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INTRODUCTION

Subcommittee Chairman Wicker, Ranking Member Schatz, and Members of the Subcommittee, I greatly appreciate the opportunity to appear before you on the critical topic of "Advancing Telehealth through Connectivity."

For almost a decade-and-a-half, I have served as an Associate Director of the Johns Hopkins Urban Health Institute, and it has been my privilege to work on one of the most challenging problems in healthcare: improving population health. My work has taken me from the so-called "ivory tower" of Johns Hopkins to the homes, alleys, and communities of inner-city East Baltimore.

Through these experiences and my years of training as a surgeon and preventive medicine doctor, I realized that too little was being done to reduce the endless flow of patients coming into emergency rooms and hospitals for care. My colleagues and I could treat many physical and psychological ailments, but we often felt powerless to provide the support patients and families needed to manage their chronic diseases or truly live "well." While we tried to provide the best care to every patient, there were – and remain – too many people who need treatment and not enough providers to meet their needs.

Consumers rely on many resources for their health – doctors certainly, but also nutritionists, pharmacies, caregivers, social services, and many others. Take for example older Americans. We know that seniors who are socially isolated are twice as likely to die prematurely. While the exact causes of these realities are not fully understood, we know that older patients are prone to depression, which is in turn associated with lack of medication adherence, poor diet, and other risk factors. To put it simply, when providers, consumers, and caregivers remain "unconnected," it is a prescription for frustration, burnout, high costs, and suboptimal outcomes.

I am sometimes asked, "Why would a Hopkins doctor come to the FCC?" My answer is simple. It's because I can't see how we are going to improve our nation's health – especially in rural and underserved areas which have higher rates of chronic illness, poorer overall health, and persistent provider shortages – without aggressively pursuing the potential that telehealth and other broadband-enabled health technologies have to offer.

Take for example, the worsening health care provider shortage and distribution problem we face. Demand for physicians continues to grow faster than supply. According to a March 2015 report by the

Association of American Medical Colleges, the physician shortage will grow over the next 10 years leading to a projected shortfall of between 46,100 and 90,400 physicians by 2025. Similarly, projections suggest a shortage of 400,000 to 808,000 registered nurses by 2020. While the provider shortfall is expected to affect everyone, it will be particularly harmful to vulnerable and underserved consumers and patients who live in rural areas. And, I should emphasize that nearly 3 out of 10 Americans live in a rural area or a small city. Thus, with approximately 300,000 primary care providers, 2.6 million nurses and 5800 hospitals and clinics, it is hard to imagine how we can provide face-to-face care for the more than 320 million Americans when they need it without a greater reliance on broadband-enabled technologies, tools, and services, such as telehealth.

I therefore believe the broadband imperative is clear, and many broadband health benefits are already on the horizon. For my work, there is no better place to be than the FCC, given its charge under the Telecommunications Act of 1996 to "encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to *all* Americans."

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As detailed below, three key points are driving and shaping the work of the Connect2Health[FCC] Task Force.

I. BROADBAND IS TRANSFORMATIVE IN HEALTH

There is one overarching reality that underscores the importance of this hearing, the Committee's work, and the FCC's role: future advances in health care increasingly are premised on the widespread availability and accessibility of high-speed connectivity.

Although broadband, by itself, is not a panacea, telehealth and other broadband-enabled health solutions are playing (and likely will continue to play) a significant role in helping to achieve the national objective of a healthier America. Recent estimates suggest that broadband-enabled health information technology (health IT) can improve care and lower costs by hundreds of billions of dollars in the coming decades, yet the United States remains behind some advanced countries in the adoption of such technology.

It almost goes without saying, that technology is transforming how we get and stay well. At the SXSW conference in mid-March, a health technology innovator announced a working medical tricorder, previously a concept relegated to Star Trek movies and other science fiction. The prototype was designed to diagnose 15 different medical conditions and monitor vital signs for 72 hours. It reportedly also conducts lab tests for conditions like diabetes, pneumonia, tuberculosis, and more. And, it includes a lipstick-sized attachment that serves as an otoscope (to examine ears) or spirometer (to measure breathing). On an almost daily basis, other broadband-enabled technologies are now being used and giving clinicians and consumers alike more (and often, better) tools for diagnosing illness and monitoring health.

These technologies are also spawning novel partnerships and unusual bedfellows. Consider the new collaboration between Qualcomm Incorporated and Walgreens that will enable consumers to connect their digital health devices (like a wrist-worn blood pressure cuff) and automatically capture all their health data in one place, with the potential to share the information with their care team.

But, as recognized by the 2010 National Broadband Plan and the 2015 Federal National Health IT Strategic Plan, achieving the full promise of telehealth and other advancements rests, in large part, on adequate broadband health infrastructure. To put it another way, we must focus on the underpinnings of tomorrow's health care system today.

II. TELEHEALTH CAN LEVEL THE PLAYING FIELD FOR RURAL AND UNDERSERVED AREAS

The FCC is actively engaged in proactive efforts to ensure that telehealth and other broadband-enabled health technologies are accessible in rural and remote areas, on tribal lands, and in other underserved sectors of the country.

Americans living in rural areas face particularly acute shortages of primary care physicians and specialists, and they often must travel long distances to obtain medical care. The increasing cost of providing health care and the demands of an aging population also put pressures on rural health care providers, many of which struggle to keep their doors open.

There is enormous potential for telehealth to help address these problems. In a broadband-enabled health future, access to physicians, specialists and high-quality health care will no longer be driven by geography. Three-hour drives to see a maternal-fetal medicine specialist, cardiologist, or diabetologist could be a thing of the past. Through telehealth, broadband connectivity can be a force-multiplier, helping to address real concerns about provider shortages. Telehealth can also be instrumental in meeting the health needs of our military veterans in rural areas where access to VA facilities is difficult (or distant).

I am going to focus primarily on how the new Connect2Health^{FCC} Task Force is pursuing this broadband imperative.

A. Connect2Health^{FCC} Task Force Mission and Goals

In March 2014, Chairman Wheeler created the Connect2Health^{FCC} Task Force, a senior-level, multi-disciplinary effort to move the needle on broadband and advanced health care technologies. This is a deliberate attempt to get ahead of the curve and to think across various agency silos, with the Task Force serving as an umbrella for the FCC's health-related activities.

Recognizing that technology-based innovations in clinical practice and care delivery are poised to fundamentally change the face of health care, the Task Force is charged with: making concrete recommendations about regulatory barriers and incentives in this area, updating the Health Care section of the National Broadband Plan, and raising awareness about the value proposition of broadband in health and the potential for addressing health care disparities in rural and underserved areas. Among other things, we will also work to highlight effective telehealth projects, broadband-enabled health technologies, and mHealth applications across the country to identify lessons learned, best practices, and regulatory challenges. Additionally, we hope to stimulate additional public-private partnerships on telehealth to move us forward.

The objectives of the Task Force, working in collaboration with internal and external stakeholders, include the following:

- Promoting effective policy and regulatory solutions that encourage broadband adoption and promote health IT;
- Identifying regulatory barriers (and incentives) to the deployment of RF-enabled advanced health care technologies and devices;
- Strengthening the nation's telehealth infrastructure through its Rural Health Care Program and other initiatives;
- Raising consumer awareness about the value proposition of broadband in the health care sector and its potential for addressing health care disparities;

- Encouraging the development of broadband-enabled health technologies that are designed to be fully accessible to people with disabilities;
- Highlighting effective telehealth projects, broadband-enabled health technologies, and mhealth applications across the country and abroad to identify lessons learned, best practices, and regulatory challenges; and
- Engaging a diverse array of traditional and non-traditional stakeholders to identify emerging issues and opportunities in the broadband health space.

B. Connect2Health^{FCC} Beyond the Beltway Series

To meet these goals, we are getting outside Washington, D.C., to where the action is.

Virginia. As part of its "Beyond the Beltway Series" to gather information and data and explore and leverage on-the-ground experiences with broadband-enabled health solutions, particularly in rural and underserved areas, the Task Force held its inaugural broadband health roundtable at the University of Virginia (UVA) Center for Telehealth last November. The roundtable drew on expertise from the Secretaries of Health and Technology for the Commonwealth of Virginia as well as representatives from the senior executive ranks of the University of Virginia. The Task Force heard a compelling story about the UVA Center of Telehealth and its two decades of innovation and leadership. In part relying on funding from the FCC's Rural Health Care Program, UVA's current telehealth network comprises 126 sites across Virginia. Dr. Karen Rheuban, a national telehealth expert, and her team explained in detail how the Center has expanded in recent years and conducted approximately 44,551 telemedicine-based services across 45 subspecialties, saving Virginians 15 million patient travel miles. Globally, the Center also supports healthcare delivery in Tanzania, Uganda, Rwanda, and Guatemala.

The Task Force was fascinated to learn how UVA's telehealth program in high-risk obstetrics achieved a 25 percent reduction in pre-term deliveries. Interestingly, this teleobstetrics program currently provides consultation, counseling, and education services, giving high-risk pregnant mothers in rural Virginia access to maternal fetal medicine specialists at UVA. UVA's success in this area amply demonstrates the substantial impact of the so-called, "non-clinical, social determinants of health." Indeed, given estimates from the Institute of Medicine that the cost of caring for these fragile infants in neonatal intensive care units exceeds $50,000 just in the first few weeks of life, these results are remarkable.

In addition, in the area of telestroke, UVA is also on the cutting edge. We were privileged to meet one the Center's telestroke patients from Culpepper, Virginia, whose life and neurological function – like the ability to speak, move, hear and see – was saved by UVA's cutting-edge telestroke program. The UVA telestroke program has increased the use of powerful clot-busting, "brain-saving" medication in Virginia to 17 percent, 14 percentage points above the national average. We are watching with interest ongoing mobile broadband telestroke trials, the next generation of life-saving telehealth innovations that UVA is pursuing.

Mississippi. In December, I and other members of the Connect2Health^{FCC} Task Force, joined by Commissioner Mignon Clyburn, were privileged to visit Jackson and Ruleville, Mississippi. The meetings, conferences, site visits, and FCC-hosted health technology forum at the Jackson Medical Mall reminded us of good old American ingenuity and creativity, which were evident throughout our two-day visit.

We saw first-hand the groundbreaking work of the University of Mississippi Medical Center (UMMC) and its national telehealth expert Dr. Kristi Henderson, as well as the work of many other clinicians, policymakers, and technology innovators, who are all laser-focused on improving health in

Mississippi through broadband. Mississippi has shown that novel public-private partnerships – with healthcare providers, telecommunications carriers, IT specialists, software developers, and government – will be instrumental in transforming the trajectory of broadband-enabled health and care in rural and underserved areas of our country. UMMC is driving telehealth beyond the boundaries of its health system, with more than 30 specialties, 550 telehealth partners, and 165 non-affiliated providers. Reportedly, its corporate telehealth program not only improves employee health and morale, but also reduces absenteeism (and increases overall productivity) associated with time taken to make an appointment and see a doctor.

During day two of our visit, Governor Phil Bryant and Commissioner Clyburn, along with a few members of the Connect2Health[FCC] Task Force, visited North Sunflower Medical Center in Ruleville, Mississippi, 120 miles north of Jackson, Mississippi. This health clinic in the heart of the Mississippi Delta is a key rural partner in UMMC's Diabetes Telehealth Network, designed to address the growing diabetes crisis that affects more than 370,000 adults in the state of Mississippi and 29.1 million people nationwide. The centerpiece of that partnership is a population health care approach that leverages telehealth technology delivered over state-of-the-art broadband connections, with the goal of improving the health of uncontrolled diabetics while reducing the overall cost of care.

It was personally inspiring for me to meet Ms. Collins and Ms. Ford, two Mississippians who are participating in the Diabetes Telehealth Network. Ms. Collins and Ms. Ford were enthusiastic and engaged in improving their health, reporting no diabetic crises or hospitalizations since beginning the program. They praised their tablets for giving them control over their disease, explaining how they get to share their physical, emotional, and psychological state through remote daily health sessions with their care team 100 miles away. In addition, the tablets automatically capture their health data, such as weight, blood pressure, and glucose levels, and transmit that information to clinicians daily. These women are empowered by broadband health technology, and are no longer captive to the more than 3,000:1 access to care ratio in their community.

The benefits of telehealth in Mississippi can be felt far beyond traditional healthcare, including in the areas of wellness, workforce development, research, education, and business development. The state's inclusive vision of broadband-enabled health care in Mississippi is to provide an access point in every community, whether in a hospital, clinic, corporate setting, school or college. Mississippi is focused on building out broadband infrastructure based on geography, not population, and striving to identify a business case that makes this approach sustainable for rural areas. In many ways, the Mississippi experience is the rural America experience.

Virginia and Mississippi are real success stories that the FCC must continue to study, for what they can teach us and other rural areas.

C. Joint FCC-FDA Workshop on Wireless Medical Device Coexistence

Another aspect of the FCC's health-related work involves its statutory spectrum management role. For example, the Task Force is coordinating with other federal agencies, academic and healthcare institutions, and industry to explore potential health risks and operational challenges associated with the increasing numbers of wireless medical devices, particularly in the unlicensed spectrum. Just three weeks ago, the Connect2Health[FCC] Task Force and the FCC's Office of Engineering and Technology co-hosted a joint workshop with the Food and Drug Administration on the safe and seamless coexistence of wireless medical technologies. The workshop pulled together expertise from 30 nationally-recognized experts based in 15 different states to do some focused thinking on the issues of medical technology innovation, wireless coexistence, and patient safety. The bottom line is that wireless medical devices must work as intended, and reliably and securely transmitting the data they collect. They also must play well in the sandbox with each other, and the health, technology and policy sectors must get ahead on this before

clinical outcomes are negatively affected. To put this in stark terms, one's Fitbit, smart car, or smart appliance should not interfere with one's insulin pump or pacemaker.

D. Future Task Force Activities

In the coming months, we plan to visit a cross-section of other rural states and communities to learn from their experiences and to shine a spotlight on what's working, and where the FCC, in collaboration with other federal and state stakeholders, can do more to help break down regulatory barriers. Thus far, we have had a wide variety of stakeholder meetings with a broad-cross section of traditional and non-traditional stakeholders: from academia, industry, advocacy groups, health care facilities, clinicians, and other government partners. The Task Force looks forward to working with, and hearing further from, these and other groups. As to data gathering, over the next several months, the Task Force plans to seek more formal public input and data on a variety of issues related to telehealth and other broadband-enabled health solutions. The Task Force also plans to release a Phase 1 version of its broadband health connectivity map using publicly available data from Virginia, in order to enlist public and community engagement and to refine the map's methodology.

III. TANGIBLE PROGRESS ON RURAL TELEHEALTH IS WITHIN OUR REACH

As demonstrated by the Task Force's Beyond the Beltway visits to Mississippi and Virginia, many telehealth advances are already underway. There is tremendous interest within and outside government in the power of telehealth to address seemingly intractable problems. Industry is beginning to innovate and collaborate, recognizing rural consumers as an attractive broadband health market. Technologists, clinicians, and rural communities are coming together. State and local governments are stepping up and often taking the lead. The stars are beginning to align, but some challenges remain.

First, we have to get broadband done right and done right now in rural and underserved areas because there are real risks of exacerbating health and economic disparities experienced by consumers living in these communities, if we fail in that endeavor. For our most rural and remote areas, we may need to focus on particularly unique solutions, including neighborhood access points for telehealth or self-service kiosks.

Second, there is a critical need for outreach and education, given the millions of Americans who remain digitally disconnected or who have limited computer and IT familiarity. I believe that rural consumers can drive the demand curve for telehealth and other broadband-enabled services if they – like Ms. Collins and Ms. Ford in Ruleville, Mississippi – better understand the value proposition of broadband in health. The Connect2Health[FCC] Task Force's efforts in this area include a series of consumer tip sheets, blogposts, speeches, and tweets; an infographic that unpacks the broadband health imperative in an easily digestible way; and its Beyond the Beltway visits.

Third, we need better tools to measure where we are now, so that we can gauge progress over time and identify the rural telehealth solutions that are providing the best return on investment. In addition to the Phase 1 maps mentioned above, the Task Force is considering the feasibility of a broadband health connectivity index to permit comparisons over time and across rural communities.

Fourth, every rural community is different and every state has unique needs and challenges. A one-size-fits-all approach to enhancing broadband deployment and uptake, will not work. We need a suite of telehealth solutions that can be tailored as appropriate.

Finally, the FCC cannot address all these challenges alone. Telehealth progress requires broad stakeholder input and collaboration. In particular, the Task Force hopes to work with stakeholders to catalyze more public-private partnerships like the one in Mississippi, with the goal of not only

understanding and characterizing the problems, but also catalyzing innovations to enable rural communities to reach critical health goals.

IV. CONCLUSION

In my view, the greatest challenge and the largest threat to the widespread advancement of rural telehealth lies in thinking too small. If we allow ourselves to believe that the value of telehealth is only to connect patients, doctors, and hospitals – a critical need to be sure, but not the end in itself – we will certainly reap tangible benefits, but we could miss the transformational possibilities that broadband health connectivity can offer our nation. I commend the Committee, and Chairman Wicker in particular, for tackling these critical issues and for recognizing that the future depends on what we do today. The Connect2Health[FCC] Task Force is committed to doing its part.