE SAUCE

- Nicotine
  - Juul (a popular brand of e-cigs) contains 59 mg/ml of nicotine in each pod—the equivalent of a pack of cigarettes
- Cannabis (Marijuana)
  - Tetrahydrocannabinol (THC)—known psychoactive component of cannabis
  - Cannabidiol (CBD) oils—not generally considered psychoactive
- Flavoring Agents
  - Thousands of flavors ranging from cotton candy, grape, mint, menthol, and chocolate cake to king crab legs and hot dogs
- Carrier (Additive) Substances (Usually Containing a -C=O moiety)
  - Vitamin E acetate and other esterified acids (See figure 1)
  - Diacetyl, acrolein, acetylpropionate, tar, acetoin, formaldehyde, tocopherol (vit E) acetate, and propylene glycol (antifreeze)
- Pesticides
- Toxins

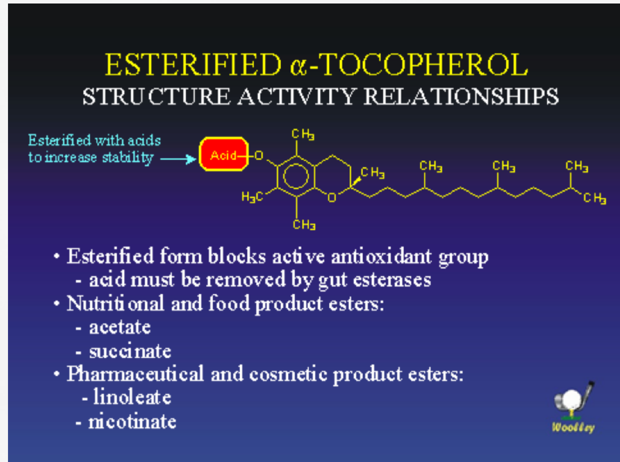


Figure 1

WHAT'S IN E-CIGARETTE VAPOR?

- *Flavoring:* Chemicals like diacetyl, which has an intense buttery flavor and can cause permanent popcorn lung damage when inhaled, have been found in many sweet e-juice oils/flavors (e.g., vanilla).
- *Particles:* Sometimes these are found at levels comparable to cigarette smoke. While there is no maximum contaminant level for certain particles, they can carry chemical or microbial contaminants through absorption and adsorption. In the lungs they can increase the risk of cardiotoxicity, lung cancer, and asthma attacks and can interfere with lung function.
- *Volatile Heavy Metals:* Metals like lead, chromium-6, cadmium, arsenic, nickel, copper, aluminum, cobalt, and mercury can be found. This may be due to contaminants in manufacturing or from the heating coils themselves. All cannabinoids have different boiling and vaporizing points. THC requires 180–210 degrees Celsius (365–410 degrees Fahrenheit) to be activated from the oil. Exposure can lead to giant cell interstitial pneumonia and can have a variety of negative health effects including brain damage, cancer, and diminished blood flow.
- *Heat-Specific Nitrosamines:* These may cause DNA damage and enhance apoptosis. Many nitrosamines have been found to be linked to chronic diseases such as fatty liver disease, insulin resistance, and obesity. They also have been reported to be carcinogenic.
- *Carbonyls:* Carbonyls like formaldehyde can potentially cause respiratory failure, skin irritation, and iritis.

HEALTH EFFECTS OF E-CIGARETTES

According to David C. Christiani, "A number of environmental agents are known to cause acute or subacute inhalation injury to the lung parenchyma. Indeed, emergency response guidelines for medical personnel describe toxic inhalation pneumonitis as a heterogeneous group of chemically induced injuries to the lung parenchyma as well as to the upper respiratory tract. The manifestations of such injury depend on the characteristics (e.g., solubility, composition) and the amount of the toxic compound or compounds inhaled."[1]

Michael A. Matthay, et al. reported that: "Depending on the type of chemical agent and the amount of material inhaled, patients may experience symptoms ranging from minor respiratory tract discomfort to acute airway injury and damage to the parenchyma with pneumonitis, alveolar edema, respiratory failure, and death. A common pathophysiological pathway includes inflammation, edema of airways with epithelial sloughing, alveolar inflammation, and edema with hypoxemia."[2]

More Possible Health Effects

- Many flavoring agents and additives are lipoid substances (oils-VOCs), which when inhaled even in small amounts, may cause aspiration pneumonitis.
- E-cigarette vapor can cause acute light-headedness, eye and throat irritation, headaches, dizziness, and coughing.
- Defective batteries have caused injuries due to burns, fires, and explosions.
- Poisonings from non-documented or non-approved formulations have been documented.
- The adverse effects of long-term or frequent exposure to e-cigarette vapor are not yet fully understood.

SIGNS/SYMPTOMS WITH INFORMING ACTIVITIES

Adapted from the Johns Hopkins Cicarone Center for the Prevention of Heart Disease

- Chronic non-productive cough
- Breathing disorders such as the following:
  - » Shortness of breath
  - » Chest tightness
  - » Wheezing
- Sudden onset asthma attacks
- General fatigue and/or fever
- Lung scarring (may not be apparent until scarring is permanent)
- Increased thirst and/or epistaxis
- Appearance and/or behavior changes
- Presence of vaping equipment or related product packaging
- Unusual online purchases or packages
- The scent or faint odor of sweet fruits or foods not recently prepared
- Decreased caffeine use
- Use of vaping lingo in text messages or on social media

WHAT TO DO FOR VAPE PEN BURNS

There have been a significant number of burns from sudden and unexpected explosions due to defective batteries in the devices and the high temperatures necessary to vaporize the oils and ingredients in the cartridges. Assessment and treatment of the burns should be instituted as soon as possible. The Burn Fellowship program at Johns Hopkins Bayview Medical Center recommends the following for non-trained individuals:

Severe Burns

If a burn has the following features seek medical attention immediately:

- The skin appears blackened, white, or blistered.
- The burn affects the face, a hand, foot, elbow, knee, or genitals.

- The burned area is more than three inches across.

Make sure the person is breathing normally and conscious.

If you can do so without causing further injury, quickly remove jewelry, belts, or restrictive clothing and elevate the burned area above heart level.

Cover the burned area with a clean, damp cloth — do not submerge it in water.

Minor Burns

- For burns smaller than the size of a quarter, place a cool compress (not ice) on the burn.
- Each day, gently cleanse the area with mild soap and water and apply a layer of antibacterial (first aid) ointment and a clean, non-stick bandage.
- Watch for signs of infection, such as fever, and seek medical attention if there is increasing redness, swelling or pain, or if there is a yellowish or foul-smelling discharge from the burn.

WHAT WE KNOW

From the CDC website[3]

- Analyses of bronchoalveolar lavage (BAL) fluid samples (fluid samples collected from the lungs) of patients with e-cigarette, or vaping, product use associated lung injury (EVALI) identified vitamin E acetate, an additive in some THC-containing e-cigarette, or vaping, products.
- Recent CDC laboratory test results of BAL fluid samples from 29 patients submitted to CDC from 10 states found vitamin E acetate in **all** of the samples.
  - » THC was identified in 82% of the samples and nicotine was identified in 62% of the samples.
  - » CDC tested for a range of other chemicals that might be found in e-cigarette, or vaping, products, including plant oils, petroleum distillates like mineral oil, MCT oil, and terpenes (which are compounds found in or added to THC products). None of these chemicals of concern were detected in the BAL fluid samples tested.
- This is the first time that we have detected a chemical of concern in biologic samples from patients with these lung injuries. These findings provide direct evidence of vitamin E acetate at the primary site of injury within the lungs.
- These findings complement the ongoing work of FDA and some state public health laboratories to characterize e-liquid exposures and inform the ongoing multistate outbreak.

About the Outbreak

- CDC is only reporting hospitalized EVALI cases and EVALI deaths regardless of hospitalization status. CDC has removed nonhospitalized cases from previously reported case counts. **See Public Health Reporting for more information.**
- **As of December 10, 2019**, a total of 2,409 hospitalized EVALI cases have been reported to CDC from all 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and U.S. Virgin Islands).
  - » Fifty-two deaths have been confirmed in 26 states and the District of Columbia **(as of December 10, 2019)**.
- Although the number of reported cases appears to be declining, states are still reporting new hospitalized EVALI cases to CDC on a weekly basis and should remain vigilant with EVALI case finding and reporting.

About Patient Exposure

- All EVALI patients have reported a history of using e-cigarette, or vaping, products.
  - » Vitamin E acetate has been identified as a chemical of concern among people with e-cigarette, or vaping, product use associated lung injury (EVALI).

  - » THC is present in most of the samples tested by FDA to date, and most patients report a history of using THC-containing e-cigarette, or vaping, products.
  - » The latest national and state findings suggest THC-containing e-cigarette, or vaping, products, particularly from informal sources like friends, or family, or in-person or online dealers, are linked to most of the cases and play a major role in the outbreak.
- CDC has analyzed national data on use of THC-containing product brands by EVALI patients.
  - » Overall, 152 different THC-containing product brands were reported by EVALI patients.
  - » Dank Vapes, a class of largely counterfeit THC-containing products of unknown origin, was the most commonly reported product brand used by patients nationwide, although there are regional differences. While Dank Vapes was most commonly reported in the Northeast and South, TKO and Smart Cart brands were more commonly reported by patients in the West and Rove was more common in the Midwest.

  - » The data further support that EVALI is associated with THC-containing products and that it is not likely associated with a single THC-containing product brand.

WHAT WE DON'T KNOW

From the CDC website[4]

While it appears that vitamin E acetate is associated with EVALI, evidence is not yet sufficient to rule out contribution of other chemicals of concern to EVALI. Many different substances and product sources are still under investigation, and it may be that there is more than one cause of this outbreak.

MULTIFACETED COMPLICATIONS IN FINDING THE CAUSE

Advocates for vaping often state that if there were problems with vaping, then science would have already found the cause. However, valid research requires time and retesting any hypothesis. Some complications in isolating the cause(s) may be these:

- The sheer number of ingredients and additives vaped
- The variety of devices
- The significant growth of vaping
- The wide segment of the population that vapes
- The poor or reluctant recall of what individuals vaped
- The role of black market vaping cartridges
- The possibility of a combination of factors
- Confusing and varied symptoms and signs
- Lack of understanding clinically significant nicotine/cannabis interactions
- Eight different forms of tocopherols (vitamin E) present (See figure 2.)

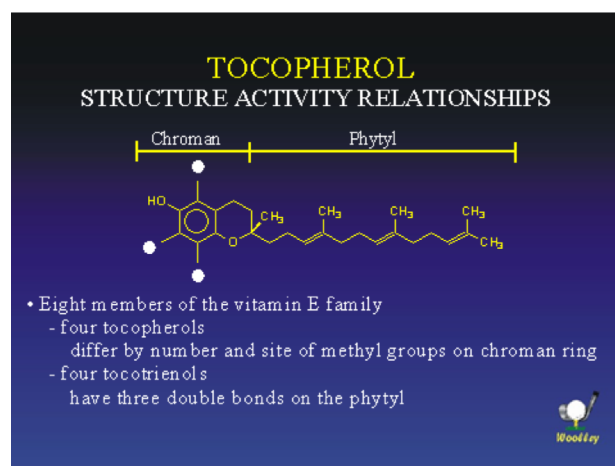


Figure 2

WHAT CDC RECOMMENDS

From the CDC website[5]

- CDC and FDA recommend that people should not use THC-containing e-cigarette, or vaping, products, particularly from informal sources like friends, family, or in-person or online sellers.
- Vitamin E acetate should not be added to e-cigarette, or vaping, products. Additionally, people should not add any other substances not intended by the manufacturer to products, including products purchased through retail establishments.
- While it appears that vitamin E acetate is associated with EVALI, there are many different substances and product sources that are being investigated, and there may be more than one cause. Therefore, the best way for people to ensure that they are not at risk while the investigation continues is to consider refraining from the use of all e-cigarette, or vaping, products.
- Adults using e-cigarettes or vaping products as an alternative to cigarettes should not go back to smoking; they should weigh all available information and consider utilizing FDA-approved cessation medications. They should contact their healthcare provider if they need help quitting tobacco products, including e-cigarettes.
- Adults who continue to use an e-cigarette, or vaping, product, should carefully monitor themselves for symptoms and see a healthcare provider immediately if they develop symptoms like those reported in this outbreak.

SOME FREQUENTLY ASKED UNCERTAINTIES

Popcorn lung is the nickname for bronchiolitis obliterans, a serious and irreversible lung disease that can damage the smallest airways in lungs, resulting in coughing and shortness of breath.

There is correlating evidence that suggests vaping may increase overall risk for cancer. This could be different than directly causing cancer.

Vaping specifically nicotine can lead to breathing problems because even in the presence of nicotine the lungs can still react to substances, especially flavoring, in the e-liquid, which can cause various types of inflammation.

JUUL has no settings. The device senses when a pull is taken from the mouthpiece and heats up to vaporize the liquid inside. As a result, the company claims it is supposedly less likely to cause burns or explode, which has been an issue with other vaping devices.

Overdose has been defined as an excessive or dangerous dose of a therapeutic agent. Nicotine has no therapeutic use, it is addictive, and it possesses toxic effects, so technically any dose of nicotine is an overdose.

ABBREVIATIONS

BAL	bronchoalveolar lavage
CBD	cannabidiol
EVALI	e-cigarette or vaping product use associated lung injury
JUUL	a popular brand of vaping device
MCT	medium chain triglyceride
THC	tetrahydrocannabinol
Tocopherol	vitamin E
VOCs	volatile organic compounds

ENDNOTES

1. David C. Christiani, "Vaping-Induced Lung Injury," The New England Journal of Medicine (September 6, 2019). https://doi.org/10.1056/NEJMe1912032.
2. Michael A. Mattay, et al., "Acute respiratory distress syndrome," Nature Reviews Disease Primers 5, no. 18 (March 14, 2019), 18–19, http://doi.org/10.1038/s41572-019-0069-0.
3. "Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products," Centers for Disease Control and Prevention, https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html, November 8, 2019.
4. Ibid.
5. Ibid.

Survivors of Our Circumstances

Talk given Oct 4, 2019 at the Collegium Annual meeting luncheon

LDS Medical Professionals

by Richard Norby

Being asked to be part of this luncheon for LDS Medical Professionals reminds me of a quote by Elder Jeffrey R. Holland in an April 1983 general conference talk when he said, "Brethren, it is impossible to express the overwhelming sense of responsibility I feel tonight. Like the mule who entered the Kentucky Derby, I know I probably shouldn't be here, but I surely like the company it lets me keep."[1]

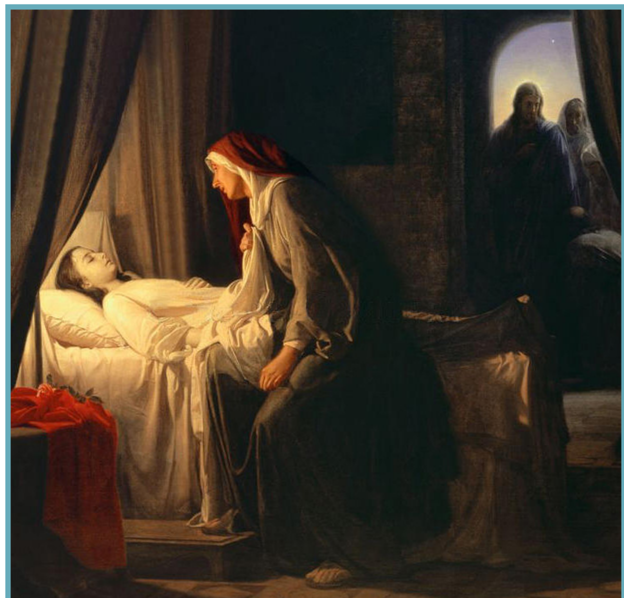
I first want to express my love and gratitude for my dear wife, Pam. She has been an inspiration to me from the moment we met in a Brigham Young University ski class shortly after I returned from my mission to France and Belgium.

From November 2010 to May 2011 there was a display of the artwork of Carl Bloch held at BYU's Museum of Art. I visited this display several times during those months and was enthralled by his depictions of the Savior's life. One piece of artwork that especially stood out was the artists' rendition of the daughter of Jairus.

In interpretations of other artists of this story the Savior is shown at the bedside of Jairus' daughter extending his hand to her as he commands her to awake from her death. But Carl Bloch shows the daughter lying on a bed with her mother at the edge of the bed with a forlorn look. In the background, in the shadows of the doorway, stand the Savior and the father, looking over the scene in front of them. The daughter and her mother are the focal point of the painting.

One of the reasons this interpretation of the story resonated with me is how it reminded me of Pam during our years of raising children and again during these past years as I have been recovering from the incidents related to the bombings at the Brussels airport.

The years of our children at home often found Pam sitting at the edge of their beds consoling, reassuring, or soothing them after a difficult day at school, during a time of sickness, or when they just needed someone to talk to.



During the many weeks spent in hospitals and for many months afterwards, Pam was at my side often with a forlorn look wondering what the outcome of my injuries would be. "There she sat at the edge of the bed" was how I pictured her during those often-endless days, always present, constantly encouraging, and continuously supporting. In my mind I could see the Savior in the framework of the doorway looking over the scene in the hospital room giving his approval of the work she was doing, ever present to step in to raise and rescue as needed.

The miracle of healings is most poignantly demonstrated in the life of the Savior. In Matthew 8:1–3, after Jesus has given his Sermon on the Mount, a leper approached him asking to be healed. This dreaded disease was incurable and those afflicted with it were outcasts of society. They had to declare their uncleanliness whenever someone approached them. This leper now approaches the Savior pleading for deliverance from the disease that possessed his body.

"Lord, if thou wilt, thou canst make me clean," was his plea.[2] The story continues, "And Jesus put forth his hand, and touched him, saying, I will; be thou clean. And immediately his leprosy was cleansed."[3]

In reading that short exchange I pictured a more detailed conversation. Instead of Jesus just putting out his hand and touching him, I visualized Jesus embracing the leper, holding him tight. Then I heard him say, "I love you and am concerned about you in a way no one else is. I know who you are. Be thou clean!"

Thus the invitation, "Come and see. Come and see the Savior, come and sit at His feet, listen to His words, watch how He treats others, feel as He feels, see as He sees, and then go and do likewise."

He can heal all sick people of all their sickness. He can make more out of you than you can out of yourself. He can make all things right. He wipes away all tears. He gives us beauty for ashes. He always gives us hope especially when we feel helpless. He will turn night into day. He compensates or makes up for all of our misgivings, weaknesses, inabilities, frailties, all that we lack, the times we don't measure up, our failures, poor grades, our sharp words, hurt feelings, when we have been shamed, our feelings of loneliness, hatred, bitterness, temptations, sins, sufferings, and wounds.

Several years ago one of our grandsons was born with some difficult challenges with sight, speech, and motor skills. One day his older five-year-old sister came home from school and was sitting at the table eating her lunch. She stopped eating and asked her mother if Jesus had come to the earth when she was little. Her mother replied that he hadn't come while she has been alive. "Did he come when grandma and grandpa were little," she then asked. Again the reply was no. "Well, when did he come?" Her mother reminded her of the time he came to the Nephites in the Book of Mormon.

She remembered and said, "Oh yeah, when he came and took each of the children and blessed them." She then asked, "So when he comes again, can we take Aaron to him and have him heal him so he can see just like he healed others in the scriptures?"

Perhaps there will come a time for each of us when we will be sitting down and in conversation with others, listening to their life's stories. Some will have had heartbreaking experiences with challenges of sickness, accidents, disease, or senility. Then, as we recall our own life's journey, we will remember our own heartrending experiences and challenges and wonder why it was so.

We might be inclined to compare the tests of others with our own. Are there easier trials than others? Why were mine so hard; why were theirs so seemingly easy? Why did another suffer so much more severely than me?

The tests of life are not on a vertical ladder where with each rung the test is more difficult or steep in comparison with those on lower rungs. Tests are measured or meted out in a personal, individual manner under the direction of Heavenly Father who knows our capacity to endure. Therefore, individual trials are on a horizontal plane where there is no comparison with another only endurance on our part.

Some quotes from Elder Neal A. Maxwell help put life in perspective:

- "Now we are entering times wherein there will before all of us as Church members, in my judgment, some special challenges which will require of us that we follow the Brethren. All the easy things that the Church has had to do have been done. From now on, it's high adventure, and followership is going to be tested in some interesting ways."[4]
- "I do not know what lies ahead of you young men, but my advice would be to fasten your seat belts and hold on firmly to your principles!"[5]
- "In case you hadn't noticed it, in the last days, discipleship is to be lived *in crescendo.*"[6]

President Russell M. Nelson has given us a current insight as to what lies ahead when he said, "Wait till next year, and then the next year. Eat your vitamin pills. Get some rest. It's going to be exciting."[7]

Even with reassurances from heaven and from living prophets, we still find that life often seems unfair. We still face trials and hardships and are often in despair more than we thought possible. Why do I have to go through what I am going through?

- A family member or friend has been diagnosed with a life-threatening disease.
- The health of someone under my care digressed instead of progressed to better health.
- Our son got cut from the ward basketball team.
- Our leather seats are not heated.
- Our missionary came home early from their mission.
- At my 20-year high school reunion, I looked 20 years older than I did when I graduated.
- I have never served as the president of anything.
- The promotion promised did not pan out.
- Our child did not get accepted into the college of their choice.
- We have a wayward child even though our family has been diligent in holding Family Home Evening, family prayer, outings, and keeping an orderly home.
- My phone charger doesn't reach my bed.
- The prayers I offer are not answered like I want them to be.

If all our prayers were answered in the way we wanted, what would be the results? How many of our family or friends would even face trials or struggles or heartache? Would there be anyone in hospitals? How many would suffer death? What would be the population of cemeteries?

All too often we seek calmness and peace without the prevailing winds of adversity. We want to appreciate joy without its opposite of misery, to love the light without darkness, to value love without the contrast of hate.

There is an Arab proverb that says, "Too much sun makes a desert." We seek for the moderate and temperate experiences of life and at the same time want to shun any extremes. Let's have it pleasant and calm all day every day.

Why is Hawaii so inviting? Why is the Sahara Desert so unappealing? Without storms and rains and wind and tempests, Hawaii would be a desert with too much sun.

After retiring in 2014, Pam and I started putting necessary things in order so we might submit our missionary recommendation form to serve as a missionary couple. We were excited to serve in any capacity in any location. In May 2015 we received a call to serve in the France Paris Mission, which included northern France; Luxembourg; and Brussels, Belgium. How excited we were.

In 2003 we were called to preside over the Ivory Coast Abidjan Mission in West Africa. At that time the mission included five West and Central Africa countries. The challenges there were great, as they are in most missions: health concerns—especially malaria—cultural dynamics, and language barriers to name a few.

One of the most difficult challenges was a war that broke out in Ivory Coast that necessitated the evacuation of forty-four non-African missionaries to Ghana where they were given new assignments to be assimilated into that mission. Another evacuation of French elders from the country of Togo to another country caused additional stress and anxiety.

With the history of our service in Africa, it was understandable that when Pam read our mission call to our family to serve in the France Paris Mission one of our daughters said, "Well at least this time mom and dad are going someplace safe."

In our anticipation for serving as a mission couple, Pam and I selected a scripture that expressed our excitement for and confidence in the process of mission calls. We chose the passage in Isaiah 41:10: "Fear thou not; for I am with thee: be not dismayed; for I am thy God: I will strengthen thee; yea, I will help thee; yea, I will uphold thee with the right hand of my righteousness."

The two of us had the assurance that we needn't fear or be dismayed in any way while serving the Lord as full-time missionaries.

While at the Provo MTC our mission president in Paris called to say that we would be living in Brussels to replace a missionary couple returning home. There we would serve with the young adults and the institute program in the ward and Pam would also serve as the mission medical advisor.

During the first part of March 2016 Pam was having some interesting thoughts about us and about family members. Shortly thereafter she asked me if I thought we would be okay if something happened to a family member. I said I thought we would be fine but wondered why she would ask such a question. It wasn't until months later that I would learn that during that time she had been having some unsettling feelings about something but she wasn't sure what it meant.

About that same time our daughter in Utah was struggling with thoughts of our safety. She would call and ask how we were doing and if we were in good health and safe in our travels. We assured her that all was well and that we were enjoying our experiences of serving in Brussels and traveling throughout the mission for zone conferences and visiting with missionaries in their apartments.

On Sunday, March 20, 2019, the zone leaders said that Sister Fanny Clain, a sister missionary serving in nearby Liege, Belgium, had received her visa to travel to the United States to continue her missionary service. For several months she had been serving in Belgium awaiting her visa to travel to the United States, as she is a French citizen.

They asked if I would take the three of them to the Brussels Airport for Sister Clain's flight. Arrangements were made to pick them up at 7:00 a.m. Tuesday morning March 22 at a local metro station and off we went for the 20-minute drive to the airport.

Upon arriving the elders carried Sister Clain's suitcases and the four of us strolled into the airport, excited for her continued mission experience in the Ohio Kirtland Mission. We entered the Delta terminal looking for the appropriate counter knowing we had plenty of time to check in for her 10:00 a.m. flight to Salt Lake City.

As was customary in the France Paris Mission, all missionaries flew into or out of Paris, as that was the headquarters of the mission. This flight was an exception because Sister Clain had been serving in Belgium for four months, making it a convenient decision to have her fly out of Brussels.

The time was about 7:50 a.m. as the four of us talked and patiently waited in line for Sister Clain to pass through the check-in counter and get ready to board her plane. We were talking and noticing small children playing and laughing near a Delta kiosk. Sister Clain said, "I hope those children aren't on my flight because if so it will be a long, noisy flight." We both laughed.

Immediately there was an explosion behind us that sent us all flying through the air, landing in different locations

not close to each other. I instantly knew it was a terrorist bomb that had been detonated. I found myself sprawled face down on the airport floor. I pushed up with my arms and looked around. People were screaming and running and trying to make sense of what had just happened. Then, 12 seconds later, another bomb was detonated. I attempted to stand up and run away from the place of the explosion but found my left leg could not carry my weigh and I fell down face first. Again I tried to get up but as soon as I put weight on my left leg I fell to the ground.

At that moment I had an sudden impression that brought with it peace, dispelling all fear. I knew in that instant that God knew who I was, where I was, what had just taken place, and what I was feeling. I also knew that He knew all the other people in the airport and what they were experiencing. Another reaffirmation was that the Savior had suffered all the pain, anguish, and sorrow of all involved in what had just taken place. This confirmation was instantaneous and did not have to be analyzed or evaluated. I knew that He knew.

From that moment on I knew that regardless of the outcome it would be okay. Doctors and medical personnel would be put in place in ensure the very best care possible. I need not worry.

About ten hours later Pam found me at one of the several hospitals used to care for all the patients of the attack. She sat down with the surgeon to get an update on my condition. The doctor said it was a very serious situation, that there were severe burns on my legs, hands, face, and neck and that a large portion of the calf of my left leg was missing. My body was full of metal shrapnel, but he had extracted as much as he could. For her it now became a waiting game.

When she returned to our apartment she opened the Book of Mormon to the chapter the two of us had read the previous night. She then started to read Ether 2 where the Jaredites were preparing for their journey to the Promised Land. The Lord instructed them that to get them from where they were to where they needed to be would require waves and storms and wind and rain; it would not be a calm voyage. Otherwise they would remain where they were and not be able to reap the rewards of their designed destination.

As Pam was reading she noticed a note I had written and attached near verses 24 and 25. It read, "The storms aren't always stilled. At times he prepares me against the storms. He could breeze me to the Promised Land but instead he prepares me to withstand the storms."

She said that as she read those words they became her mantra. She was willing to be prepared to withstand the storms.

Another lesson she quickly had to learn was during her prayer at the end of that first day. As much as she wanted me to be healed and for all of us to have the pain and ensuing struggles removed, she knew that God's will must take precedence over her own desires and wishes. In her prayer she had to verbalize that principle. When she did, her feelings of despair left and her outlook was brightened.

One of our daughters had a similar experience on Father's Day in June 2019. She remarked: "We talked a little bit in Sunday School about submitting our will to the will of the Lord. It made me think three years ago when I just wanted my will to be fulfilled and that I wanted you to live and everything to be normal. Saying, 'if it be thy will' in my prayers was really hard at first! What a great lesson it taught me though when I could finally submit to His will and have the peace that whatever happened I would be OK. I'm so thankful that you were saved."

President Spencer W. Kimball said:

> *We knew before we were born that we were coming to the earth for bodies and experience and that we would have joys and sorrows, ease and pain, comforts and hardships, health and sickness, successes and disappointments, and we knew also that after a period of life we would die. We accepted all these eventualities with a glad heart, eager to accept both the favorable and unfavorable. We eagerly accepted the chance to come earthward even though it might be for only a day or a year. Perhaps we were not so much concerned whether we should die of disease, or accident, or of senility. We were willing to take life as it came and as we might organize and control it, and this without murmur, complaint, or unreasonable demands.*[8]

Being surrounded with and continually experiencing the incidents of life we must ask ourselves the question, "Am I a victim or a survivor of my circumstances?" We can often be victims of our own design. Accepting a victim status gives us all the excuses we need to act the way we do for when we are looking for an excuse anyone will do.

One might feel that he or she is a victim of a divorce, an early release from a mission, or of not fitting in with a particular group of friends. Others might feel like a victim because of past sins, or because of some action of another, or because of a myriad of other possible life situations.

But the reality is that we are not *victims* of our circumstances, we are *survivors* of our circumstances. You cannot be a victim unless you choose to be.

The Book of Mormon teaches us because we have been "redeemed from the fall [we] have become free forever, knowing good from evil; to act for [ourselves] and not to be acted upon."[9]

When we are "acted upon," when someone is aggressive towards us, often our response is to take

offense, to retaliate, to counter in some way to the action towards us. If someone says something unkind, the natural reaction is to counter with an unkind remark. If someone cuts us off on the freeway the natural reaction is to be aggravated and we want to get even with him or her is some measure.

We are admonished to "act for [ourselves]," to be in control, to not let others determine how we respond to situations, especially those beyond our control. We must choose or act and not react or be acted upon.

It seems that victims are most often those being acted upon, giving excuses for their behavior while survivors act for themselves and choose how to respond to situations regardless of the setting.

The people of Ammon in the Book of Mormon were converted Lamanites who were brought to the knowledge of the Lord and turned from their wicked ways. They took upon themselves the name of Anti-Nephi-Lehies. They made a covenant with God that they would bury their weapons of war with a promise to never stain their swords again with the blood of their brethren.

As a testimony to God and also to men that they never would use weapons again, they buried them deep in the earth.[10] They did not bury them in the closet where they would be easily retrieved just in case they needed them or with their handles sticking out.[11]

The same might be suggested for those who feel they are victims of circumstances. Bury your arsenal of excuses of not measuring up, of thinking you are second class or third string, of feeling you cannot repent or that it's too late to do so, of being picked on, of hurt feelings, or of life not being fair. Stop thinking you are a victim of your circumstances.

If tragedy has struck, if you have been offended, if you didn't get what you think you deserved, if you're not the top pick of your peers, if life has treated you unfairly, then let it go.

I cannot wish my legs back to carry me as they once did, to run and climb and jump and swim. So I chose to be content "with [my] allotted 'acreage,' while still using whatever stretch there may be in any tethers."[12]

An all-knowing Heavenly Father will use our personal "allotted acreage" to further the work of the gospel of Jesus Christ, however meager our acreage might be.

During his battle with leukemia Elder Neal A. Maxwell taught:

> *I was doing some pensive pondering and these 13 instructive and reassuring words came into my mind: "I have given you leukemia that you might teach my people with authenticity." He then went on to express how this experience had blessed him with "perspective about the great realities of eternity.… Such glimpses of eternity can help us to travel the next 100 yards, which may be very difficult."*[13]

As God has given us our own version of leukemia: heartache, anxiety, spiritual or emotional wounds, lack of abilities, etc., we too can teach others with authenticity as we bear witness of the saving power of the Atonement of Jesus Christ and of a Father who knows best how to get us from where we are to where we need to be.

There are lessons that have been accentuated and lessons that have been learned since our family's experience in Brussels: God knows who we are; prayers can be answered in ways that we would have never imagined; God may not come when we call, but He will always be on time; life is not always fair; too much sun makes a desert; we can choose to be victims or survivors; for every Friday of crucifixion there is a Sunday of resurrection; when we are impatient with God it means we have a better way of doing things; our storms are not always stilled; and perhaps the most important lesson is that our faith is in Jesus Christ and not in desired outcomes.

ENDNOTES

1 "Within the Clasps of Your Arms," *Ensign*, May 1983.
2 Matthew 8:2.
3 Matthew 8:3.
4 "The Old Testament: Relevance within Antiquity," CES Religious Educators Symposium, August 18, 1979, 12.
5 "Remember How Merciful the Lord Hath Been," *Ensign*, May 2004.

6 "Premortality, a Glorious Reality," *Ensign*, November 1985.
7 *Deseret News*, November 28, 2018.
8 *Faith Precedes the Miracle* (Salt Lake City: Deseret Book, 1972), 106.

9 2 Nephi 2:26.
10 See Alma 24:11–18.
11 See Dale G. Renlund, "Unwavering Commitment to Jesus Christ," *Ensign*, November 2019.
12 Neal A. Maxwell, "Content with the Things Allotted unto Us," *Ensign*, May 2000.
13 As quoted in M. Joseph Brough, "Lift Up Your Head and Rejoice," *Ensign*, Nov. 2018.

Monitoring TYPE TWO DIABETES *in the* Twenty-First Century

by **Scott Moore, DO, MLS (ASCP)[CM]**

Diagnosing diabetes—that's the easy part. Long-term monitoring—that's what generally throws a wrench in things. Typically, patients are diagnosed with diabetes whenever a fasting blood glucose over 126 mg/dL is identified. Alternatively, there are other ways to diagnose diabetes: a random blood glucose over 180 mg/dL, a 1- or 2-hour Oral Glucose Tolerance Test with a value over 200 mg/dL or 140 mg/dL respectively,[1] or a Hemoglobin A1c value over 6.5 percent. These diagnostic criteria may be different in various regions around the world but are fairly accurate in most regions in the USA.[2]

OK, so now the patient has been diagnosed, and we are trying to manage their insulin or their other antihyperglycemic medications. Today, we have the benefits as well as the challenges of real-time glucose monitoring. In order to determine if our patients will benefit from its use or to optimize our utilization of this new monitoring, we need to be able to answer a few questions about its use, such as: Can continuous glucose monitoring (CGM) systems be used for diagnosis? Is home blood glucose monitoring still beneficial for patients? Will my patients be eligible for CGM systems? How do I use it to monitor disease progression properly? Are these new

flash analyzers accurate and consistent with modern laboratory standards?

The diagnosis of type two diabetes mellitus (T2DM) has remained relatively unchanged for many years, but there are many new at-home monitors that may be further developed into potential diagnostic tools that clinicians may use. For example, the use of CGM systems preemptively in high-risk populations may eventually lead to a new era of early diagnosis and improved management of prediabetes. As of right now, however, the use of CGM as a diagnostic tool is still developing, but it appears very promising.[3]

While CGM is not used for diagnosis, the looming question is, Does its use actually improve glucose control? Some may see this analogy similar to comparing how owning a scale can help patients lose weight. "When performance is measured, performance improves. When performance is measured and reported, the rate of improvement accelerates."[4] Home blood glucose monitoring devices, which have been used for years, effectively function as scales. When patients see a value that is out of the reference range, they do something to change their lifestyle, be it eating a banana during hypoglycemia or eating less ultra-processed foods, or moving more for hyperglycemia. These patients, although likely capable, may not be able to make optimal usage of the information provided by the CGM sensor without appropriate training and occasional counseling with their physician.

This need for monitoring is potentiated if our patients need insulin, but what about the patients who can manage their blood sugars with diet? Does blood glucose monitoring do more harm than good in these patients?[5] A Cochrane review demonstrates that, although it may seem intuitive for patients who are not using insulin to monitor their own blood glucose concentrations, any benefit conferred by this practice is slight in the first six months after beginning use of blood glucose monitoring.[6] The benefits of glucose monitoring may, in fact be superimposed with other problems, like 6 percent higher scores on the depression subscale in patients who monitor their T2DM and are not able to keep their blood sugars in the proper window. Depression and diabetes have been linked to a higher mortality rate.[7] There is also no evidence, as stated in the Cochrane review, that "self monitoring of blood glucose (SMBG) affects patient satisfaction, general well-being or general health-related quality of life."

With that evidence, it may seem difficult to recommend to patients with T2DM that are not on insulin to continue monitoring their blood sugar. Within the first six months after diagnosis, the evidence shows that there is marginal benefit for the entire population, but this truly comes down to the specific clinical scenario and the physician's professional opinion of who would benefit most from beginning blood glucose monitoring. After one year of monitoring blood glucose in patients with T2DM who are not on insulin, the benefits of SMBG seem to disappear.

In 2017, a study[8] from UNC Chapel Hill came out in JAMA that placed 450 patients with non-insulin dependent T2DM into three groups: no monitoring of blood sugars, once daily monitoring, and once daily monitoring with enhanced feedback, meaning that the participants would receive messages from their blood glucose meters intended to educate and motivate them. Surprisingly, they found that compared to the group that had no monitoring of their blood sugars, the patients who were assigned to the monitoring groups had no clinically significant differences[9] in glycemic control at one year out. This didn't mean that the patients who were monitored didn't have any benefit at all from the monitoring but that benefit likely occurred within the first six months and at the time of follow up at the year mark, the monitoring and non-monitoring groups seemed to have equaled out again.

With that information, it seems that CGMs might be difficult for patients with T2DM to get. Who is eligible for a CGM monitor? While these monitors were first used in the type one diabetic patients, Medicare has initiated coverage of CGM in patients with T2DM.[10] Since then, more and more patients and physicians have come to rely on CGM to monitor their patients with T2DM within the first year of therapeutic implementation.[11] These patients need to qualify and have either T1DM or T2DM, checking their blood glucose four or more times per day, using three or more antihyperglycemic medications or use an insulin pump, and requiring frequent adjustments to their medication regimen (See table 1).

In those patients, in whom SMBG may be beneficial, it is suggested for the monitoring with CGM to be structured with the medical care team and for that information to be used in the management of therapy. A recent metanalysis,[12] which assessed 1277 patients in the SMBG group and 1027 patients in the non SMBG group, used HbA1c as the primary endpoint, to verify the effect of SMBG (vs no monitoring), structured SMBG (vs unstructured), and of SMBG-driven therapy adjustments. SMBG appeared to reduce the HbA1c by −0.17% (95% CI −0.25 to −0.09%, $P < .003$). The reduction in HbA1c was slightly greater but significant in the structured group, −0.3 percent (95 percent CI −0.49 to −0.1 percent). Lastly, the group with structured SMBG, in which the data was used to adjust the antihyperglycemic medications, had a decrease of HbA1c greater than the unstructured group; −0.27percent (95 percent CI −0.49 to −0.04 percent, $P < .018$).

TABLE 1: ELIGIBILITY CRITERIA FOR CGM

Patient has T1DM or T2DM
Checking Blood Glucose ≥4x/day
*Use of ≥3 antihyperglycemics
*Use of an insulin pump
Requires frequent medication adjustments

* Patient only needs one of the two

The question then arises, If we begin to base our decisions on these home glucose monitoring systems, are they accurate? This was evaluated back in 2000 and validated with modern devices that there is adequate consistency between CGM and other handheld blood glucose meter values.[13] All types of CGM have relatively equivalent accuracy and utilization rates, and there seems to be no superiority with any of the different brands in this regard.[14] In comparison to laboratory values, the measurement error is not outstanding, but accuracy continues to improve. As CGM started, we saw a measurement error of more than ±20 percent. Today, the error is a little less than ±10 percent.[15] Back in 2010, only 16 of 27 blood glucose monitoring systems that were tested met the minimum accuracy requirements of the standard. Twenty-four of these blood glucose analyzers used the glucokinase method, and three used the hexokinase method for glucose detection.[16] These barriers to implementation of accuracy and standardization are being addressed, and we can expect utilization of CGM to increase which will likely result in improving patient outcomes and public health.

We may recognize now that CGM can produce reliable values for us to base treatment decisions on, but what is the effect of CGM on patients? How does it benefit them, despite the many studies that show that CGM isn't beneficial after the first six months to a year? Even though the accuracy may be decreased in CGM and other SMBG devices, it has been demonstrated that CGMs can accurately detect concentrations between 72-180 mg/dL (3.9-10.0 mmol/L) during a twenty-four-hour period. This is defined as time in range (TIR), which is the optimal range for patients with T2DM to be in. There is a strong association with diabetic retinopathy in T2DM and the time the patients spend out of that range.[17] CGM users are more likely to keep their blood glucose within that range because they are actively managing their glucose concentrations.

One of the most powerful benefits that CGM provides is reducing the amount of time that patients experience hypoglycemia, defined as a blood glucose level <70 mg/dL. A recent metanalysis showed that close monitoring substantially reduces the amount of time that patients spend <70 mg/dL and saw no differences whether the system was used in T1DM vs T2DM, children vs adults, or the length of the study.[18]

A pilot study performed in New Zealand in 2019,[19] took twenty adults with obesity and T2DM and undertook a twelve-week lifestyle intervention (diet and exercise). The patients were then randomized to either a group with a Real-Time CGM (RT-CGM) and access to the visual display or a blinded group with a RT-GCM and no access to the visual display. This demonstrated that patients in the unblinded RT-GCM group were able to achieve a 40 percent greater reduction in their glucose-lowering medications when compared to the blinded group. The diabetes-related medications and HbA1c were assessed at baseline (week 0) and at twelve weeks. This was in the initial six-month window when patients likely benefit from CGM, so this is not surprising. The change in HbA1c did not differ significantly between the two groups. The benefits from monitoring were likely minimal in this study aimed primarily at assessing the effect of lifestyle change.

Now that we understand some of the benefits and drawbacks of CGM, where do patients start when their physician gives the approval to start CGM? Table 2 contains a reference of some of the more common glucose sensors, their prices, and other considerations when recommending specific sensors for your patients.

If it is decided that the patient needs monitoring, then they might also benefit from an insulin pump. Table 3 can serve as a useful guide to two of the common insulin pumps and their prices. The data demonstrate that these additional units are substantially more expensive than a monitor; however, when used in tandem with a monitor, the switch from multiple daily insulin injections to continuous subcutaneous insulin infusion can provide a slight, yet significant improvement in HbA1c.[20] This improvement might also be harmful in the long term because these patients experienced more frequent hypoglycemic episodes, and their healthcare expenditures increased.

After all that has been researched, the right choice to use a CGM unit or not is still very individualized, along with the decision about which pump to use. Patients should research the available CGM systems, if it is mutually decided that one would be beneficial for them. These CGM systems may only benefit the patient for the first 6–12 months but may also help them to better manage their blood sugar for the long term.

TABLE 2: SENSOR DEVICE[1]

Name	Freestyle Libre[2]	Eversense[3]	Guardian 3®[4]	G6[5]
Brand	Abbott	Eversense	Medtronic	Dexcom
Cost	$69.99 for the device and $35.99 for each 10-day sensor *Free 14-day trial	$99 Eversense Bridge Program	~$750 total cost Many different models of payment	Low $354 Average $418
Provider Placement of Sensors	No	Yes	Yes	Yes
Accuracy	Acceptable	Acceptable	Acceptable	Acceptable
Medicare Approval	Yes	Yes	Yes	Yes
Interferences	Ascorbic acid (Vitamin C) and salicylic acid	Tetracycline and Mannitol, but NOT acetaminophen NOR ascorbic acid[6]	Acetaminophen[7]	Acetaminophen > 1000 mg/day

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3 Eversense Bridge Program, https://www.eversensediabetes.com/patient-bridge.
4 Guardian Sensor 3, Medtronic Diabetes, http://www.medtronicdiabetes.com/products/guardian-sensor-3.
5 Safety Information, Dexcom, https://www.dexcom.com/safety-information.
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TABLE 3: COMBINED GLUCOSE MONITORING AND INSULIN DELIVERY SYSTEMS

Name	Paradigm 670/630[1]	OmniPod DASH System[2]
Brand	Minimed	Insulet
Cost of Pump	$5,200	Starter kit $660 *One zero-cost PDM with 4 years of purchase of Pods
Cost of Disposables	$115 for 10 infusion sets. 2-3 days per infusion set[3]	$30/Pod. Each Pod lasts 3 days[4]
Cost of disposables over 1 year	$1,399	$3,650
Total Cost for 1st Year	$6,599	$4,310
CGM Compatible	Yes	Yes
Additional Features	Smartphone connectivity	Smartphone connectivity, iPhone widget

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3 ADW Diabetes, https://www.adwdiabetes.com.
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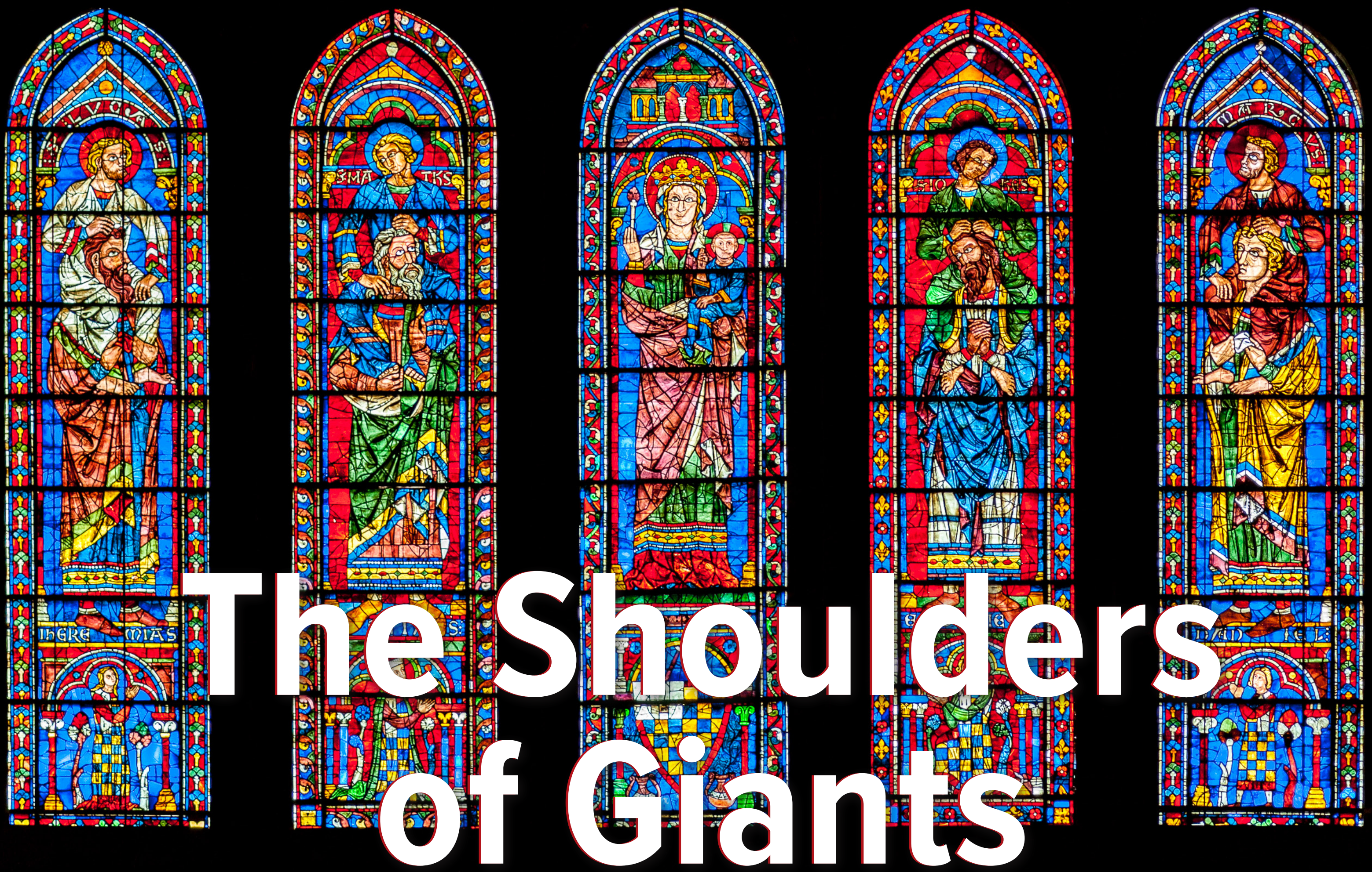

The Shoulders of Giants

Looking Back and Moving Forward

BY LLOYD D. NEWELL

In the south transept of the Chartres Cathedral, four tall stained-glass windows depict Matthew, Mark, Luke, and John. Finding something like this in a medieval cathedral is not unusual, but something about these depictions is unique: each of the Gospel writers is being carried on the shoulders of a larger-than-life Old Testament prophet: Jeremiah, Isaiah, Ezekiel, and Daniel. In beautiful art glass, these images capture what Bernard, the twelfth-century chancellor of the School of Chartres, told his students—we are all dwarfs, perched on the shoulders of the giants who preceded us.[1]

Men and women who accomplish something meaningful often repeat this sentiment. In humility, they acknowledge that they have benefited from the experiences and wisdom of their predecessors, to whom they give at least part of the credit for their achievements. For example, Sir Isaac Newton—who, among other things, invented calculus and the reflective telescope and defined the laws of motion—reflected on his accomplishments with these words: "If I have seen farther, it is by standing on the shoulders of giants."[2]

In reality, we all stand on the shoulders of giants, whether we know it or not. Most often these giants are common people who have made a difference in our lives: parents, spouses, family, friends, colleagues, leaders, and teachers. Because of them, we reach heights that otherwise would not be possible.

Some prefer to focus on the mistakes and weaknesses of previous generations. But the wise know how to learn from those mistakes without being overly critical. Some might say that today's problems are unique and even unprecedented, making the past irrelevant. But the humble recognize that the answers to today's problems are quite often found in the same time-tested virtues exemplified by the giants who went before us. The truth is that we are better able to move forward into the future when we first look back and remember the past.

As medical professionals, you might feel indebtedness

to your predecessors as acutely as anyone. You surely have been blessed with many colleagues who have both lived their faith and modeled excellence in medicine and caregiving. In addition, it's likely that many of you entered the medical profession because of the influence of a mentor or teacher—someone who taught you, believed in you, and made you want to help others; someone who lifted you up so you could see farther and reach higher. Yours is a caring profession, and in most cases I would think that you chose it because you care and have received care.

John Newton, creator of the beloved song "Amazing Grace" wrote, "We think we know a great deal, because we are ignorant of what remains to be learnt."[3] So much of "what remains to be learnt" can be found in the hearts and minds of those who went before us—personally and professionally. And it may be, as Elder Neal A. Maxwell taught, "We need to be reminded more than we need to be instructed."[4]

And so, today, I wish to speak about a giant upon whose shoulders I stand, a man I never met but whom I think about often. Every week, I am blessed to serve as the announcer for the Tabernacle Choir's long-running broadcast *Music and the Spoken Word.* You cannot even glance at the history of this remarkable program without immediately encountering its longtime announcer, writer, and producer, Richard L. Evans. For over 40 years, Richard L. Evans and *Music and the Spoken Word* were practically synonyms. And, almost unbelievably, he performed much of his service while also serving as a member of the Quorum of the Twelve Apostles. His continued influence on the program—and on me personally—is incalculable. And yet I worry sometimes that too many of the younger generations of the Church today hardly know who he was. We cannot forget giants like Richard L. Evans and so many others. Tonight, in the spirit of favoring reminders over instruction, I will speak of a giant, Richard L. Evans.

I begin with the end. In April 1972 President Harold B. Lee, First Counselor in the First Presidency, opened the first session of general conference by noting one who was missing. He said, "It is with subdued hearts that we remember our beloved Richard L. Evans. His voice, his spirit, and his admonitions and counsel were one of the highlights of his association as a General Authority of the Church. Richard L. Evans didn't just belong to the Church; he belonged to the world, and they claimed him as such. We know that there are heavenly choirs, and maybe they needed an announcer, and one to give the Spoken Word. If so, maybe the need was so great that he is called to a higher service in that place where time is no more."[5]

President Lee's words must have comforted those who had been mourning the death of this extraordinary man. *Music and the Spoken Word,* the broadcast that he shaped

Richard L. Evans, announcer for Music and the Spoken Word, 1930-71. © 2009 Intellectual Reserve, Inc. All rights reserved.

Several KSL radio announcers rotated through the choir assignment until, in 1930, Richard L. Evans received the permanent responsibility, a job he held until 1971. Evans began by simply announcing the hymns or musical selections, but soon added commentary to accompany the musical themes. The commentary expanded to incorporate the timely messages of hope and encouragement that became the "spoken word."

and served for forty-one of his sixty-five years, would ever remain his legacy. Upon his passing, the First Presidency of the Church said, "While others may be raised up to shoulder part of the heavy load he carried, there will never be one to take the place of Richard L. Evans, apostle, philosopher, thoughtful friend, wise counselor, loving husband, and father."[6] Indeed, his life's work brought immeasurable recognition to the Church; his words and actions helped build bridges of understanding around the world. And yet, few of his admirers knew of his humble, even inauspicious beginning.

A descendant of hardworking, faithful pioneer ancestors, Richard Louis Evans was born in Salt Lake City on March 23, 1906. He was the ninth child of goodly parents, John and Florence Evans. His father had worked up the ranks as an errand boy at *Deseret News* to the position of general manager. Ten weeks after Richard was born, his father returned by streetcar from a late Church meeting. He tried to get off the streetcar just before it reached a full stop, but he missed his footing and fell to the ground. He suffered a concussion and other injuries and

died several weeks later. Richard's widowed mother was left with nine children under 18 years of age. Although Richard never knew his father, his mother always taught the children that their father was still with them as the head of their eternal family.[7]

Richard and his siblings learned to work hard in a variety of jobs to help support the family. From the early years of grade school to the time he left on his mission, Richard delivered newspapers, sold flowers, washed dishes, drove truck, and worked as a traveling salesman, to name but a few of his many jobs. At this early age he learned about thrift, frugality, and the value of hard work—all of which would become common themes in his future *Spoken Word* messages. He excelled in school, was the editor of his high school newspaper and yearbook, became a champion debater, and received the Heber J. Grant scholarship award.

Not long after Richard turned twelve, he was playing in a field with some friends, one of whom had a loaded BB gun. While they were playing, the gun was accidentally discharged, and a pellet struck Richard in his left eye. With blood streaming down his face, he ran home and told his startled sister, "Don't cry. Pray for me!" He lost his eye, but the accident could have left him severely disfigured or even killed him. But thanks to the prompt attention and surgical skills of a family friend, Dr. L. W. Snow, Richard was fitted with an artificial eye that could move in unison with his good eye.[8]

Rarely have I talked with anyone who knew about Elder Evans's artificial eye or the untimely death of his father. I have searched in vain for any reference to those two events in his writing and speaking. Elder Evans's son told me that he found out about the eye accident from his mother when he was a teenager. It seems Elder Evans didn't spend much time with self-pity. He just went forward with his life. However, those disadvantages seemed to give him an extra measure of spiritual sensitivity and empathy for others who struggled with adversities. Perhaps they also made him more determined to work hard and succeed.

Throughout life, Elder Evans was known for his loving devotion to his mother. It seems that his father's death strengthened the bond of affection between mother and son. From her, Richard learned the principles of the gospel—especially the importance of strong faith. When he was just eleven years old, Richard wrote her this poem:

Patient mother long ago,
As patient now if not more so.
All the years that she has faithfully served;
Whether tired or not, she is like a sweet bird. . . .

I owe her all I own, if not more.
It matters not in the future whether I am rich or poor;
I will go through every kind of strife
To keep her safe throughout my life.[9]

When Richard was sixteen, an inspired patriarch blessed him that he would have a bright career, that he would stand in holy places and mingle with many of the best men and women upon the earth, and that he would serve the Lord in distant lands, travel much, and see many wonderful things. The patriarch also blessed him that his tongue would be loosed and become as the pen of a ready writer in dispensing the word of God and in preaching the gospel to his fellow man.

At age twenty, Richard L. Evans was called to the British Mission, where he served for nearly three years. During his mission, he was given many opportunities to develop both his character and his writing skills. Under the direction of Elder James E. Talmage and then Elder John A. Widtsoe (both of the Quorum of the Twelve Apostles), he served as associate editor of the *Millennial Star*, a periodical published by the mission. Elder Widtsoe also appointed Elder Evans to be secretary of the mission and persuaded him to write the centennial history of the Church in Great Britain.[10] He was rigorously taught, lovingly mentored, and warmly embraced by these two giants in Church history.

Richard L. Evans continued a close association with Elder and Sister Widtsoe until their deaths. They had lost their last surviving son only a few months before beginning their service in England, and Elder Evans became like a son to them. They gave him a key to their home, which he carried in his pocket until the day he died as a reminder of what the Widtsoes meant to him.

During the years after his mission, opportunities and blessings continued to pour into Elder Evans's life, as he worked hard and prepared for his future. He earned bachelor's and master's degrees with honors from the University of Utah, got a job as an announcer with radio station KSL, began announcing *Music and the Spoken Word*, and became editor of the *Improvement Era*. In 1933, he married Alice Thornley of Kaysville, Utah, and together they had four sons. (Not long after I began announcing *Music and the Spoken Word,* it was my great pleasure to meet Sister Evans and visit with her at length. She was so gracious and kind—an "example of the believers."[11] Truly, alongside every remarkable man is an equally remarkable woman.)

Richard's various assignments allowed him to develop a close relationship with President Heber J. Grant. On one occasion, while editor of the *Improvement Era*, Richard spoke with President Grant about his desire to pursue job opportunities in broadcasting in several large eastern cities. When he asked President Grant's advice, the prophet looked at him with a twinkle in his eye and said, "Brother Evans, I believe you might do just as well at home."[12] Richard's

brother commented that "as his life unfolded, Richard recognized that . . . the President's advice had changed his whole life—and for the better."[13] Indeed, many years later he would say on *Music and the Spoken Word*:

No man ever lived his life exactly as he planned it. There are things all of us want that we don't get. There are plans that all of us make that never move beyond the hopes in our hearts. . . . There are many things in life beyond the present power of anyone to alter or to answer or to understand. And what we cannot understand we shall have to accept on faith—until we do understand. In any case, rebellion isn't the answer. But neither is hopeless resignation. . . . But somewhere between bitter rebellion and beaten resignation there is an effective fighting ground where a man can make the most of whatever is; where he can still face each day and do with it whatever can be done."[14]

In 1938, President Grant called Richard L. Evans to serve in the First Council of the Seventy. At age thirty-two, Elder Evans was the youngest man called as a General Authority in more than thirty years, joining a quorum whose average age at the time was sixty-five. In an address at the conference where he was sustained, Elder Evans said:

I spent a sleepless night Thursday night, burning old bridges and building new ones. I think that perhaps this call would have come easier to me a little later in life, after I had had a better opportunity to make substance of more of my dreams, but perhaps this is not so. Perhaps I must just exchange old dreams for new dreams. . . . The Lord still chasteneth whom he loveth, and all those things which come into our lives in spite of our best-laid plans, are part of the education and enriching experience of every child of God who walks the earth."[15]

By that time, Elder Evans had already been announcing for the Tabernacle Choir for eight years, since he was just twenty-four years old. Early on, he simply announced the titles of the choir's songs and the station identification. Over time, however, he began to relate the title of a song to some point of philosophy or moral insight. These short thoughts flowed from the music and evolved into three-minute, nondenominational sermonettes. Listeners were so pleased with his inspirational messages that they became a regular, indispensable part of the choir's weekly broadcast. Elder Evans's trademark sermonettes were known for their simple eloquence and uncommon wisdom.

In 1954, to commemorate twenty-five years of *Music and the Spoken Word*, *Life* magazine editorialized on the program's legacy with these words:

Those who know this program need no arguments for listening to it, or no introduction to its producer and commentator, Richard L. Evans . . . or to the disciplined voices [of the Choir]. . . . Millions have heard them, and more millions, we hope, will hear them in years to come. It is a national institution to be proud of, but what matters more is that Americans can be linked from ocean to ocean and year to year by the same brief respite from the world's week, and by a great chord of common thoughts on God and love and the everlasting things.[16]

For forty-one years, until his death, Richard L. Evans continued as announcer, writer, and producer of *Music and the Spoken Word*. His name and voice are forever linked to the broadcast. His indelible contribution is still imprinted on the broadcast each week, perhaps most conspicuously in his words that still conclude the broadcast today: "May peace be with you this day and always." Truly, he was the man who created *Music and the Spoken Word* as we know it.

His greatest honor came at the age of forty-seven (after serving fifteen years in the First Council of Seventy) when, at the October 1953 general conference, President David O. McKay announced his name as the newest member of the Quorum of the Twelve Apostles. After a sustaining vote, President McKay said, "Elder Evans, whom you know and have known because of his work on the radio and his service in the stakes, and whom the entire nation knows,—Richard L. Evans, — will now speak to us."[17]

The new Apostle came to the pulpit in the Tabernacle and said:

> I have frequented these beloved walls for a period now approaching a quarter century in many situations and assignments. But this is the most difficult thing I have here had to do. It seems that this chapter was not in the script which I had written for myself. In the brief, but in some respects too long a time since first I became aware of this possibility, I have measured the full measure of my life many times over. There are those here who know much better than I the weight of this work. There is none here who knows better than I my own limitations, inadequacies, and imperfections, and the feeling of smallness which I have. But if you and my Father in heaven will accept me as I am, with your help and his, I shall earnestly endeavor to be better than I am or have ever been.[18]

As a special witness of Jesus Christ to the world, Elder Evans would take on new and demanding activities and assignments. And all the while, he would remain the voice for *Music and the Spoken Word*, rarely missing a broadcast, still producing it, and still writing and announcing its weekly message.

Elder Evans's Spoken Word messages explored a wide variety of subjects, each filled with hope and truth, the good news of the gospel. He often spoke of such principles as work, gratitude, duty, industry, civility, happiness, and love. He promoted timeless values, constantly urging his vast audience to focus their lives on the everlasting things.

He said on the broadcast, "Life is largely a reflection of what people believe plus what they have the courage and conviction to stand for, to live for."[19] His voice was a constant in good times and bad. Like trusted friends, Richard L. Evans and *Music and the Spoken Word* saw their audience through war and depression, peace and prosperity. He steadied troubled hearts, added upon joys, lightened loads, and led one generation after another to God.

Still today, I receive scores of letters—mostly from people who are not members of The Church of Jesus Christ of Latter-day Saints—expressing gratitude for the program, and some of them also express love and admiration for Richard L. Evans, nearly fifty years after his death, remembering with fondness his voice and his messages. "I grew up listening to the spoken word with Richard L. Evans," one person wrote me years ago. "Through the radio he became my friend during both happy and difficult years. Sometimes I can still hear his voice softly giving me some much needed counsel."[20]

Elder Evans understood the awesome power of broadcasting and other media to shape opinions and spread goodwill, so he worked tirelessly to share these gifts with a broader audience. He was instrumental in bringing *Music and the Spoken Word* to a television audience in 1949, and within ten years, a national poll declared it America's most popular classical and religious program. *Music and the Spoken Word* is now the longest continuously broadcast network program in the world. It is produced and distributed internationally to some 2,000 television, radio, and cable stations each week.

In addition to producing and writing the weekly choir broadcast, Elder Evans wrote a syndicated newspaper column for William Randolph Hearst's *King Features Syndicate* for five years. It was circulated to millions of homes and had one of the largest readerships in the nation. Elder Evans wrote articles for *Reader's Digest* and *Encyclopedia Britannica* and was asked to write an article defining the Church's beliefs for *Look* magazine.[21]

He wrote seventeen books, most of them compilations of his messages and quotes, nationally published by Harper and Brothers. His books were read by millions and reviewed by the most prestigious media outlets of the time, including the *New York Times,* which said in a review of a compilation of his messages, "[They] reveal an Addisonian charm which lifts them into literature. . . . Here is a classic, an example of how to put ancient realities to a modern world." The *Los Angeles Times* gave similar praise: "There is a classic simplicity here which makes meaning clear, and an eloquence which drives home a point."[22]

Richard L. Evans was also busy with civic affairs, most notably with the Rotary Club. Over three decades, he rose from local offices to become president of Rotary International in 1966. During that year, he and his wife addressed hundreds of audiences across the United States and in scores of nations. It would be impossible to calculate the goodwill he generated as he traveled, spoke, and met with dignitaries and officials across the world. The people with whom he met came to love and trust him—and the Church he so loyally served.

People often wondered how he could do it all. They attributed his accomplishments to talent and genius. He had much God-given ability, to be sure, but those who knew him best "recognized the working garments in which the genius was clothed."[23] He was an extremely hard worker, seldom rested from his labors, and often rose between 3:00 and 5:00 a.m. to work for a few hours before going to the office.

Richard L. Evans's death at age sixty-five was unexpected. He succumbed to a viral infection just after midnight on November 1, 1971. Elder Evans worked vigorously, as usual, up to his final days. Just before he died, he lay in his hospital bed as a recording of the Sunday morning broadcast came on. His voice and words encouraged faith in the future:

There are times when we feel that we can't endure—that we can't face what's ahead of us . . . that we can't carry the heavy load. But these times come and go . . . and in the low times we have to endure; we have to hold on until the shadows brighten, until the load lifts. . . . There is more built-in strength in all of us than we sometimes suppose. And what once we said we couldn't do, or couldn't live with, or couldn't carry, we find ourselves somehow doing and enduring."[24]

On Sunday, November 31, 1971, thirty days after Elder Evans's passing, the announcer who stood in his place for the choir broadcast read from one of Elder Evans's messages, entitled "I Stood on the Shoulders of Giants." Part of that message reads:

In a sense, all of us stand on the shoulders of giants. All of us stand on the shoulders of others—no man is self-made; no man is self-sufficient; no man of himself has brought into being all the things that enrich his life. All of us inherit so much from the past that we have an obligation to serve the present and to pass on and improve the world of the future.[25]

Now, I wish to conclude with my *Spoken Word* from last Sunday, March 31. Perhaps my being with you tonight inspired this message about learning from people who have passed away.

The End in Mind

(March 31, 2019 broadcast)

As we get older, we tend to look at ourselves, others, and the world around us quite differently than when we were younger. Hopefully, we've learned a few things, gained wisdom and friendships

along the way, and done our part to contribute to the world. Sometimes we become more interested in things that before didn't capture our attention.

For example, one man, now well into his sixties, spends more time reading obituaries in the newspaper. He reads not only to see if people he knows have passed away but also to learn more about life from people whose journey is now complete.

Obituaries, like funerals, remind us of our own mortality, that it's only a matter of time until "our time" will come. Most of us don't like to think about such things. But there's value in learning about the good in other people, how they lived their lives, what they accomplished, their successes and sorrows. Obituaries also give us a chance to feel just a bit of what the mourning loved ones feel—some of their grief but also some of their joy in remembering a life well lived. All of this can help us live with more purpose and meaning.

That's because when we read about someone else's life, we can't help but think about our own. When our final tribute is written, what will it say? What relationships and experiences will really matter then? How do we want to be remembered?

Some people call this keeping the end in mind.[26] The simple truth is that if you know where you want to end up, your daily journey will be more purposeful and meaningful. How can we live a little better today? How can we make a little more difference for others? How can we bring a little more light, a little more joy into the world? These questions and others like them give us an opportunity to, in a sense, write our obituary in advance. And someday, when someone reads our obituary, perhaps they'll remember us fondly and be inspired to live a better life.

You and I stand on the shoulders of giants. We can make our lives and the lives of others better with love in our hearts, faith in God and His purposes, and a brightness of hope for the future. My hope is that you and I can strive to keep the end in mind and be the shoulders upon which others will stand.

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8 *My Brother Richard L.*, 7.

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10 See Richard L. Evans, *A Century of Mormonism in Great Britain: A Brief Summary of the Activities of The Church of Jesus Christ of Latter-day Saints in the United Kingdom with Emphasis on Its Introduction One Hundred Years Ago* (Salt Lake City: The Deseret News Press, 1937).

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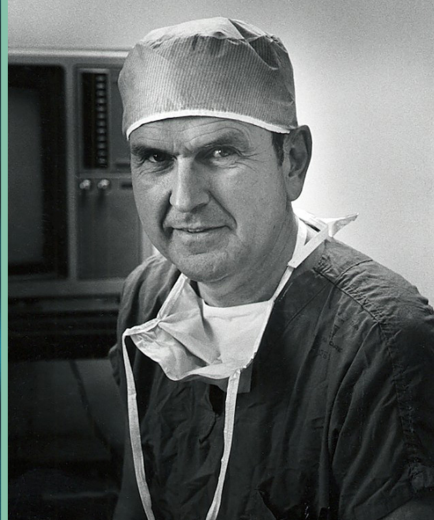

Photo of President Nelson courtesy of The Church of Jesus Christ

Who They Are and Who They Can Become

How President Russell M. Nelson's Career in Medicine Shaped His Public Ministry

by **Richard K. Gurgel, M.D.**

We live in a remarkable era of the history of The Church of Jesus Christ. Since President Russell M. Nelson's call to be the President of the Church in January 2018, there have been numerous and historic adjustments to the Church that have come through him by way of revelation. These events were well summarized by Elder Jeffrey R. Holland, when he said:

> *Consider the swirl of bold initiatives and new announcements in the Church in these recent months. As we minister to one another, or refine our Sabbath experience, or embrace a new program for children and youth, we will miss the real reason for these revelatory adjustments if we see them as disparate, unrelated elements rather than as an interrelated effort to help us build more firmly on the Rock of our Salvation.*[1]

As we study the words of President Nelson over the course of his apostolic ministry and now as the President of the Church, there are clear themes that emerge—the importance of covenants and the covenant path, the

importance of the temple, finding joy through the gospel of Jesus Christ, faith in the Savior, repentance, receiving revelation, and a fixed focus on the Savior, Jesus Christ. Additionally, as we study the entire body of President Nelson's general conference addresses, there are frequent references to his professional background in medicine that are used to teach gospel principles. Never before has there been a Church president with a professional background in medicine, let alone President Nelson's dual doctorate when also considering his PhD. As members of The Church of Jesus Christ who are also physicians, we cannot overemphasize the importance of this era. By studying President Nelson's life, we have the opportunity to learn from a man who was able to draw from his professional experiences in medicine to teach great spiritual lessons and to bless the lives of others.

As we study the messages of President Nelson, it is notable to see and hear how often he referenced his career in medicine. He frequently teaches gospel truths by using lessons he has learned from medicine and science. This motivated me to do a formal analysis of President Nelson's general conference messages to look for and analyze these specific references. The objective of this paper is to demonstrate how President Nelson used references to medicine in his general conference talks and to highlight some particular examples that illustrate the influence of medicine on his ministry.

It is important to note that while President Nelson frequently referenced his professional training in medicine, his messages were first and foremost centered on the Savior, Jesus Christ. In the October 2003 general conference, President Nelson taught, "The Twelve come from different backgrounds—business, education, law, and science. But not one was called to serve because of that background. In fact, all men called to positions of priesthood responsibility are chosen because of who they are and who they can become."[2] While his call to the holy apostleship superseded his work in medicine, his professional background played an important role in how he has taught the gospel. The experiences drawn from the practice of medicine have informed President Nelson's ministry. The title of this paper, "Who they are and who they can become," was chosen because of President Nelson's message from the October, 2003 general conference. While he had a professional background in medicine, he was not called to serve as an apostle because of any professional achievement. His sacred calling came because of who he is, and who the Lord knew he would become.

METHODS

The analysis of this study has been restricted to the general conference messages that are available through the Church's website.[3] While there are many other public addresses that have been recorded and could have been included, President Nelson's general conference messages from April 1984 until October 2019 are deliberately included to focus on messages that are written to address the worldwide Church. Portions of his talks that were included in this analysis are these:

- Direct references to a career in medicine or medical school
- Medical or scientific facts that are given from a physician's perspective (such as a discussion on the harmful physical effects of not obeying the Word of Wisdom)[4]
- Stories from experiences that arose from President Nelson's professional career in medicine
- Principles that emphasize natural laws or science that are germane to a professional training in these disciplines
- Analogies to health or medicine (i.e.such as contention spreads "like a sore"[5])
- Descriptions of a medical condition, such as deafness,[6] or dealing with illness or death
- References to the human body, such as Paul's description of the body like the Church,[7] how the heart works, or how the body heals itself.

RESULTS

Since his call to the holy apostleship in April 1984 until the October 2019 general conference, President Nelson has given 85 general conference addresses. Additionally, in October 1993, he gave a talk to the Parliament of World Religions that is included in the Gospel Library with his general conference messages. Here are some descriptive statistics of this analysis:

- Of the 86 talks, a reference to medicine appeared in 50 (58 percent) talks. These 50 talks with a reference to medicine comprised a total of 104,150 words. Of these words, references to medicine comprised a total of 10,212 words (9.8 percent) of the talks.
- From April 1984 to April 1994, the first decade of President Nelson's ministry as an Apostle, all 22 of his talks (100 percent) referenced medicine in some way.
- From October 1994 to April 2004, 12 of his 20 talks (60 percent) included a reference to medicine.
- From October 2004 to April 2015, 9 of his 22 talks (41 percent) included a reference to medicine.
- Since October 2015 until the most recent conference in October 2019, 8 of his 21 talks (38 percent) include a reference to medicine.
- The relative percentage of each talk that references medicine is shown in figure 1.

DISCUSSION

President Nelson's career as a cardiac surgeon clearly influenced the messages he has delivered to the Church as an Apostle and President of the Church. This was especially true in the first decade after President Nelson's call to the Quorum of the Twelve, but it has continued even to the most recent general conference. What can we learn from President Nelson's references to his medical career? He has shared three notable experiences that can illustrate many important principles regarding how faith can influence the practice of medicine and how the practice of medicine can influence faith.

1. *Complications*

In October 2015 and April 2016, President Nelson shared his experience operating on two daughters with congenital heart disease. The first half of the story was given in the context of teaching the immeasurable positive influence faithful women have on the world, and the influence his wife Dantzel had on him. He said:

> *Throughout my life, I have been blessed by such women. My departed wife, Dantzel, was such a woman. I will always be grateful for the life-changing influence she had on me in all aspects of my life, including my pioneering efforts in open-heart surgery.*
>
> *Fifty-eight years ago I was asked to operate upon a little girl, gravely ill from congenital heart disease. Her older brother had previously died of a similar condition. Her parents pleaded for help. I was not optimistic about the outcome but vowed to do all in my power to save her life. Despite my best efforts, the child died. Later, the same parents brought another daughter to me, then just 16 months old, also born with a malformed heart. Again, at their request, I performed an operation. This child also died. This third heartbreaking loss in one family literally undid me.*
>
> *I went home grief stricken. I threw myself upon our living room floor and cried all night long. Dantzel stayed by my side, listening as I repeatedly declared that I would never perform another heart operation. Then, around 5:00 in the morning, Dantzel looked at me and lovingly asked, 'Are you finished crying? Then get dressed. Go back to the lab. Go to work! You need to learn more. If you quit now, others will have to painfully learn what you already know.'*
>
> *Oh, how I needed my wife's vision, grit, and love! I went back to work and learned more. If it weren't for Dantzel's inspired prodding, I would not have pursued open-heart surgery and would not have been prepared to do the operation in 1972 that saved the life of President Spencer W. Kimball.*[8]

President Nelson shared the second half of this tragic and tender story six months later in the general priesthood session of general conference in a talk entitled, "The Price of Priesthood Power." He shared the following:

> *In my last conference message, I related my devastating experience many years ago when, as a heart surgeon, I was not able to save the lives of two little sisters. With permission of their father, I would like to say more about that family.*
>
> *Congenital heart disease afflicted three children born to Ruth and Jimmy Hatfield. Their first son, Jimmy Jr., died without a definitive diagnosis. I entered the picture when the parents sought help for their two daughters, Laural Ann and her younger sister, Gay Lynn. I was heartbroken when both girls died following their operations. Understandably, Ruth and Jimmy were spiritually shattered.*
>
> *Over time, I learned that they harbored lingering resentment toward me and the Church. For almost six decades, I have been haunted by this situation and have grieved for the Hatfields. I tried several times to establish contact with them, without success.*
>
> *Then one night last May, I was awakened by those two little girls from the other side of the veil. Though I did not see or hear them with my physical senses, I felt their presence. Spiritually, I heard their pleadings. Their message was brief and clear: 'Brother Nelson, we are not sealed to anyone! Can you help us?' Soon thereafter, I learned that their mother had passed away, but their father and younger brother were still alive.*
>
> *Emboldened by the pleadings of Laural Ann and Gay Lynn, I tried again to contact their father, who I learned was living with his son Shawn. This time they were willing to meet with me.*
>
> *In June, I literally knelt in front of Jimmy, now 88 years old, and had a heart-to-heart talk with him. I spoke of his daughters' pleadings and told him I would be honored to perform sealing ordinances for his family. I also explained that it would take time and much effort on his and Shawn's part to be ready*

Figure 1. This graph shows the relative percentage of how much each of President Russell M. Nelson's general conference messages has a reference to medicine by year.

> *and worthy to enter the temple, as neither of them had ever been endowed.*
>
> *The Spirit of the Lord was palpable throughout that meeting. And when Jimmy and Shawn each accepted my offer, I was overjoyed! They worked diligently with their stake president, bishop, home teachers, and ward mission leader, as well as with young missionaries and a senior missionary couple. And then, not long ago, in the Payson Utah Temple, I had the profound privilege of sealing Ruth to Jimmy and their four children to them. Wendy and I wept as we participated in that sublime experience. Many hearts were healed that day!*[9]

President Nelson has blessed the entire Church by sharing these profound experiences. From this story, we can learn so much about revelation, forgiveness, humility, the importance of sacred covenants made in holy temples, the eternal nature of the family, the strength that comes from a loving spouse, the realities of living in a fallen world, the power of the Savior's Atonement to overcome and heal us from the effects of the Fall, and the reality that life continues and the work of salvation occurs on both sides of the veil. In addition to these truths, as physicians, we can draw additional insights that are applicable to our practice of medicine, particularly in managing complications.

Complications occur in medicine, despite our best efforts to prevent them. Complications can occur, not only because of negligence or malpractice, but because the nature of our work puts us in highly complex situations for which we may not yet have a solution. We live in a fallen world. We can witness the far-reaching effects of the Fall within our own bodies, from the molecular structure of our DNA to our cells, tissues, and organ systems. Children are born with congenital anomalies. Cancer still claims too many lives. Our sensory systems are not built to last. The tightly regulated homeostasis of our bodies is subject to error. Some of these inherent shortcomings of our bodies may never be fully corrected until we receive the Savior's gift of immortality in resurrected bodies. Until that time, the effects of the Fall can teach us. As President Nelson has taught, "Were it not for the Fall, our physicians, beauticians, and morticians would all be unemployed."[10] It is incumbent on us to try to learn the laws that govern the proper function of our bodies and work tirelessly to master and obey those laws of health to the benefit of our patients. As physicians, we are doing our part to learn how to overcome the physical effects of the Fall. The answers to overcoming the Fall are all contained within the Savior's Atonement. If we can include Him in what we do, we can elevate our practice of medicine and our lives.

When complications occur, they can have a profound influence on us as clinicians. The practice of medicine is

very humbling (if we allow it to be). Consider President Nelson's experience. Even 58 years after complications happened to Laural Ann and Gay Lynn Hatfield, the tragedy of losing those little girls still weighed very heavily on him. How many of us have similarly had sleepless nights, tear-filled moments, and thoughts of self-doubt after experiencing a complication? President Nelson's response is so instructive. He persevered with faith. He relied on the Lord. He lived his life in such a way as to be worthy of revelation and profound spiritual experiences, which led him and the Hatfield family to the temple.

From President Nelson's experience, we also learn of the blessing of a supportive spouse with "vision, grit, and love." Medical spouses are called to bear a heavy burden and are often the unsung heroes of a career in medicine. They are frequently required to make sacrifices and subsume their own needs for the needs of unknown patients. For any number of reasons, not all physicians are blessed with such supportive spouses. For those who are, however, we need to acknowledge, cherish, and express gratitude to dedicated spouses for the sacrifices they make and the support they provide.

2. *Revelation and Prayer*

What is the role of revelation and prayer in your practice of medicine? Is there a way to more fully involve the Lord in how we perform the work of healing? President Nelson provided a wonderful example in how we can receive answers to our prayers and revelation as we care for patients. In the April 2003 general conference, he shared the following lesson:

> *Many of us have had experiences with the sweet power of prayer. One of mine was shared with a stake patriarch from southern Utah. I first met him in my medical office more than 40 years ago, during the early pioneering days of surgery of the heart. This saintly soul suffered much because of a failing heart. He pleaded for help, thinking that his condition resulted from a damaged but repairable valve in his heart.*
>
> *Extensive evaluation revealed that he had two faulty valves. While one could be helped surgically, the other could not. Thus, an operation was not advised. He received this news with deep disappointment.*
>
> *Subsequent visits ended with the same advice. Finally, in desperation, he spoke to me with considerable emotion: 'Dr. Nelson, I have prayed for help and have been directed to you. The Lord will not reveal to me how to repair that second valve, but He can reveal it to you. Your mind is so prepared. If you will operate upon me, the Lord will make it known to you what to do. Please perform the operation that I need, and pray for the help that you need.'*
>
> *His great faith had a profound effect upon me. How could I turn him away again? Following a fervent prayer together, I agreed to try. In preparing for that fateful day, I prayed over and over again, but still did not know what to do for his leaking tricuspid valve. Even as the operation commenced, my assistant asked, 'What are you going to do for that?' I said, 'I do not know.'*
>
> *We began the operation. After relieving the obstruction of the first valve, we exposed the second valve. We found it to be intact but so badly dilated that it could no longer function as it should. While examining this valve, a message was distinctly impressed upon my mind: Reduce the circumference of the ring. I announced that message to my assistant. 'The valve tissue will be sufficient if we can effectively reduce the ring toward its normal size.'*
>
> *But how? We could not apply a belt as one would use to tighten the waist of oversized trousers. We could not squeeze with a strap as one would cinch a saddle on a horse. Then a picture came vividly to my mind, showing how stitches could be placed—to make a pleat here and a tuck there—to accomplish the desired objective. I still remember that mental image—complete with dotted lines where sutures should be placed. The repair was completed as diagrammed in my mind. We tested the valve and found the leak to be reduced remarkably. My assistant said, 'It's a miracle.' I responded, 'It's an answer to prayer.'*
>
> *The patient's recovery was rapid and his relief gratifying. Not only was he helped in a marvelous way, but surgical help for other people with similar problems had become a possibility. I take no credit. Praise goes to this faithful patriarch and to God, who answered our prayers. This faithful man lived for many more years and has since gone to his eternal glory.*[11]

It has been said that necessity is the mother of invention. Similarly, necessity can be the catalyst for revelation when we realize how much we need divine instruction to care for Heavenly Father's children. President Nelson showed us how to do this. Consider how many patient

lives could be blessed if each physician similarly included prayer in the practice of medicine! The creation of the human body was the crowning event of the Creation. It also embodies all of the frailties and myriad limitations that came with the Fall. With diligence and faith, the Lord could unlock from our understanding so many mysteries about how the human body functions and what is necessary to overcome the deleterious effects of the Fall. We can include the Lord as we care for our patients. We can privately pray for and about them and hope for revelation. We can ask for the guidance of the Holy Ghost to elevate our thoughts to a higher and holier way beyond our formal medical training. How wonderful it would be to serve as the Lord's intern and be taught by the Master Healer!

Late Church President Spencer W. Kimball speaks with Elder Russell M. Nelson, who performed life-saving open-heart surgery on President Kimball and now has followed in his footsteps to become president of The Church of Jesus Christ. Photo courtesy of The Church of Jesus Christ.

3. *Following the Brethren*

Prior to his call to the Quorum of the Twelve Apostles, President Nelson had the opportunity to operate on President Spencer W. Kimball, when President Kimball was serving as the Acting President of the Quorum of the Twelve Apostles. In his October 2014 general conference message, President Nelson described this experience as follows:

> *Well do I remember my most unique 'deed' to sustain a prophet. As a medical doctor and cardiac surgeon, I had the responsibility of performing open-heart surgery on President Spencer W. Kimball in 1972, when he was Acting President of the Quorum of the Twelve Apostles. He needed a very complex operation. But I had no experience doing such a procedure on a 77-year-old patient in heart failure. I did not recommend the operation and so informed President Kimball and the First Presidency. But, in faith, President Kimball chose to have the operation, only because it was advised by the First Presidency. That shows how he sustained his leaders! And his decision made me tremble!*
>
> *"Thanks to the Lord, the operation was a success. When President Kimball's heart resumed beating, it did so with great power! At that very moment, I had a clear witness of the Spirit that this man would one day become President of the Church!*
>
> *You know the outcome. Only 20 months later, President Kimball became President of the Church. And he provided bold and courageous leadership for many years."*

President Nelson did not want to perform the operation on President Kimball. Surgeons like to operate when there is a clear and objective indication for surgery, the surgical plan is well described with highly reliable outcomes, and the patient is medically well-suited to endure the operation and recovery. President Kimball was not an ideal surgical candidate given his age and medical co-morbidity of heart failure. President Nelson had no experience doing this type of open heart surgery in a patient of this age and condition. Despite these obstacles, however, the First Presidency recommended the surgery, and both President Kimball and President Nelson had the faith to proceed.

This experience highlights some important lessons that are highly relevant to the faithful physician. One principle involves following the Brethren, and by extension, following the Spirit. In 1972, there were no cardiothoracic surgeons in the First Presidency. The recommendation they made for President Kimball to undergo surgery was not based on firsthand, professional experience. In fact, their recommendation was made contrary to medical advice. Clearly, the Lord had a purpose for President Kimball and his life, and the Lord communicated, by revelation to the First Presidency, that he needed to have surgery. How often do we seek and follow the promptings of the Spirit, even when those promptings may conflict with our own preconceived notions of how we would do something? We are wise to remember that the Lord's ways are not our ways.[12] He is trying to help us function at a higher and holier level. The Spirit may prompt us, or our priesthood leaders may provide us with counsel that does not always align with how we would do things. By exercising faith, however, we can bring about the Lord's will in our lives and the lives of others.

If we seek the Lord with real intent—meaning that we really intend to follow the promptings we receive[13]—and ask Him for instruction, we open our hearts and mind to revelation. President Nelson's experience operating on President Kimball is also instructive that following revelation often leads to additional revelation. When President Nelson followed the counsel of the living

prophets and performed the surgery, he had his own sacred experience in knowing that President Kimball would one day become the President of the Church.

CONCLUSION

President Russell M. Nelson is a remarkable man and is the Lord's living prophet. His life was shaped and directed by our Heavenly Father to prepare him to be the Lord's mouthpiece and authorized representative on earth. That spiritual training included, in part, his career as a cardiac surgeon. The Lord tutored President Nelson with spiritual experiences in medicine that would later be used to instruct the whole Church.

It should be noted that while this analysis has focused on President Nelson's background in medicine, personal references to his family were similarly apparent throughout this analysis. President Nelson has been very open about his role as husband, father, and grandfather in his general conference messages. He would often talk about his family members in a very loving and familiar way. President Nelson's biography, *Father, Surgeon, Apostle*, written by Elder Spencer J. Condie[14] is appropriately titled as these three words summarize major roles and responsibilities that President Nelson has embraced during his life.

In summary, we are blessed to be led by a living prophet. As members of the Church and disciples of Christ who are also physicians, we are unusually fortunate to be able to witness the ministry of President Russell M. Nelson. He directs us to the Savior. Jesus Christ is the Master Healer. He has a perfect understanding of the issues of health and sickness, life and death. Spiritual and physical healing were hallmarks of His mortal ministry. Some of the greatest miracles of Christ's mortal ministry were miracles of healing—healing the deaf, blind, halt, maimed, infected, and even the dead. That divine healing can continue into each of our lives through the power of His infinite Atonement.

ACKNOWLEDGEMENT

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ENDNOTES

1 Jeffrey R. Holland, "The Message, the Meaning, and the Multitude," *Ensign* or *Liahona,* November 2019.
2 Russell M. Nelson, "Personal Priesthood Responsibility," *Ensign* or *Liahona,* November 2003.
3 https://www.churchofjesuschrist.org/general-conference/speakers/archive?speaker=Russell%20 M.%20Nelson
4 Russell M. Nelson, "Addiction or Freedom," *Ensign,* November 1988.
5 Russell M. Nelson, "The Canker of Contention," *Ensign,* May 1989.
6 Russell M. Nelson, "Listen to Learn," *Ensign,* May 1991.
7 Russell M. Nelson, "The Creation," *Ensign,* May 2000.
8 Russell M. Nelson, "A Plea to My Sisters," *Ensign* or *Liahona,* November 2015.
9 *Ensign or Liahona,* May 2016.
10 President Russell M. Nelson, "The Atonement," *Ensign,* November 1996.
11 Russell M. Nelson, "Sweet Power of Prayer," *Ensign* or *Liahona,* May 2003.
12 Isaiah 55:8
13 President Nelson, "Ask, Seek, Knock," *Ensign* or *Liahona,* November 2009.
14 Spencer J. Condie, *Father, Surgeon, Apostle* (Salt Lake City: Deseret Book, 2003).

Migraine

Diagnosis and Treatment for Primary Care Providers

by **Dan Henry, MD**

The following presentation was given by Dr. Henry at the 2019 Medical meeting, and it was received very well. While it is a departure from our traditional articles we wanted to include it here for those that may have missed it.

I began my medical career as a student at the University of Washington Medical School in 1971. I moved to Utah for my Family Practice residency at the University of Utah in 1975, and began my practice as a family physician in 1978 at Foothill Family Clinic in Salt Lake City, Utah. My interest in headache medicine began after my youngest daughter, Danielle, developed migraine disease in 1989 at the age of eight. Danielle was initially diagnosed with cyclical abdominal migraine, and her disease progressed rapidly. By age eleven, despite all efforts to find an effective treatment, Danielle was diagnosed with severe chronic migraine disease, defined as fifteen or more headache days per month.

Danielle was willing to try anything and did so under the care of multiple neurologists, a pain physician, a biofeedback specialist, an acupuncturist, and a psychologist, none of whom could stop the progression and pain of

her disease. As her health deteriorated, I consulted with experts across the country and studied migraine disease extensively. Danielle was one of the first children in Utah to try triptans when they were first approved by the FDA. I also traveled with her to California to try Botox injections, which were experimental in the treatment of headache disease at the time.

Danielle was an exceptionally bright student and played high school basketball, tennis, and softball while experiencing daily migraine attacks. At the end of her sophomore year, Danielle suffered a migrainous infarction, known as an ischemic stroke, which is an extremely rare occurrence in adolescents with migraine. The stroke weakened the muscles around her eye; she developed ptosis and required surgery.

I played the role of her primary care physician, consulting with doctors around the country to find the best treatment options. I was always on the lookout for the latest information, trials, and treatment for Danielle. As a family we were devastated when Danielle ended her battle with migraine and took her own life during her senior year of high school.

Following the loss of our daughter, I focused on making a difference for those with migraine and headache disorders by devoting my practice to headache medicine. Today, my medical practice focuses primarily on headache medicine with a special interest in child, adolescent, and young adult patients with headache. Seeing over 80 patients each week, I practice headache medicine full time in order to improve the lives of others.

I have also trained other primary care physicians, nurse practitioners, and physician assistants at my clinic in headache medicine. In addition, I have trained several family practice residents as part of their residency program.

ABOUT MIGRAINE

Migraine is an extraordinarily prevalent neurogenetic brain disorder, affecting thirty-nine million men, women, and children in the United States and one billion globally. Migraine is a recurring type of headache that can cause severe throbbing or pulsing pain accompanied by other debilitating symptoms such as nausea, vomiting, weakness, vision loss, and extreme sensitivity to light and sound.

Migraine is the third most common disease in the world and the second leading cause of all global disability. Despite its prevalence and severity, there are only approximately 1,500 to 2,000 health care providers who have either been UCNS-certified or have taken a strong interest in headache.

Based on my experience, I feel that migraine and headache disorders are one of the most misunderstood and highly stigmatized diseases in the world. It's also often improperly diagnosed and treated due to lack of education and training of primary care providers.

I see patients every day who have lived with this disease for years, unable to find a provider who can diagnose and treat it. They are resigned to living with chronic pain. The most rewarding aspects of this career are the patients who, once properly diagnosed and treated, have gone from severe disability to normal, functional lives. One of my biggest frustrations is the lack of primary care providers who are trained to recognize the symptoms of migraine and begin appropriate treatment.

DANIELLE BYRON HENRY MIGRAINE FOUNDATION

In 2016, my wife, Diane, my daughter, Elizabeth, and I established the Danielle Byron Henry Migraine Foundation to increase public awareness of migraine disease

and its impact on patients, their families, and society. The mission of Danielle Byron Henry Migraine Foundation is to provide support and access to treatment for those living with migraine, especially young adults and children.

Danielle Byron Henry Migraine Foundation is currently working to increase awareness and understanding of migraine disease in schools and the workplace, education of primary care providers to recognize and manage the disease with a vision of opening a comprehensive migraine treatment center in Utah.

In 2017, Danielle Byron Henry Migraine Foundation partnered with the University of Utah Department of Neurology's Headache Outreach Program to provide "Headache School." The only program of its kind in the United States, Headache School offers free, monthly didactic sessions for patients and treatment providers, followed by therapeutic yoga sessions.

The mission of Headache School is to educate sufferers of migraine and headache disease in a collaborative and supportive environment with the vision of eliminating suffering through education. Past didactic sessions are available on the website, extending the reach of this innovative local program to patients and providers alike.

Together with the Association of Migraine Disorders we developed of "A Migraine Toolbox: A Practical Approach to Diagnosis and Treatment," an online continuing medical education program designed for primary care providers to improve their care of those living with migraine. This is necessary because there are not enough neurologists to treat the more than thirty-nine million people in the US who have headache disorders. In addition, Danielle Byron Henry Migraine Foundation has provided financial assistance for the promotion and distribution of "A Migraine Toolbox."

A MIGRAINE TOOLBOX: A PRACTICAL APPROACH TO DIAGNOSIS AND TREATMENT

Module 1: Diagnosis

This module shares a methodology, including questionnaires, that will allow you to recognize migraine disease in its many presentations—all within the tight constraints of your busy medical setting. By the end of this learning module you will be aware of the international classification of headache disorders and the basic neurobiology of migraine disease. You will be able to identify acute and chronic migraine disorders—with and without aura.

Upon completion of these activities, participants should be better able to

- recall details about migraine disease prevalence,
- define common migraine diagnostic criteria,
- paraphrase the essential concepts of migraine pathophysiology, and
- describe a strategy for evaluating patients with migraine disease.

Module 2: Treatment

The second learning module simplifies the process of determining migraine treatment programs. By its conclusion, you should be confident that you have the skills to manage patients with migraine. Your strategy should include identification and avoidance of triggers, effective lifestyle changes, and familiarity with the pros and cons of interventional and preventive medications and devices. There will be brief reviews of the different options in neuromodulation, CGRP blockers, and medical marijuana.

Upon completion of these activities, participants should be better able to

- describe how to create a treatment plan which includes appropriate medications and alternative therapies,
- identify migraine triggers,
- describe effective lifestyle changes for migraine disease,
- compare and contrast both preventive and interventional medications for migraine disease,
- describe different options in neuromodulation,
- describe the pros and cons of CGRP blockers, and
- explain the evidence behind treatment of migraines with medical marijuana.

Module 3: Specialty Care

This educational module addresses specialized topics of migraine management. By its conclusion, you should be confident that you have the skills to recognize and treat pediatric headaches and other disorders, to choose the most effective emergent migraine care, and to perform nerve blocks. This learning module also introduces some information about post-traumatic headache syndromes, whiplash, and the relationship of post-traumatic stress and migraine. The value of inpatient migraine facilities is reviewed.

Upon completion of these activities, participants should be better able to

- recognize the pattern of symptoms and age of some migraine-related pediatric disorders,
- describe how to treat pediatric headaches,
- recall the most effective therapies for migraine patients presenting to the emergency department,
- describe the options and the techniques of occipital and sphenopalatine nerve blocks,
- explain the relationship of migraine disease to post-traumatic headache syndromes, whiplash injuries, and post-traumatic stress disorders, and
- recall the indications for inpatient admission for patients with migraine.

Module 4: Specialty Care

The final two-hour educational module in the management of migraine turns its attention to the specialized areas medication overuse headaches, vestibular migraine, cluster headache and hormone-related migraine issues. In each of these four topics, this course offers how to identify the specific migraine condition and reviews the literature and recommendations for helping patients safely find some relief.

Upon completion of these activities, participants should be better able to

- recognize and treat medication overuse headache,
- institute the best history taking method for vestibular migraine,
- describe the basics of the vestibular migraine pathophysiology,
- recall the vestibular migraine treatment options,
- distinguish cluster headache from other forms of migraine,
- recall the most effective treatments of cluster headache, including oxygen therapy and medications,
- describe the issues related to various stages of migraine for a woman: menstruation, pregnancy, breastfeeding, perimenopause, menopause, and post-menopause,
- recite the relationship of migraine and contraception with the risk of stroke,
- discuss the pros and cons of various forms of contraception for women with migraine, and
- discuss the potential for hormone-replacement therapy as a treatment for migraine related to menopause.

RESOURCES

- "A Migraine Toolbox: A Practical Approach to Diagnosis and Treatment" https://www.mycme.com/search/migraine+toolbox/.
- Danielle Byron Henry Migraine Foundation, https://daniellefoundation.org/.
- Headache School, https://medicine.utah.edu/neurology/headache-neuro-ophthalmology/headache-school/.