Medical Devices
Remote Patient Monitoring

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Executive Summary

Key Patents

Assignee	Patent/Application	Title	Reason
Masimo Corp	US9872623B2	Arm mountable portable patient monitor	Highest citation count - 197
Deka Prods Partnerships	US20200306446A1	Patch-sized fluid delivery systems and methods	Largest family 314
Cercacor Lab	US20190142283A1	Handheld processing device including medical applications for minimally invasive and non-invasive measurements	Highest citation count for “wearable” tech - 100
Rite Aid HDQTRS	US20180158555A1	Medical Kiosk and method of use	Highest citation count for “mobile app” - 30

Market Analysis

Application Trend

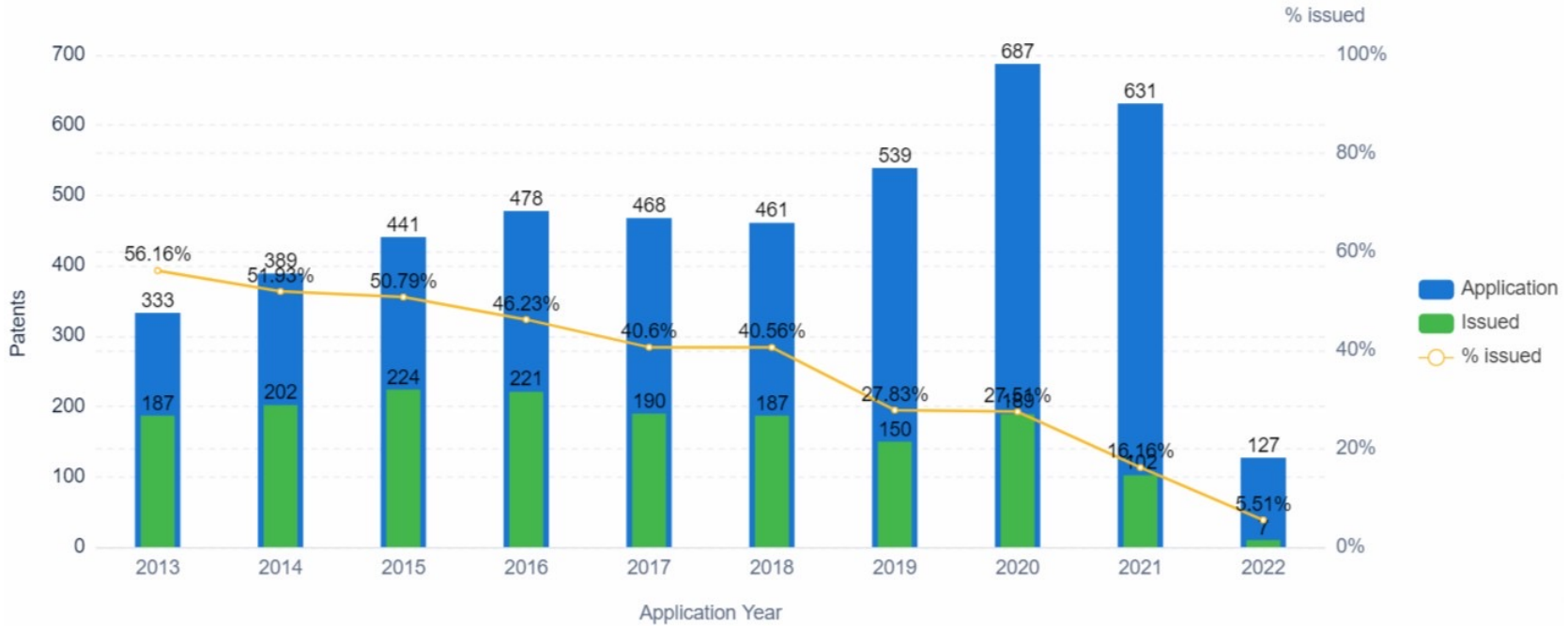

Figure 1: This graph displays the application rate over time. The blue bar is the number of applications and the green bar represents the number of applications granted in that year. It should be noted that the due to the delay in granting patents and publishing applications, the last few years do not contain all the possible data.

As an indicator of innovation, we are using the application rate to determine the increase in novel technologies related to remote patient monitoring (RPM). We notice that while **the average growth of application is 9% per year**, the grant rate is continuing to decrease. In 2013, 56% of patents were granted; in comparison, only 40% of patents were granted in 2018. This could suggest that the market is maturing; however, other indicators like (1) legal status and (2) numbers of assignees might suggest otherwise.

1) The ratio of applicants has changed between 2013 – 2021. In 2013, there were 333 applications to 317 assignees, and in 2021, there were 631 applications to 1,009 assignees. The market has become much more competitive potentially to do to the increased consumer demand. In a maturing market, we tend to see the reverse effect where the number of assignees begins to consolidate under larger organizations.
2) When considering figure 2, we notice that **Pending** is the most common legal status assigned to remote health care monitoring, suggesting that the grant rate can still drastically increase as these patents go through the examination process.

Market Analysis

Application Trend

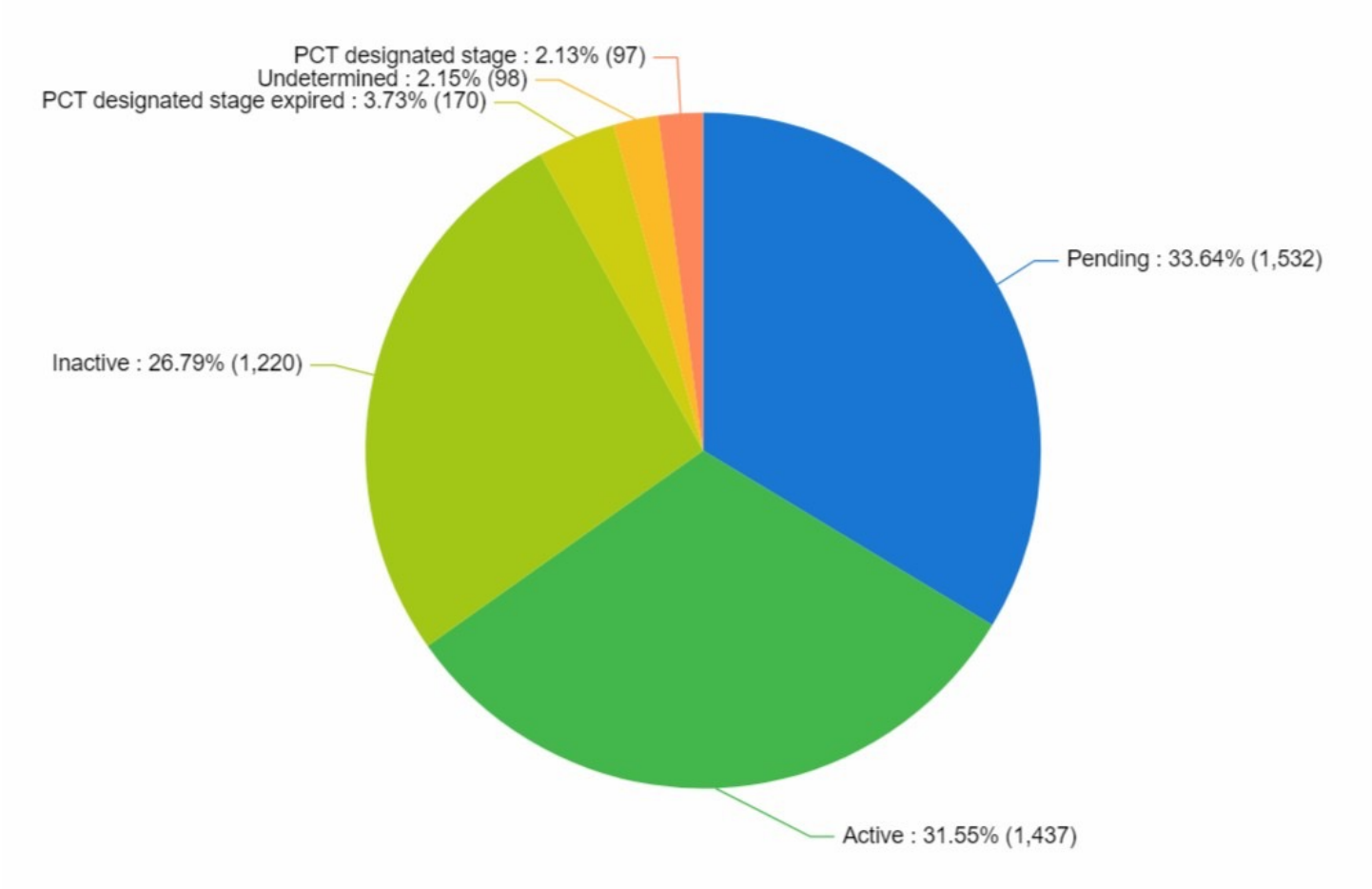

Figure 2: This graph displays the state of legal status for each patent. "PCT designated state" and "PCT designated stage expired" are in relation to applications filed to the World Intellectual Patent Office (WIPO) via the Patent Cooperation Treaty (PCT.)

Market Analysis

Geographic Distribution

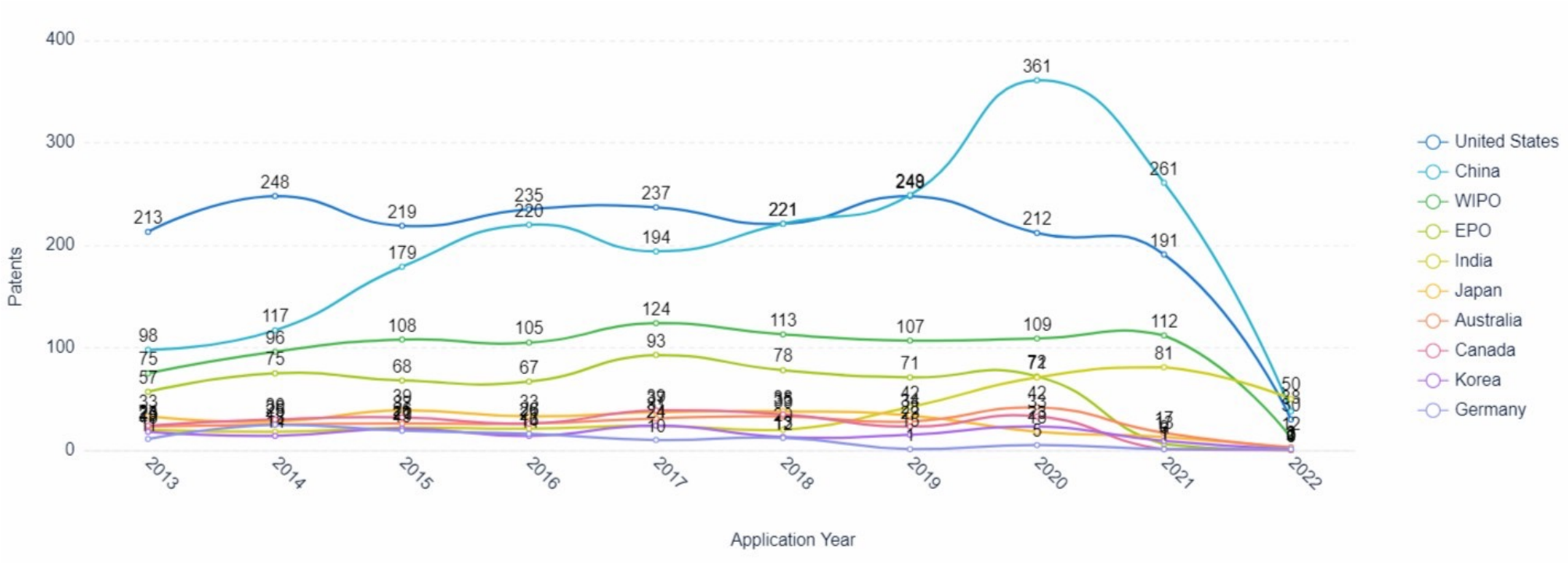

Figure 3: This graph displays the application count vs the year for the top 10 jurisdictions.

Innovations associated to remote patient monitoring are mainly being filed in the United States, China, Europe, India, Japan, Australia, and Canada.

Initially, China seems like the most interesting market because, in 2020, it surpassed the US with 361 patents filed. However, when we look at China more analytically, the top assignees tend to be either American companies like Medtronic and Phillips or Chinese universities. Furthermore, Figure 4 displays that most innovations filed within China are not being filed in any other jurisdiction. This suggests that innovation coming out of China is not being commercialized globally, and so it might be difficult to enter the Chinese market as a small- to mid-sized organization.

Market Analysis

Geographic Distribution

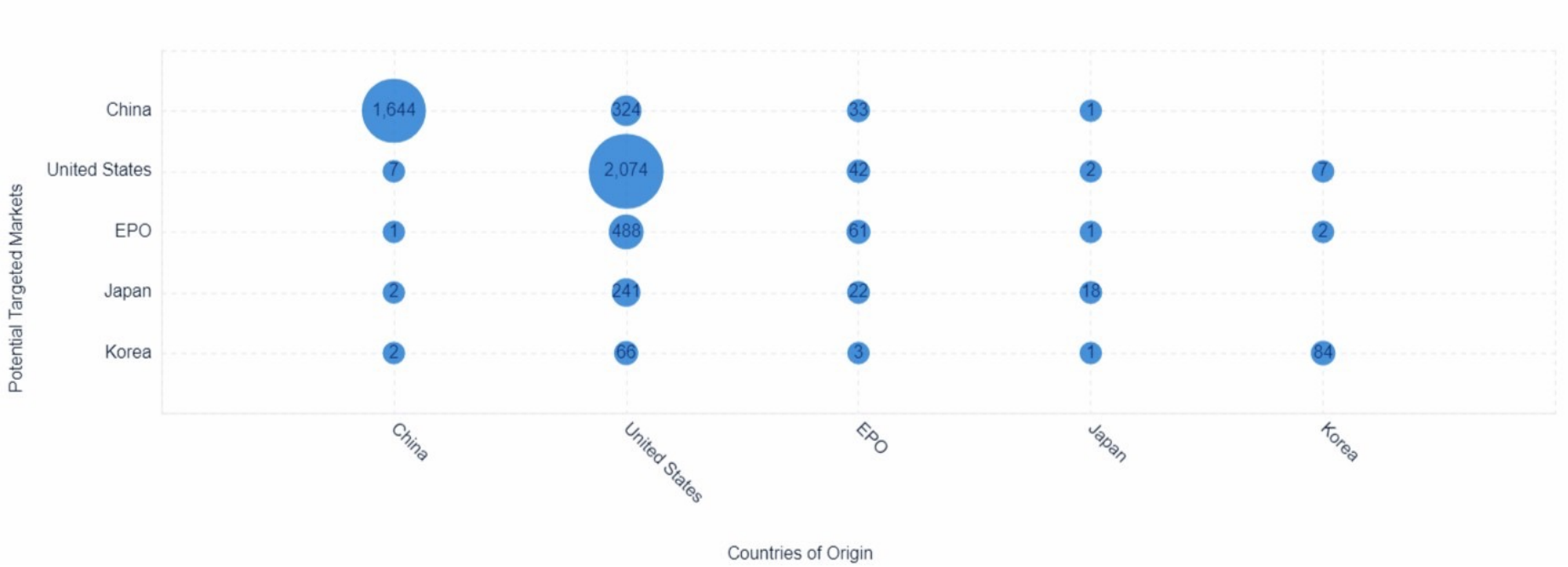

Figure 4: The x-axis displays which jurisdictions the patent applications were initially filed in and the y-axis plots which jurisdictions the applications the simple family was extended to. This graph helps indicate whether organizations are typically protecting their invention in their own market or extending this to more profitable markets elsewhere.

When we dissect this data further by active and/or inactive patents, we notice a change in top jurisdictions — most notably, India falls off the list and is no longer considered within the top 10 jurisdictions. In comparison, there is no significant change between the other top countries. What makes this interesting is when we consider just pending patents. In Figure 5, both China and the United States remain the top filers, but in the last few years, India has begun to close the gap. Over 220 patents are currently pending in India, and these applications tend to be primarily filed by individual doctors and inventors. While these assignees are not necessarily a commercial threat, they do indicate India is an innovative leader in remote patient monitoring and a possible partnership.

Market Analysis

Geographic Distribution

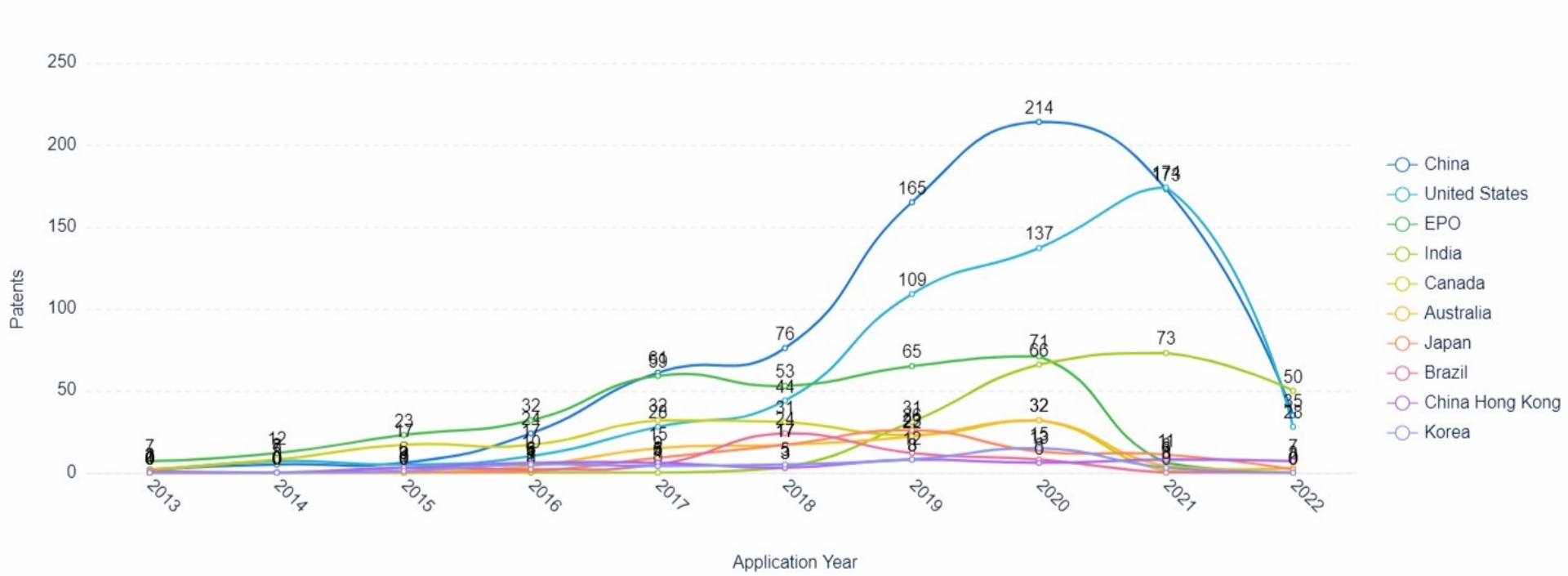

Figure 5: This graph displays the application count vs the year for the top 10 jurisdictions, specifically for pending patents.

Market Analysis

News and VC Investment

Based upon the application and geographic patent trends, innovation within remote patient monitoring is continuing to increase. This analysis is affirmed by the news trends, VC investments, and market reports. Market growth (specifically, within the telehealth consulting market) as published by research and markets is expected to increase at **20% CAGR,** growing from **48.25 billion USD in 2019 to 181.21 billion USD in 2026**. This is not contained to just telehealth consulting, as smaller markets, such as wearable medical devices (which have an estimated size of 6.85 billion USD in 2026), are estimated to increase by 20% CAGR.

The two main questions are: What is driving this growth? And will it remain?

A keyword analysis of news articles indicates that “pandemic” is one of the most used words when discussing remote patient monitoring. During the COVID-19 pandemic, patients’ access to healthcare was limited and there arose a need for remote solutions. However, with the pandemic winding down, will the remote patient monitoring market see a downturn like e-commerce and online deliveries did?

Based on a recent KLAS Research Report, this is not necessarily the case. Healthcare organizations are thriving with their remote patient monitoring programs. In-person admissions have decreased by 38%, which reduced operating costs and patient wait times, and patient satisfaction has increased by 25%. Furthermore, with an aging population in North America, growth in RPM is expected to continue.

Finally, VC investment corresponds with the innovation and market trends found on Patsnap Discovery. VC funding has increased from 200 million USD in 2017 to just under 3 billion USD in 2021. Notably, Blackstone Accelerates Growth funded Medable for 304 million USD in 2021 so they can remotely collect heart rate and sleep data in order to support clinical trial research.

Market Analysis

Top Assignees

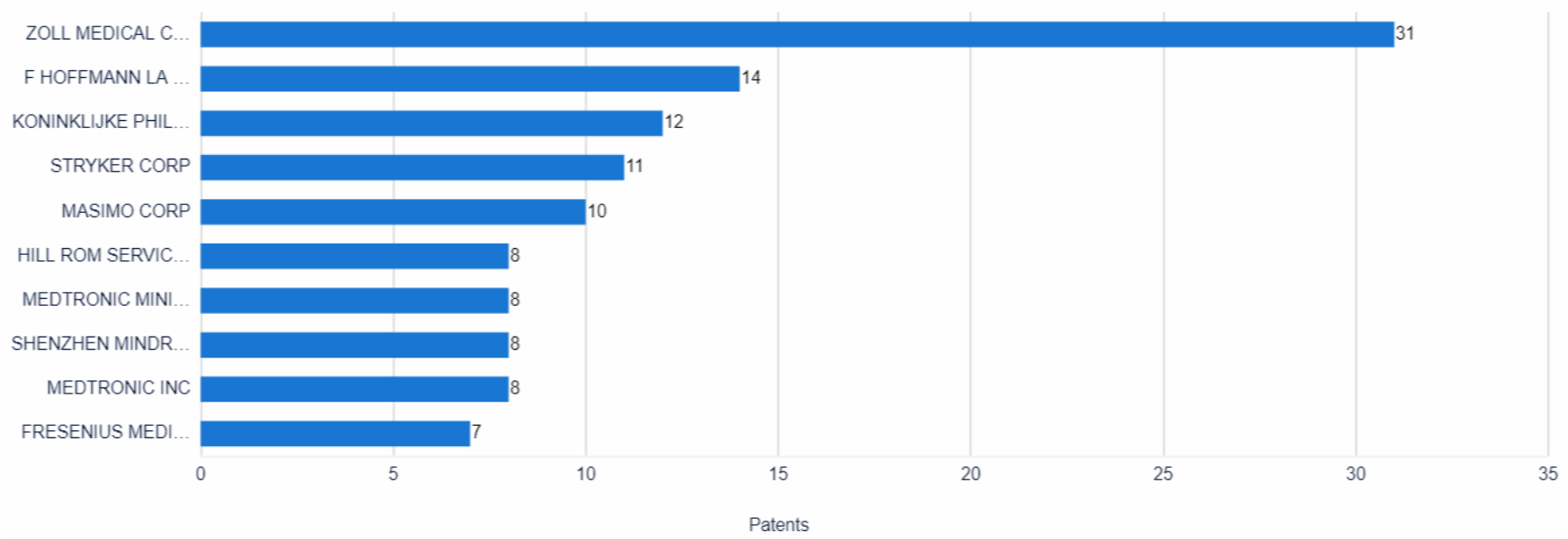

Figure 6: This figure displays the top 10 companies with pending patents in remote patient monitoring.

Back in Figure 1, we saw that the grant rate in this industry was decreasing. That didn't necessarily mean that innovation was stagnating, simply that many patents were still in the pending examination. In Figure 6, we are looking at the top 10 companies with pending patents and we have landscaped the top five below in Figure 7.

Stryker Corporation has a focus on patient support apparatus and remote consultation. Patent US20210298682A1 "*Patient support apparatus with patient information sensors*" is an example of a support apparatus that Stryker is innovating in to record and log patients' sleep data.

Zoll Medical seems to be investing in wearable devices US20190282821A1 "*Wearable medical device for continuous heart monitoring with intermittent additional signal data provided via one or more touch-sensitive electrodes".* Many of these devices seem to focus on monitoring heart function through electrocardiogram (ECG).

Finally, Roche is testing the progression of symptoms associated with muscular disability. They currently have many patents, such as EP3987538A1 *"Digital biomarker"*, which utilizes a mobile application to receive patient data.

Market Analysis

Top Assignees

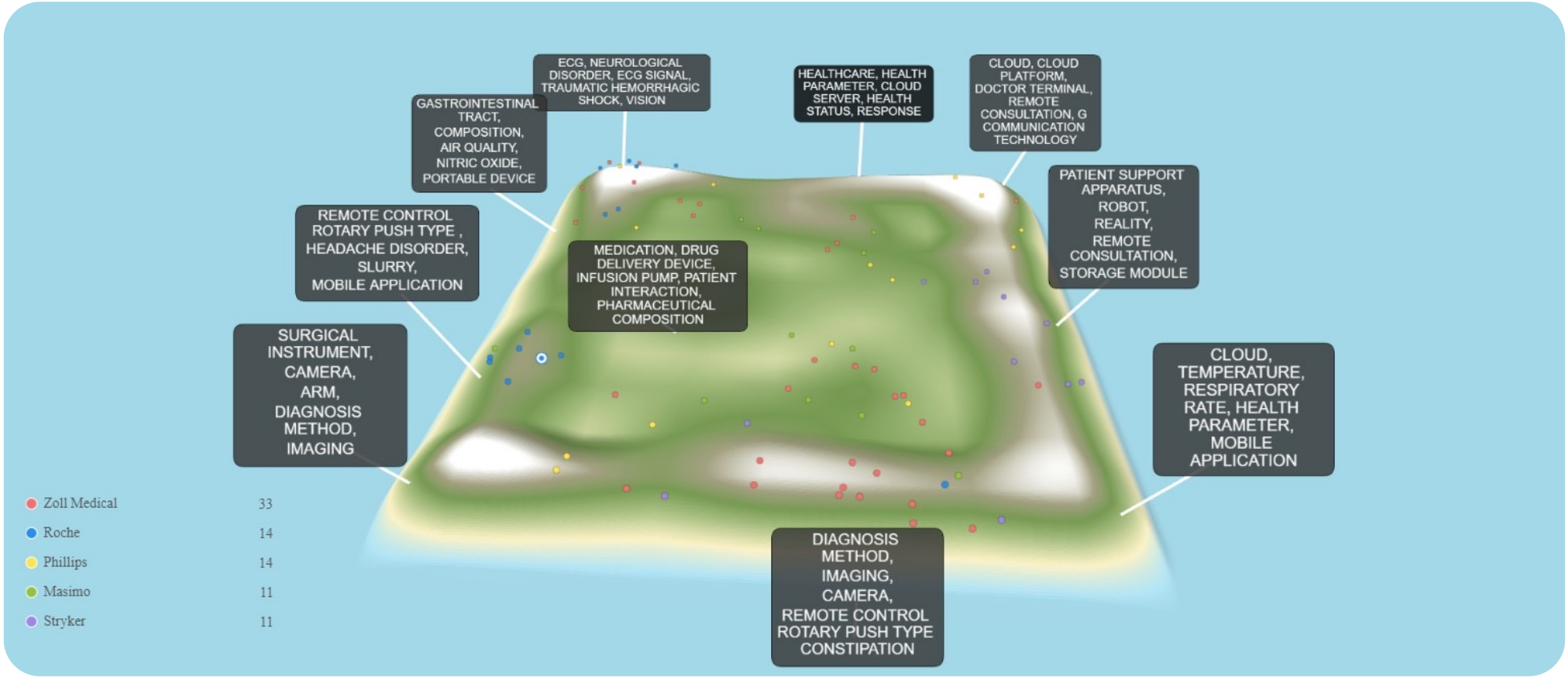

Figure 7: This figure displays a patent landscape of the dataset we obtained on remote patient monitoring. Patents are clustered together based upon IPC codes. Areas coloured white have high patent density and areas coloured blue or brown have low patent density. Plotted on this graph is the top five patent filers in this industry. They are coloured as follows: Red is Zoll Medical, blue is Roche, yellow is Phillips, Green is Masimo, and purple is Stryker.

Conclusion

Remote patient monitoring is a growing industry brought on by the ubiquity of personal devices, aging population, and the COVID-19 pandemic. Indicators such as increasing patent applications, number of assignees, and continued investment in the technology support the assumption that this remote patient monitoring has not yet reached market maturity.

It should be noted that large multinational organizations are already creating intellectual property (IP) in the space, but no litigation has been observed yet and the number of assignees continues to increase. This suggests there is still plenty of whitespace in which to develop new technologies and gain a monopoly within the industry.

Disruptive business-to-consumer technology, such as mobile apps, wearable diagnostic equipment, and tele consulting services, continue to have innovations published, resulting in 60% of patents as pending. If looking to invest in this technology, businesses should continue to monitor the IP space in order to ensure they have freedom to operate as these new patents become publicly available.

Connecting the dots so you can innovate better

Founded in 2007, PatSnap is the company behind the world's leading Connected Innovation Intelligence platform. PatSnap is used by more than 10,000 customers in over 50 countries around the world to access market, technology, and competitive intelligence as well as patent insights needed to take products from ideation to commercialization. Customers are innovators across multiple industry sectors, including Biotechnology, Medical devices, Pharmaceuticals, Chemical, Electronics Manufacturing, Automotive, Consumer Goods, Aviation & Aerospace, Education, and Legal Firms.

PatSnap's team of 1,000+ employees work from its global headquarters in Singapore, London, and Toronto. To learn more about how PatSnap is improving the way companies innovate, visit **www.patsnap.com.**

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