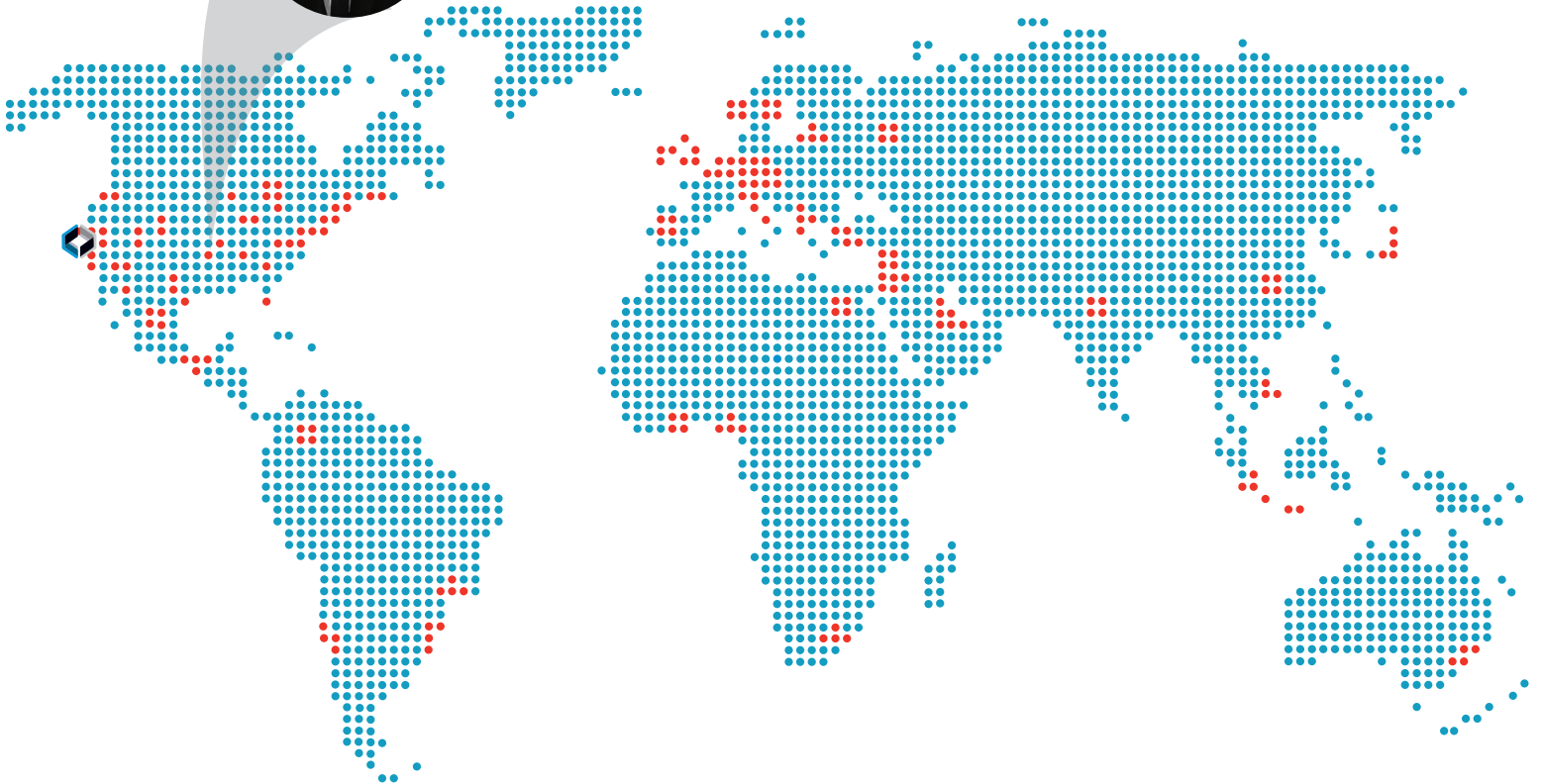




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Disrupting Healthcare: No Experience Needed

Matt Otterstatter

Class 18

This research started with a personal twist. After a highly successful career in the software industry, my father, Jon Otterstatter, co-founded Preventice,¹ a company that applies data analytics to the healthcare industry by remotely monitoring outpatient heart rhythms. What started as a hobby rapidly became much more, and he decided it was time to raise money to grow the company.

Although he had been a successful entrepreneur with a prior IPO of Showcase Corporation,² [multiple venture capitalists told him that Preventice was too risky because he had no prior healthcare experience.](#) Preventice did ultimately raise a few rounds of venture capital, and after a few years of high growth, Merck acquired a controlling interest in the company for an undisclosed, albeit significant, multiple.³

While proud of my father and happy for his success, I perceived a problem in the funding ecosystem. While my father is a tireless worker

with a great business mind, he is not a rare genius forging a path no one else could follow. I wondered how many other entrepreneurs had built successful companies in the healthcare industry—without prior industry experience.

Numerous blogs and articles⁴ suggest that entrepreneurs without relevant background experience are at a significant disadvantage for raising venture funding. This preference for entrepreneurs with domain expertise seems to be prudent in established industries with conventional ways of doing business; however, how do you define relevant experience in an emerging subsector of that industry? Specifically, what about an emerging sector that is the intersection of two other industries (healthcare and IT)? I set out to answer the following question: [“How important is prior healthcare experience for an entrepreneur starting a healthcare IT company?”](#)

¹ <http://www.preventicesolutions.com/>.

² *Minneapolis/St. Paul Business Journal*, “Showcase Plans IPO,” 29 April 1999, <http://www.bizjournals.com/twincities/stories/1999/04/26/daily14.html>.

³ Aditi Pai, “eCardio, Preventice Merge, Merck GHI Fund Majority Stakeholder,” *MobiHealthNews*, 9 September 2014, <http://mobihealthnews.com/36397/ecardio-preventice-merge-merck-ghi-fund-majority-stakeholder>.

⁴ Mark Suster, “The Four Main Things that Investors Look for in a Startup,” *Both Sides* (blog), 6 October 2010, <http://www.bothsidesofthetable.com/2010/10/06/the-four-main-things-that-investors-look-for-in-a-startup/>; John Rampton, “25 Reasons I Will Not Invest in Your Startup,” *Entrepreneur*, 15 September 2014, <http://www.entrepreneur.com/article/236999>; James E. Gaskin, “Painful Truth on Why Venture Capital Firms Reject Startups,” *IT World*, 15 June 2012, <http://www.itworld.com/article/2722650/it-management/painful-truth-on-why-venture-capital-firms-reject-startups.html>.

Researching Successful Healthcare IT Startups

While studying this question, I was introduced to Jonathan Norris, a managing director at Silicon Valley Bank (SVB) who happened to be doing his own research on healthcare investments. He had recently published an article called “Strong Momentum in Healthcare: Trends in Mergers and Acquisitions.”⁵ In the article, Norris made a broad assessment of the healthcare industry by looking at overall investment amounts, sector performance, and exits from 2005-2012. He was able to dig deeply into the SVB database, a very reliable source of information given the firm’s platform. SVB is centrally positioned in the venture industry, leveraging relationships with many top-tier venture firms and startups; they see a lot of financing deals, manage many of the mergers and acquisitions, and so are well positioned to analyze the state of venture markets.

Norris’s report provided macro-level insight into the entire healthcare industry. My goal was to understand more about the emerging healthcare IT industry, and collaboration with him on this dataset allowed me to examine that subsector in more detail. Specifically, there were 50 startups from 2005-2012 characterized as healthcare IT that had successful exits (defined here as venture-backed companies with an IPO or acquisition of at least \$50M). The data on company exits is particularly important to me, because **although understanding new investment trends might indicate potential, analyzing exits indicates ultimate success**—the key outcome I needed to answer my fundamental question.

Digging Deeper: Interviews with Founders

Looking at the data set of 50 successfully exited healthcare IT startups, I knew **I needed to dig deeper into the specific traits and background experiences of**

⁵ Silicon Valley Bank, “Strong Momentum in Healthcare: Trends in Mergers and Acquisitions,” presentation slides, July 2013, <http://www.svb.com/pdf/healthcare-report-2013-presentation/>.

the entrepreneurs behind these successful companies. I reached out to all of the entrepreneurs, and ultimately was able to conduct interviews with the founders of 14 of the 50 (28%). Given the relatively small size of this subsector as of 2012, composing only about \$20B of the \$3T total healthcare market,⁶ and its new arrival into the larger healthcare industry, other data is limited or lacking.

When requesting interviews, I made no reference to what question I was exploring—I simply informed the entrepreneurs that I was doing a research project for the Kauffman Fellows Program and I wanted to interview successful entrepreneurs in healthcare. Bias was therefore minimized because I did not previously know any of the subjects, nor did I perform any filtering on people available for interviews. Finally, by not disclosing the questions prior to the interview, I did not induce any responder bias that would skew the results.

The True Value of Prior Experience

First and foremost, **the data on experience yielded some very interesting results.** I asked for their total prior professional experience, as well as how many of those years were in the fields of healthcare, biotechnology, or life sciences.

In terms of the overall number of years of prior working experience, there was a diverse age range of entrepreneurs. The stereotype may be the young college drop-out; however, the data from numerous studies⁷ show that entrepreneurs come from all walks of life. The 14 entrepreneurs I interviewed, who had successfully built healthcare companies and sold them, were

⁶ Bernie Monegain, “Big Growth Forecast for Health IT Market,” *Healthcare IT News*, 30 December 2013, para. 1, <http://www.healthcareitnews.com/news/big-growth-forecast-health-it-market>; Dan Munro, “U.S. Healthcare Hits \$3 Trillion,” *Forbes*, 19 January 2012, para. 1, <http://www.forbes.com/sites/danmunro/2012/01/19/u-s-healthcare-hits-3-trillion/#55fa60172f67>.

⁷ Vivek Wadhwa, “Why Middle-Aged Entrepreneurs Will Be Critical to the Next Trillion-Dollar Business,” *VentureBeat*, 31 October 2014, <http://venturebeat.com/2014/10/31/why-middle-aged-entrepreneurs-will-be-critical-to-the-next-trillion-dollar-business/>; Krisztina ‘Z’ Holly, “Why Great Entrepreneurs Are Older than You Think,” *Forbes*, 15 January 2014, <http://www.forbes.com/sites/krisztinaholly/2014/01/15/why-great-entrepreneurs-are-older-than-you-think/>; Kauffman Foundation, “The Anatomy of an Entrepreneur,” 8 July 2009, <http://www.kauffman.org/what-we-do/research/2010/05/the-anatomy-of-an-entrepreneur>.

similarly diverse in terms of age, as can be seen by the x-axis of [figure 1](#).

However, the results for amount of experience inside the healthcare industry were shocking ([figure 1](#)). Of the 14 entrepreneurs interviewed in this study, **71% (n = 10)** of the founders of healthcare IT companies with successful exits had *no prior healthcare experience at all*. On the other end of the spectrum, only 1 entrepreneur (7%) had what could be characterized as deep domain expertise, defined here as having more than 10 years of experience. The remainder (21%, n = 3) had some healthcare experience, about 4 years on average.

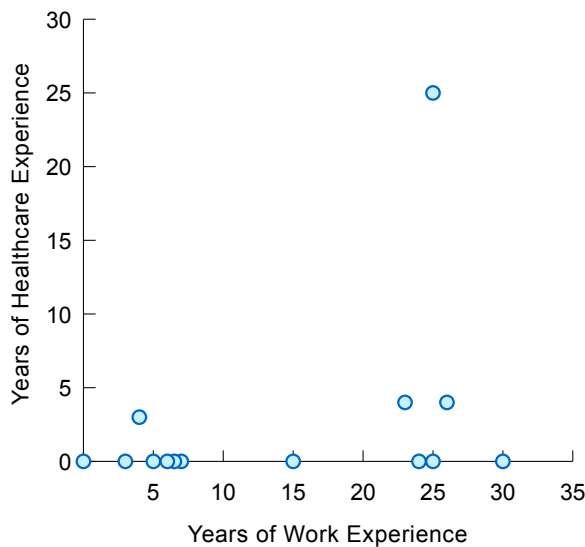


Figure 1. Prior Experience Among Successful Healthcare IT Entrepreneurs—Generally and in Healthcare Specifically. Author’s figure.

Inspiration from the Outside

I asked my interviewees if their inspiration came while working in the healthcare industry, or while they were on the outside looking in at a problem. All of them save one (93%, n = 13) could be characterized as industry outsiders ([figure 2](#)). And of the 4 with prior healthcare experience, 3 shifted to a completely new area within the healthcare industry.

So, **13 successful founders all had recognized opportunities to**

innovate outside their primary area of expertise. Only one person in the study (7%) had dedicated a lifetime of research and development activity in preparation for tackling a particular problem in the healthcare industry.

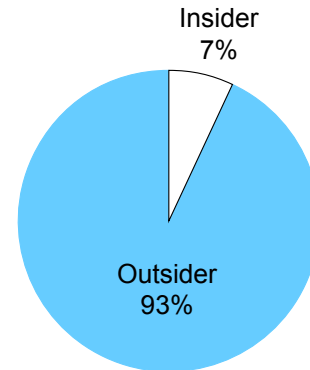


Figure 2. Prior Relationship to the Healthcare Industry. Author’s figure.

Success in Other Industries

The VCs who declined to invest in my father’s company felt that his prior success as an entrepreneur didn’t apply because it wasn’t in healthcare specifically. So, I asked my interviewees whether this was their first experience with a startup. The majority (71%, n = 10) did have experience with startups in other technology domains prior to their foray into healthcare ([figure 3](#)).

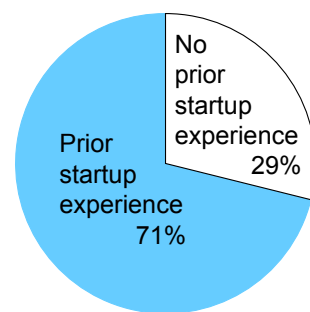


Figure 3. Previous Experience Founding a Startup. Author’s figure.

Founder’s Role in Early Sales

All 14 founders said they had personally acquired “all” or “nearly all” of their early customers, as opposed to hiring a sales force or using an outside channel. Therefore, according to this

study of exits, **the largest predictor of success in healthcare IT companies was the founders' own ability to find customers** (see Lak Ananth, "High-Tech Exceptionalism: From the Front Lines"). This may seem like a cliché, as it is obviously important for early-stage companies to find customers; however, the effect seems to be more pronounced in healthcare IT where the path to revenue is more difficult to navigate than in traditional IT companies. Rather than simply selling directly to consumers or businesses, healthcare IT companies often need to deal with numerous regulations and unique payment systems and organizations.⁸

Prior Healthcare Experience Is Irrelevant—And in Fact May Hinder Success

This study provides strong evidence that prior healthcare experience is not required to build successful healthcare IT companies. Of course, 14 of 50 is a relatively small sample size and those interested in validating or questioning these findings should do further research. That being said, the overwhelming nature of the responses to certain questions provides a strong degree of statistical confidence that the trend holds even with a small number of samples.⁹

Why might reality contradict the common VC assumption that healthcare experience is vital?

I believe the unique challenges of healthcare have largely been exaggerated, resulting in an overemphasis on the value of experience.

In fact, I argue that it can potentially be a disadvantage to have too much prior healthcare experience. When entrepreneurs from one

industry bring their ideas and methodologies to a new sector, they often spark new innovations because of their unconventional approach. History has shown that this transitional tactic can create a strong competitive advantage, with examples ranging from Nike using automotive shock-absorbing technologies in their footwear to aerospace companies mimicking the wing profiles of birds.¹⁰ A recent example in healthcare IT is the application of jet engine failure algorithms to predict cardiac health.¹¹

I suggest that healthcare insiders are not developing these innovations as frequently as outsiders because of their unconscious assumptions about the status quo. Studying the history of the U.S. healthcare system, one can see the "level of thinking" that has created today's problems. Every change made to public policy, every new benefit added, and every political maneuver has simply been a reactionary "Band-Aid" addressing a specific problem at the time. The result is an inefficient system, lacking an integrative design. People who spend their careers becoming proficient at navigating the minutia of healthcare standards and regulations might find it challenging to conceive of a radically different world.

In this research, 93% ($n = 13$) of the successful healthcare IT entrepreneurs founded a company in an area outside their expertise and 71% ($n = 10$) had no healthcare experience, which supports my theory that **prior healthcare experience may be a hindrance**. People who have spent a lifetime in any system become blinded to alternatives by their own patterns and experience, and have difficulty challenging assumptions that are so deeply ingrained that they are no longer conscious thoughts. **One cannot think outside the proverbial box, if the box is all one knows.**¹²

⁸ Donald F. Lee III, "What It Takes to Be a Successful Healthcare Entrepreneur," *Algonquin Studios* (blog), 6 May 2015, <http://blog.algonquinstudios.com/2015/05/06/what-it-takes-to-be-a-successful-healthcare-entrepreneur/>; Nat Turner, "Why Aren't There More Traditional Tech Entrepreneurs in Healthcare?" *NatSTurner.com* (blog), 2011, <http://www.natsturner.com/post/23138977178>.

⁹ For example, the question regarding prior healthcare experience had a yes/no answer, so a binomial distribution was used (computing the upper and lower limits via the probability mass function). With a 90% confidence interval, the upper and lower bounds are calculated to be 87% and 51%, respectively. In other words, even with only 14 data points, because of the one-sided nature of their outcomes, it can be stated with 90% statistical confidence that the majority of successful healthcare IT entrepreneurs did not have any prior healthcare experience.

¹⁰ Ellen Enkel and Oliver Gassmann, "Creative Imitation: Exploring the Case of Cross-Industry Innovation," *R&D Management* 40, no. 3 (2010), doi: 10.1111/j.1467-9310.2010.00591.x.

¹¹ Garrett Reim, "PhysIQ Raises \$4.6 Million to Monitor Human Health with Predictive Analytics," *Built In Chicago*, 28 July 2014, para. 4, <http://www.builtinchicago.org/2014/07/28/physiq-raises-46-million-monitor-human-health-predictive-analytics>.

¹² George Dvorsky, "The 12 Cognitive Biases that Prevent You from Being Rational," *io9*, 9 January 2013, <http://io9.com/5974468/the-most-common-cognitive-biases-that-prevent-you-from-being-rational>.

Entrepreneurs who come to healthcare IT from the software world are accustomed to an environment where anything is possible—the beauty of software is that virtually any product can be built if given enough time.¹³ This completely fungible and also limitless potential can rapidly affect an entrepreneur’s worldview and may increase ambition for attacking large problems like healthcare that others wouldn’t dare to touch.¹⁴

For Healthcare IT Success, the Revenue Model Must Be Ironclad

A story from World War II offers a very relevant lesson for healthcare IT innovation. Airplanes often returned from battle riddled with bullet holes, and the natural response of the mechanics was to improve the armor in those areas and send the planes back into service. After a while, an observant mechanic noticed that most of the bullet holes were concentrated in relatively unimportant areas, and he wondered if these minor repairs were the best use of material. He concluded that **the areas without damage were actually the most critical and needed the most armor**—a single bullet there must be a fatal blow, since planes with damage in those areas did not return. When they applied armor in this seemingly counterintuitive way, the survival rate of the planes dramatically increased (**figure 4**).¹⁵

Analogously, investors are constantly assessing their “fleet” of investment companies for weaknesses. Here a “bullet hole” is a flaw in the company, which could occur in operations, strategy, management, or another area. Many companies crash and burn because of these faults, while a few come back safely in the form of a successful exit. Investors learn from those experiences and apply “armor” by spending extra

time on diligence in select areas they identify as needing to be robust and “bullet-proof.”

However, the WWII story demonstrates that the goal should be for VCs to spend time and resources applying defenses in the most fatal areas. Traditional venture funds have been applying “armor” to the domain-experience criterion, making sure that their healthcare entrepreneurs have prior industry experience. The results of this study show that **lack of healthcare experience is an easily survivable bullet hole, while a lack of startup experience is a more serious but not completely fatal flaw**. However, the ability to find paying customers and figure out the revenue model in healthcare was a unanimous trait among these 14 entrepreneurs: **there were no surviving “aircraft” with a bullet hole in their revenue model**. This finding suggests that a flaw in the revenue model is a fatal blow to the viability of a company in the complex airspace of healthcare IT.

Opening the Doors to Outsiders in Healthcare IT Innovation

The results of this study have implications for three main stakeholder groups who are exploring healthcare IT products and services in some



Figure 4. Grumman F6F-3 Hellcat with over 200 bullet holes, circa 1943.¹⁶

¹³ Steve Denning, “Why Software Is Eating the World,” *Forbes*, 11 April 2014, <http://www.forbes.com/sites/stevedenning/2014/04/11/why-software-is-eating-the-world/>.

¹⁴ Diana Ransom, “Why Steve Case Says Future Entrepreneurs Will Need Greater Support,” *Inc.*, 4 May 2015, <http://www.inc.com/diana-ransom/why-itll-take-a-village-to-startup.html>.

¹⁵ Annie Tête, “SciTech Tuesday: Abraham Wald, Seeing the Unseen,” *The National World War II Museum*, 13 November 2012, <http://www.nww2m.com/2012/11/scitech-tuesday-abraham-wald-seeing-the-unseen/>.

¹⁶ Extensive research was unable to determine the photographer’s name or the rights holder for the picture. As the image is used widely across the Internet, the photograph is used here as part of the common domain.

way or another: VCs, traditional healthcare companies, and healthcare entrepreneurs.

Importantly, these findings strongly suggest that **VCs should not immediately rule out entrepreneurs because of a lack of healthcare experience.**

VCs have essentially been fishing in the top right sector of the experience box in [figure 1](#), when the data show that most of the fish are on the bottom (i.e., have little or no healthcare experience). Investors should also view the startup team holistically, and recognize both the strengths of an outside technical background and the potentially game-changing perspective outsiders bring to healthcare problems. If the VC's concern is operational risk, one simple answer is that **healthcare expertise can be imported to the team** in the form of a chief medical officer or regulatory consultant.

Secondly, traditional healthcare companies or systems looking for innovation might consider opening the door to non-traditional (i.e., outside) candidates. For example, a big medical device company might have entrepreneurs in residence or internal R&D teams that need an infusion of new ideas. Rather than seeking new people with 20 years in healthcare, they might consider hiring people from software startups with little to no healthcare experience, who have other valuable perspectives and enjoy new challenges.

Finally, **entrepreneurs should not shy away from tackling healthcare problems because of a lack of healthcare experience.** Clearly, some entrepreneurs have not been discouraged by naysayers, and my father is a great example of one who persevered and succeeded. Hopefully

his personal story, combined with these research findings, provides encouragement to entrepreneurs who might have been on the fence about pursuing an opportunity as a healthcare outsider.

If these three groups do expand their set of considerations, I believe the long-term implications will be very positive for society. A greater quantity and quality of innovations will be funded and tested. The pace of disruption in healthcare will be expedited—which is badly needed given the systemic problems. We will all benefit from improved health outcomes, affordability of healthcare, and overall quality of life.



Matt Otterstatter

Matt is a partner at Vilicus Ventures, an early-stage VC firm based in Minneapolis, MN. He has no experience

in healthcare, although he invests in entrepreneurs seeking to disrupt it. Prior to cofounding Vilicus, Matt was a program manager and senior engineer of rocket propulsion systems at Aerojet Rocketdyne in California. He's a big nerd with a big heart. Matt has launched a nonprofit for Minnesota entrepreneurs called Accel.MN, which leverages the Kauffman Fellows model of a trusted cohort in a setting applied to collaboration among founders. Matt is also a Techstars mentor across multiple programs and serves on the board of universities advising their entrepreneurial curriculum. He and his wife have 3 boys who love LEGOs. Kauffman Fellow Class 18.

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