

Meet Carlos Rivera

AGE 61 • PRONOUNS: HE/HIM/HIS

PROFILE: RETIRED ENGINEER AND ENJOYS REFURBISHING FURNITURE

Carlos is an Air Force Veteran who, over time, developed a rare form of hearing loss. Carlos' heart condition and previous combat-related surgeries made him certain he did not want another invasive procedure to treat the condition. Unfortunately, surgery was seemingly the only treatment available. Carlos continued to struggle with impaired hearing, which strained his quality of life and personal relationships.

Carlos' care should not be limited. Carlos, like many patients, craved a personalized solution that respected his care preferences and was responsive to his health needs. Most of all, he wanted to feel involved in the care process with his providers.

This story is inspired by a real-life example, but sensitive information has been altered to maintain confidentiality.



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MONITORING



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One Size Does NOT Fit All

Compared to other countries with high gross national income, the U.S. has the lowest life expectancy (78.8 years old), despite spending far more on health care than any other country.¹³ This imbalance between care spending and care success articulates the urgent need for U.S. health care to evolve past its “one-size-fits-all” model. The alternative that should be adopted is a patient-matched, personalized approach to care services and products, integrating the individuality of patients to improve trust and collaboration.

¹³ Centers for Disease Control and Prevention. (2021, October 20). FastStats - Life Expectancy. <https://www.cdc.gov/nchs/faststats/life-expectancy.htm>. Last reviewed October 20, 2021. Accessed October 15, 2021.

¹⁴ Davison, B. J., Glawe, M. E., Goldenberg, S. L., Degner, L. F., Hoffart, D., & Berkowitz, J. (2002). Assessing information and decision preferences of men with prostate cancer and their partners. *Cancer nursing*, 25(7), 42-49. <https://doi.org/10.1097/00002820-200207000-00009>

¹⁵ S. Garfield, M.P. Douglas, K.V. MacDonald, D.A. Marshall, K.A. Phillips Consumer familiarity, perspectives and expected value of personalized medicine with a focus on applications in oncology, *Personalized Medicine*, 12 (1) (2015), pp. 13-22, [10.2217/pme.14.74](https://doi.org/10.2217/pme.14.74)

¹⁶ Ballard DH, Mills P, Duszak R Jr, Welsman JA, Rybicki FI, Woodard PK. Medical 3D Printing Cost-Savings in Orthopedic and Maxillofacial Surgery: Cost Analysis of Operating Room Time Saved with 3D Printed Anatomic Models and Surgical Guides. *Acad Radiol*. 2020;27(8):1103-1113


92.5%

92.5% of individuals want to play either an active or a collaborative role in decision making with their physician.¹⁴


95%

95% of the U.S. health consumers, aged 30 years and older, expect personalized medicine to have a positive benefit.¹⁵


\$15M+

\$15.24 Million estimated yearly cost avoidance with 3D printing applications in the operating room.¹⁶



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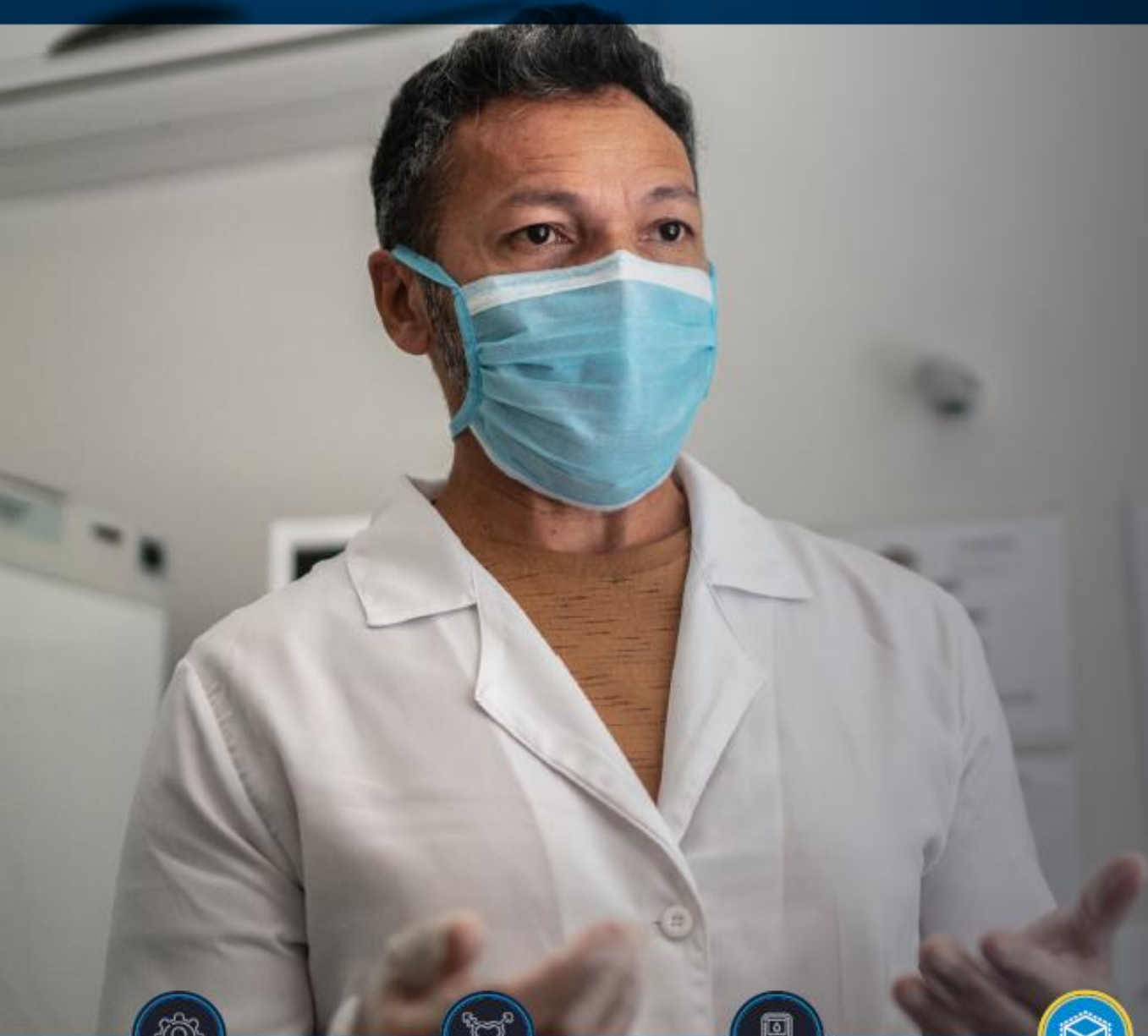
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Personalizing the Future of Care

3D Printing reimagines personalized care delivery and provides patient-specific solutions, even when no commercial products exist or are available. This capability makes it easy for Carlos to co-create a non-surgical solution with his care team and receive a personalized, patient-matched 3D Printed ear stent for his condition. VA's investment in 3D Printing began in 2017 through the establishment of the VA 3D Printing Network. With 3D Printing capabilities at over 65 VA Medical Centers (VAMC), VA has established new health care possibilities across five clinical service lines: bio-printing, orthotics & prosthetics, assistive technology, dental, and pre-surgical planning.



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3D Printing Demonstrates Principles for Value-Driven Innovation

Meaningfulness

3D Printing enables care teams to account for the whole Veteran and create 1:1 customized solutions that respect the Veteran's unique anatomy, preferences, values, and treatment goals. This technology is a conduit for translating the Veteran-voice into clinical outcomes in ways that matter most to the Veteran.

Appropriateness to Scale

3D Printing's approach to scale focuses on targeted investments in clinical areas that are (1) most ripe for custom care and (2) have high-cost expenditure for the enterprise (e.g. pre-surgical planning and dental). 3D Printing's potential avenues for enterprise-wide benefits—such as cost-avoidance, licensing, and commercialization potential—will enable self-sustainment and enterprise-wide implementation.

Time to Value Realization

3D Printing improves access to timely care solutions, provides more effective care through personalization and improves care team efficiency. There's significant cost avoidance from reduced community care outsourcing, allowing VA to optimize existing infrastructure and human capital. Over time, 3D Printing will drive the equitable distribution and availability of health care solutions (e.g., devices, bioprinted organs).



Measuring the Value of 3D Printing

Access

Improves access to custom health care solutions by providing patient-matched products that do not exist commercially or have an extended lead time for production



Effectiveness

Improves effectiveness of care by delivering targeted solutions that match the individual Veteran's anatomy, needs, and preferences



Efficiency

Improves efficiency through reduced production throughput time, limited recurring maintenance, and improved product efficacy; efficiency gains may also be captured through providers' time savings in appointment lengths and pre-surgical planning



Equity

Improves equity by increasing the availability and distribution of healthcare solutions that were previously unavailable or difficult to obtain



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