

**Before The
Federal Communications Commission
Washington DC 20554**

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In the Matter Of)	
)	
Fostering Innovation and Investment in the)	GN Docket No. 09-157
Wireless Communications Market)	
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A National Broadband Plan For Our Future)	GN Docket No. 09-51
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COMMENTS OF THE WEST WIRELESS HEALTH INSTITUTE

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SUMMARY

The West Wireless Health Institute (the “Institute”) submits these Comments in response to the Commission’s recent Notice of Inquiry seeking comment to “understand better the factors that encourage innovation and investment in wireless” and to “identify concrete steps the Commission can take to support and encourage further innovation and investment in this area.” In particular, the Institute applauds the Commission for seeking comment in the Notice of Inquiry on the innovative uses of wireless to improve the effectiveness, cost, or availability of health care in this nation and on the impact that wireless devices or services could have in this regard. Notice of Inquiry at para. 16. The Institute is one of the world’s first medical research organizations dedicated to advancing health and wellbeing through the use of wireless technologies. We look forward to working together with the Commission, other governmental agencies, private parties, and all stakeholders to improve health care for all Americans and to drive down the cost of providing such care through the use of innovative wireless technologies.

In prior Orders, the Commission has discussed the dramatic benefits that advanced telecommunications in general, especially broadband, provide to the health care industry and patients, including the provision and expansion of network capacity for telemedicine and for the exchange of medical data.¹ More recently, on September 15, 2009, the Commission held a Workshop on Health Care as part of the National Broadband Plan proceeding, GN Docket No. 09-51. The Workshop sought to determine how and where broadband networks are deployed to provide telehealth services throughout the nation, as well as to learn of successful telehealth

¹ See, e.g., Rural Health Care Support Mechanism, WC Docket No. 02-60, Report and Order, Order on Reconsideration, and Further Notice of Proposed Rulemaking, 18 FCC Rcd 24546, 24550 ¶ 6 (2003).

programs and whether telehealth diagnosis and treatments are covered under medical insurance. At this Workshop the Commission heard from various experts including Aneesh Chopra, the Federal Chief Technology Officer of the United States (CTO), who stated, “We cannot move forward in advancing our nation's health care reform goals without the appropriate use of technology in health care, and telemedicine is a key component.”²

Far beyond telemedicine applications, wireless health technologies hold the potential to revolutionize health care delivery by dramatically reducing costs; increasing the efficiency and effectiveness of health care providers; and extending the reach of health care services to underserved populations. Mobile devices, such as cell phones, smart phones, smart books and wireless medical devices, all play important roles in this revolution and in the broader ecosystem of health information technology.

Health care expenditures in America account for over \$2.2 trillion dollars annually - roughly 16% of our nation's Gross Domestic Product - yet America ranks 19th out of countries in quality of care. Innovative wireless communications will be an essential component of improving the quality of care and driving down costs. However, realizing the enormous potential of wireless health will require significant investment in new technologies, as well as documentation that wireless health solutions produce better and more cost-effective health outcomes. Equally important to fulfilling that potential is mobile broadband technology, which can provide high speed internet access to Americans wherever they work, live, travel – or seek medical care.

² See <http://www.fcc.gov/realaudio/mt091509.ram>; Communications Daily, Vol. 29, No. 178, September 16, 2009, at Pgs. 1-2.

As the Commission itself has found in May of this year, 95.6% of the US population is covered by at least one mobile broadband network (defined as a network based on EV-DO or WCDMA/HSPA), and 99% of the non-rural US population and 82.8% of the rural US population is so covered.³ Achieving 100% mobile broadband coverage as quickly as possible—certainly within the next few years— is vital for wireless health. Just as vital is the continued expansion of the already vast mobile broadband eco-system driven by constant upgrades to air interfaces, increased efficiencies in the utilization of licensed spectrum, network capacity enhancements, new chipsets that power devices to offer a plethora of bands and technologies (licensed for wide area networks and unlicensed for local area networks), and a constantly expanding number of mobile broadband devices and mobile applications with rich content and varied operating systems.

We urge the Commission to set a national goal of universal mobile broadband coverage. No single step that the Commission could take would do more to facilitate innovation in wireless health. Patients, doctors and hospitals all need ubiquitous mobile broadband coverage if wireless health is to deliver on its potential. In addition, we recommend that the Commission consider refocusing the rural health care pilot program to provide funds for the use of commercial mobile

³ See Bringing Broadband to Rural America, Report on a Rural Broadband Strategy, released May 22, 2009, at Pgs. 12-13. In making that finding, the Commission defined networks based on EV-DO and WCDMA/HSPA as constituting mobile broadband. The Commission used the same definition of mobile broadband in its annual reports on the state of competition in the US wireless market in 2009, 2008, and 2007. See Thirteenth Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No. 08-27, DA 09-54, released January 16, 2009 at Pgs. 69, 73-74; Twelfth Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No, 07-71, released Feb. 4, 2008, at Pgs. 8, 68-69; Eleventh Report, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No, 06-17, released Sept. 29, 2006, at Pg. 54

broadband networks, rather than funding the construction of dedicated, single-use wireline networks, The use of commercially available devices on commercially available mobile broadband networks will ensure the widest possible broadband access and coverage at the lowest possible costs. In addition, we believe that federal funding under the ARRA, other health-related programs, or some other program should be used to subsidize mobile broadband devices and telemedicine software and applications for health care professionals and patients. These are critical building blocks for wireless health.

The Institute looks forward to working with the Commission as it prepares the National Broadband Plan and as it continues its laudable efforts to facilitate innovation in wireless health.

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COMMENTS OF THE WEST WIRELESS HEALTH INSTITUTE

The West Wireless Health Institute (“the Institute”) hereby submits these Comments in response to the Commission’s Notice of Inquiry in the above-captioned proceedings, GN Docket No. 09-157, GN Docket No. 09-51.

I. Introduction

The Notice of Inquiry seeks to understand the factors that encourage innovation and investment in wireless and to identify concrete steps the Commission can take to support further innovation and investment in this area. The Notice of Inquiry seeks comment on innovation in many aspects of wireless, but it contains a paragraph singling out wireless health. Notice of Inquiry at para. 16. Therein, the Notice of Inquiry on the innovative uses of wireless to improve the effectiveness, cost, or availability of health care in this nation and on the impact that wireless devices or services could have in this regard. The Institute is pleased to see the Commission’s focus on wireless health and submits these comments to support the Commission’s efforts.

Issues surrounding wireless health should be viewed in the context of the broader set of issues concerning the health care system in this nation. This system is in a state of crisis, and there is no single solution. But a convergence is taking place between individualized medicine

and wireless technology, with the potential to completely transform health care delivery as we know it. In the same way digital entertainment and communication devices have changed how we entertain ourselves, digital wireless devices will change how we manage our health and take care of ourselves. Technology in development today includes hundreds of ingenious wireless sensors. These non-invasive sensors, in the form of disposable bandages and pills, transform the human body into an information gateway. Vital signs, glucose levels, caloric intake and expenditure, and a host of other health parameters can be monitored and transmitted in real-time to medical centers, physicians or back to an individual patient or caregiver.

These tools collapse time and space, and open-up a brand new ubiquitous frontier called “wireless health” that enables doctors and patients to collaborate anytime, anywhere and in multiple ways—all of which will drive improved care and lower costs.

II. The Emerging Field of Wireless Health

While many advances have been made over the last few years, the field of wireless health is in its infancy. Its lexicon includes the terms “telemedicine,” “telehealth,” “e-health,” “mHealth,” and, “mobile health.” Its players range from small start-up ventures, to Fortune 500 companies, to global health organizations, to leading universities and major foundations.

Wireless health encompasses a broad range of solutions that enable physicians, patients, consumers and caregivers to cost-effectively prevent, diagnose and monitor health conditions, manage treatment and enable timely communication and intervention – all with ubiquity provided by mobile broadband service.

Devices and products used for wireless health now include “end-to-end” systems powered by advanced chipsets with integrated support for numerous technologies which power

devices such as wearable sensors. Medical devices are beginning to integrate wireless digital functionalities for licensed wide areas and unlicensed local areas.

The Institute is working to tap the enormous potential of this emerging field and urges the Commission to help nurture its acceleration.

III. Focus Areas for Wireless Health

“Simply put, in the absence of a radical shift towards prevention and public health, we will not be successful in containing medical costs or improving the health of the American people.” - President Barack Obama.

Wireless health solutions offer just such a "radical shift" for the future of health care delivery. Whether via mobile phone or smart "band-aids" or other devices, wireless health applications offer convenient and personalized solutions to help people make changes in their lifestyle and reduce their risk for disease – among many other applications. As such, the Institute recognizes four broad areas of focus for wireless health today: Disease Prevention, Disease Management, Aging in Place, and Underserved Populations.

A. Disease Prevention

Wireless technologies offer tremendous potential for helping individuals to stay healthy. Wireless sensors, for example, can detect a 'shift' in someone's health as soon as it occurs. Thus, a patient with high blood pressure can be monitored with a wireless device that registers changes and sends an immediate warning to a doctor if those changes are life-threatening—preempting potentially fatal complications such as stroke and heart attack.

One such product, the CardioNet Mobile Cardiac Outpatient Telemetry™ (MCOT™), offers an integrated technology and service to detect arrhythmic events by a monitor that transmits ECG data to a monitoring center utilizing a 3G cellular modem. This system enables

continuous, round-the-clock heartbeat-by-heartbeat, ECG monitoring, analysis and response, at home or away. The device is enabled with 3G CDMA2000 mobile technology and wireless networking services to help physicians diagnose and treat patients with arrhythmias where time is of the essence and delays can lead to increased morbidity and mortality.

Disease prevention is a critical focus area for wireless health, particularly with regards to lowering the high costs of health care. More than 100 million Americans are currently living with at least one chronic condition. Chronic illness, much of which is preventable, is a major source of U.S. health care expenditures as the following cost summary shows (per individual; cost in thousands):

Annual Health Care Cost: U.S.⁴

Individual with one chronic illness:	\$6,032
One chronic illness, plus a disability:	\$10,908
One chronic illness, plus disability and functional limitation:	\$16,245

B. Disease Management

As noted supra, chronic conditions place an enormous burden on our health care system. In 2003, a study released by the CDC and RTI International found that obesity-related medical expenditures alone reached \$75 Billion.

Wireless health offers tremendous opportunities for mitigating the impact of chronic disease. The opportunities are so wide-ranging because wireless health solutions reach through the entire continuum of care, across the ages, from preemies to seniors, and the full spectrum of diseases. In particular, the Institute’s medical researchers and engineers will be developing

⁴ Source: Johns Hopkins School of Public Health Partnership for Solutions.

technologies to target the most prevalent and costly chronic conditions, all of which can be addressed via wireless health solutions, as illustrated in the following chart ⁵:

Disease	No. Affected	Wireless Solutions
Alzheimer's	5 M	Vital signs, location, activity, balance
Asthma	20 M	RR, FEV1, Air quality, oximetry, pollen count
Breast Cancer	3 M	Ultrasound self-exam, Web
COPD	10 M	RR, FEV1, Air quality, oximetry
Depression	19 M	Med Compliance, Activity, Communication
Diabetes	21 M	Glucose, Hemoglobin A1C
Heart Failure	5 M	Cardiac pressures, weight, BP, fluid status
Hypertension	74 M	Continuous BP, Med compliance
Obesity	80 M	Smart scales, Caloric in/out, Activity
Sleep Disorders	15 M	Sleep phases, quality, apnea, vital signs

C. Aging in Place

The concept of “aging in place” refers to older adults remaining independent, and ultimately, staying in the comfort of their own home for as long as possible. Aging in place encompasses health, psychological wellbeing, social connectedness, safety, optimized disease management, and, easy access to health care. Wireless solutions powered by mobile broadband are being developed to address each of these areas.

This is critical because by 2020, nearly 55 million Americans will be 65 years or older. Long-term care is extraordinarily expensive, with the annual cost of a private room in a nursing facility exceeding \$70,000 and in an assisted living facility exceeding \$33,000. Costs are forecast to increase at 6.4 percent per year, a rate far higher than GDP or inflation.

Wireless sensors that aid older adults include those that detect motion, mood changes, and help prevent falls—and the same technologies in development for disease prevention and

⁵ Source: West Wireless Health Institute. All data, U.S.

management can be adapted for an older population's needs. Such technology will help prevent unnecessary hospitalization, as well as mitigate the need for assisted living and long-term institutionalization. Wireless health solutions will offer older adults significantly more choice in how and where they live, and add a sense of empowerment, freedom and control to daily life.

D. Underserved Populations

During a September 2009 keynote speech, Dr. Garth Graham, the Department of Health and Human Services' Deputy Assistant Secretary of Minority Health, stated that "Segments of poor rural Americans have a life expectancy of 15-17 years less than wealthy, urban Americans. Health disparities for minorities are growing as well."⁶

Consensus is building that mobile phones and the Internet play significant roles in reaching minorities and underserved populations with health information and services. Wireless mobile technologies extend the reach of physicians to areas with health care personnel shortages, while at the same time, people without access or the financial means to see a doctor rely heavily on the Internet for health information.

When asked whether mobile technology could be used to improve patient health, Graham cited a powerful example: "Hurricane Katrina proved there is value in mobile technology when trying to reach the health needs of minorities. Seventy-five percent of those affected by Katrina had access to a cell phone." Further, Graham noted that low-income and minority populations are likely to seek out health information online. The opportunity is ripe for government and other stakeholders to create Web-based resources to promote public health goals.

⁶ See <http://www.healthcareitnews.com/news/health-technology-said-reduce-care-disparity-poor-and-minorities>, Healthcare IT News, September 23, 2009.

The Institute will be exploring innovative wireless health solutions to close the gap on health disparities in the U.S. At the same time, as stated infra, modernizing the Commission’s rural health pilot program has the potential to be a significant driver in improving access to care.

IV. Wireless Health Public Policy

A. Health Care Reform Intersects with Wireless Health

President Obama's plan to “lower health care costs and ensure affordable, accessible health coverage for all” is a far-reaching attempt to reform our \$2.2 trillion health care system. The plan recognizes that health care in the U.S. has become a “disease care system,” with substantial under-investment in prevention and public health.

Recently, the Executive Office of the President released a report titled, “A Strategy for American Innovation: Driving Towards Sustainable Growth and Quality Jobs.”⁷ The report states that “The President’s health IT initiative is designed to drive technological innovation that will help prevent medical errors, improve health care quality, reduce costs, and cement U.S. leadership of this emerging industry.”⁸ It also calls for expanding the use of health information technology e.g., “electronic medical records, mobile health applications, [and] sensors for monitoring chronic diseases.”⁹

As stated supra, the four areas of focus for wireless health – Disease Prevention, Disease Management, Aging in Place and Underserved Populations – complement the President's goals and are important drivers for accomplishing true health care reform.

⁷ See “Strategy For American Innovation” <http://www.whitehouse.gov/administration/eop/nec/StrategyforAmericanInnovation/>.

⁸ Id. at Pg. iii.

⁹ Id. at Pg. 21.

B. Modernizing The Commission's Rural Health Pilot Program

This Notice of Inquiry seeks comment on how to encourage growth in the use of wireless devices and services for health care. Notice of Inquiry at para. 16. As shown supra, mobile broadband networks and devices offer tremendous potential to improve health care delivery in this nation. Achieving the goal of universal mobile broadband coverage in the near future will greatly facilitate the use of wireless devices and services for health care, but there is more that the Commission can do.

The Commission has a well-intentioned rural health care pilot program. The program is designed “to provide funding to support the construction of state or regional broadband networks and services provided over the networks,” and applicants can seek funding “to construct a dedicated broadband network that connects health care providers in a state or region.” Order, 21 FCC Rcd 11111 (2006). But, the pilot program only funds dedicated networks. The pilot program does not provide any funding for the use of commercially available mobile broadband networks, which already cover 95% of the US population. In addition, the pilot program does not provide any funding for wireless devices, telemedicine applications and software, or personal computers. See <http://www.fcc.gov/cgb/rural/rhcp.html#orders>. Moreover, although the pilot program includes funding of up to \$400 million per year, almost no funds have been paid out, and the program will soon expire.

The pilot program should be modernized so that it provides funds for the use of commercially available mobile broadband networks. Wireless health care will be provided over commercial mobile broadband networks, rather than over dedicated networks constructed by hospitals, which can never attain the wide coverage of commercial mobile broadband networks.

Doctors and patients will use commercially available mobile broadband devices to access these networks for wireless health services.

In addition, federal funding should be used to subsidize mobile broadband devices, wireless health devices, and telemedicine software and applications for health care professionals and patients. These are critical building blocks for wireless health. Federal funds under the ARRA, other health-related programs, or some other program should be made available to drive the rapid and broad proliferation of such devices, software, and applications.

V. The Work of the West Wireless Health Institute

As stated supra, realizing the enormous potential of wireless health will require significant investment in new technologies, as well as documentation that wireless health applications produce better and more cost-effective health outcomes. Most wireless health applications are relatively new or have undergone only small-scale testing.

In response, the West Wireless Health Institute was launched earlier this year. The Institute is a 501c3 nonprofit medical research organization—one of the few medical research organizations in the world supporting the exploration, validation and application of wireless technologies to advance human health and wellbeing. Established with a \$45 million grant from the Gary and Mary West Foundation, the Institute is based in San Diego, California, which is home to one of the nation's largest clusters of life science and wireless companies.

The Institute's goal is to move emerging wireless health technologies quickly into the hands of doctors, health care organizations and consumers – ensuring along the way that life-enhancing and lifesaving devices and products are safe, secure, reliable and cost-effective.

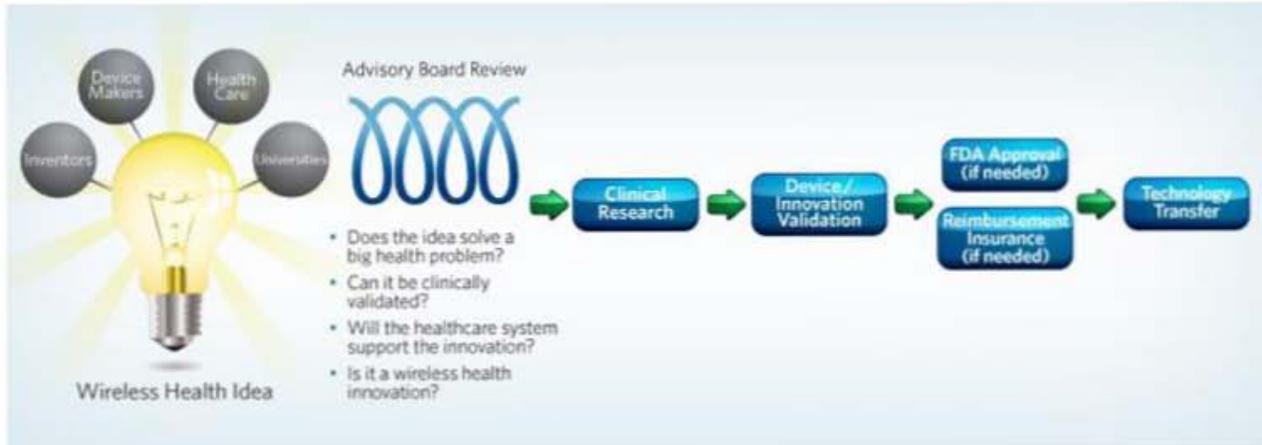
In addition to being a center for clinical research and validation, the Institute will be a global resource for wireless health education, offering programs ranging from postdoctoral

fellowships to consumer education. The Institute will also work across the public and private sectors to address challenges to the widespread adoption of wireless health solutions, including: regulation and reimbursement; interoperability; and industry standards such as privacy and security.

Under the leadership of Eric J. Topol, M.D., a world-renowned expert in wireless medicine, research at the Institute will focus on the development and validation of wireless sensors – wearable, implantable and ingestible – for health and wellness applications. The development of such sensors and wireless system technologies will require rigorous validation through randomized clinical research trials. This requires design and execution of prospective clinical research in multicenter networks, as well as testing whether the new wireless technology achieves better clinical outcomes (such as preventing death, heart attack and stroke) compared to current standards of care. Every sensor being investigated by and in development at the Institute will go through such validation.

The prototype for this research is the use of the wireless continuous electrocardiogram (ECG) recording, which had to be compared with the traditional Holter 24-hour monitor in a randomized trial before this technology was accepted for routine use by the medical community.

Example of Wireless Health Development at the Institute



Recently, the Institute teamed with Corventis Inc. for its first multicenter, randomized clinical trial. The collaboration will test remote wireless monitoring to prevent hospital readmissions for heart failure patients. Corventis is a developer of wireless cardiovascular solutions designed to enable early detection, prevention and treatment of cardiovascular conditions.

Congestive heart failure is the leading reason for hospital admission in the U.S., and it was recently shown that 26.9% of heart failure patients in the Medicare cohort are re-hospitalized within 30 days. The cost burden to the health system for these readmissions is profound and estimated to be in the range of \$10 Billion per year. With the newfound ability to monitor multiple highly relevant physiologic parameters on a continuous 24 hour/7 day basis — such as heart rhythm, fluid status and respiratory rate — there is the potential to markedly reduce the need for hospital readmissions among patients with heart failure.

The Corventis remote monitoring wireless system was approved by the FDA in February, 2009. The technology is designed to deliver focused visibility into the cardiac health status of patients by combining patient-friendly wearable sensors with advanced computational

algorithms, global wireless capabilities and a comprehensive web-based infrastructure. Heart failure is prototypic for remote wireless monitoring. Through innovative wireless sensor technologies that use smartphones and wireless broadband communication, the capability of early and rapid detection of key parameters with simple disposable smart band aid's can relay the data on a continuous basis through the Internet. The trial is designed to clinically validate remote wireless monitoring technology while proactively managing heart failure patients with the goal of reducing hospital readmissions.

VI. Conclusion

Global connectivity powered by mobile broadband is at the core of the wireless health revolution. Wireless medical devices, sensors, and other mobile products will enable truly individualized medicine, keeping people healthy and out of the hospital. On a broader level, wireless health also has the power to create a *connected* health care delivery system, with solutions that are predictive and preventive.

Congress, in passing the stimulus legislation, which directed the Commission to write the National Broadband Plan, and the Commission, in completing that task, are both correct to focus on health care as a key driver of broadband. Through its work, the Commission has the unique ability to change the ways in which health care is delivered in the U.S. We urge the Commission to undertake this responsibility by setting the goal of universal mobile broadband coverage within the next few years, by modernizing the Commission's rural health care pilot program, and by continuing to find ways to spur innovation and investment in wireless health.

Respectfully submitted,

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