

How Common Are Digital Wrap-Around Product Tie-Ins With FDA-Approved New Market Entrants?

Navaratnam P,^{1,2} Friedman H,² Navaratnam A²

¹DataMed Solutions LLC., New York, NY, USA; ²Sygeny Ltd, Helsinki, Finland

INTRODUCTION

- Digital health is a broad category of technology that includes mobile health (mHealth), health information technology (IT), wearable devices, telehealth and telemedicine, and personalized medicine.¹
- Advocates have positioned that investments in digital health can result in increased efficiencies (with corresponding reductions in costs and improvements in outcomes), improved access, quality and enhanced personalization of medicine.
- Interest among the pharmaceutical industry to promote digital wrap-arounds in tandem with new product introductions in order to optimize patient adherence, monitoring and health outcomes.

OBJECTIVE

- To better understand the current utilization of digital wrap-around products among FDA approved novel new market entrants.

METHODS

Overview:

- A systematic review of recent novel product approved by the FDA in 2016 and the presence of digital wrap-arounds associated with these product introductions was conducted.
- Digital wrap-arounds were defined as any digitally-based mechanism such as a web-enabled device; platform or mobile application intended to improve patient outcomes, adherence, and treatment costs through enhanced monitoring, education, support and/or a feedback loop to providers. Patient-centric support mechanisms such as dedicated call-lines, care coordinators and patient-friendly websites are not digital wrap-arounds.
- The literature review consisted of an exploration of the scientific and medical literature (PubMed); product package inserts; and lay media sources (Internet, trade journals, tech websites, etc.) to determine if there were any mentions of a digital wrap-around that was scientifically tested or promoted concurrently with new product approvals.
- Key words and phrases using terms such as 'mhealth', 'ehealth', 'digital health technology', 'wraparound', 'wrap-around', etc., along with generic names of the drugs was utilized in these searches. All searches were performed in the English language where the time frame of the PubMed search was January 1, 2011 to December 10, 2016.
- For each drug, information was captured regarding whether there was information about the presence of a digital health wrap-around as well as specifically if there was a web-based platform, mobile application, or patient self-monitoring device-enabled platform. Additionally, it was identified if the service was complimentary, a paid service or unstated.

Data analysis

- Analysis was descriptive, with raw numbers calculated for the number of records identified in the searches and time trends identified.
- All analysis and graphics developed using Microsoft Excel 2016.

RESULTS

- The phrases e-health (10,352 records) and m-health (10,201 records) were found in over 10,000 records in PubMed between 2011 and 2016.
- There was an increase in the number of records found in PubMed using the keywords 'e-health' or 'm-health' during the time period of interest 2011 to 2016 (Figure 1).
- Expanding the search of digitally related terms, we identified that the most common PubMed terms in the search period were 'digital' and 'mobile' while terms such as 'wraparound,' 'wrap-around', 'connected devices' and 'digital health technology' were far less common (Figure 2).
- PubMed search total for the time period January 2011 to December 2016 identified substantial records for the drugs of interest but no results when the PubMed search for the drug of interest was combined with search terms related to digital health including "ehealth", "mhealth", "digital health technology", "wraparound", and "wrap-around". (See Table 1)
- Of the product approvals examined, only 2 were for diagnostics while the other 17 were for drugs.
- Nearly 80% of the approvals were for chronic conditions compared to roughly 20% for acute conditions (Figure 3)
- The most common therapeutic area of the 2016 novel FDA approvals was for products in Oncology, followed by Infectious Diseases (Figure 4)
- Of the 19 new and novel product approvals that were identified from the FDA website between January 1st, 2016 and December 10th, 2016 (www.fda.gov), we found that there were no records in the PubMed search with specifically designed digital wrap-arounds associated with these recently approved novel compounds that enhanced patient adherence, monitoring and outcomes over time.
- Online searches had identified other patient support mechanisms including patient support portals, online and call lines for support, and downloadable resources including printable tracking.
- One drug of interest, Zepatier[®] (elbasvir and grazoprevir), was reported in December 2016 to have "a patient support portal called C Ahead Patient Support Program, where there are e-mail contact support services and reminders, a mobile app to track treatment and text based reminders". This package of services met our definition of a digital health wraparound. As of April 2017, patient support tools for Zepatier are found through The Merck Access Program located at <http://www.merckaccessprogram.com/> and not through a stand-alone C Ahead Patient Support Program.

Table 1: PubMed Results Search Results (January 2011–December 2016)

	Total PubMed records	Drug + any of the digital items (mhealth, ehealth, "digital health technology", wraparound, wrap-around)
daclizumab	259	No records found
lixisenatide	167	No records found
venetoclax	159	No records found
ixekizumab	123	No records found
"obeticholic acid"	98	No records found
atezolizumab	98	No records found
brivaracetam	82	No records found
defibrotide	65	No records found
pimavanserin	57	No records found
reslizumab	54	No records found
"sofosbuvir and velpatasvir"	42	No records found
fluciclovine	21	No records found
etepirsin	17	No records found
bezlotoxumab	12	No records found
"elbasvir and grazoprevir"	9	No records found
olaratumab	8	No records found
obilttoximab	8	No records found
"gallium dotatate"	6	No records found
"lifitegrast ophthalmic solution"	5	No records found

Figure 1. PubMed Record Count of "Ehealth" and "Mhealth" Over Time

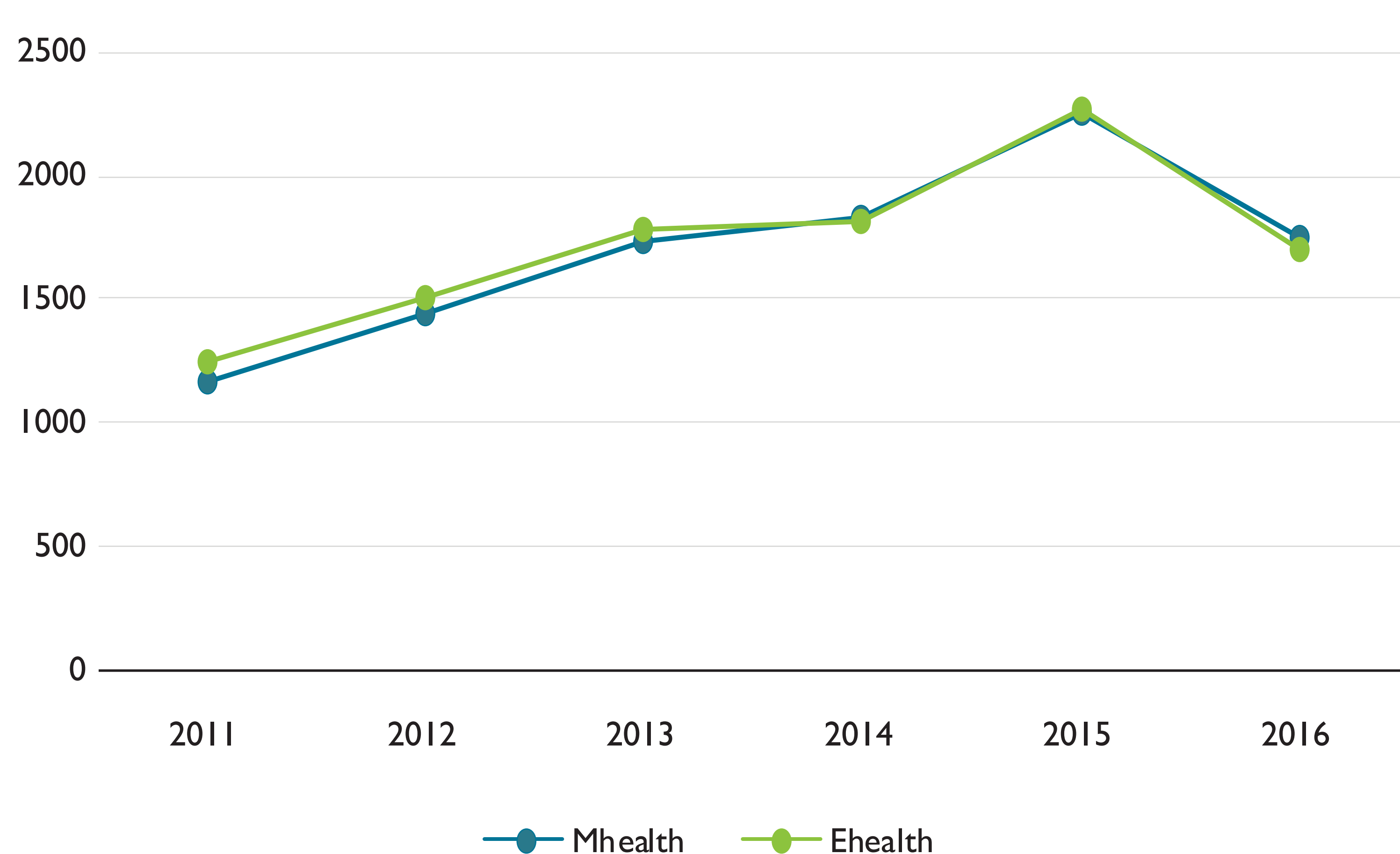


Figure 2. PubMed Record Count Jan 2011–Dec 2016 for Specific Terms Related to Digital Technology

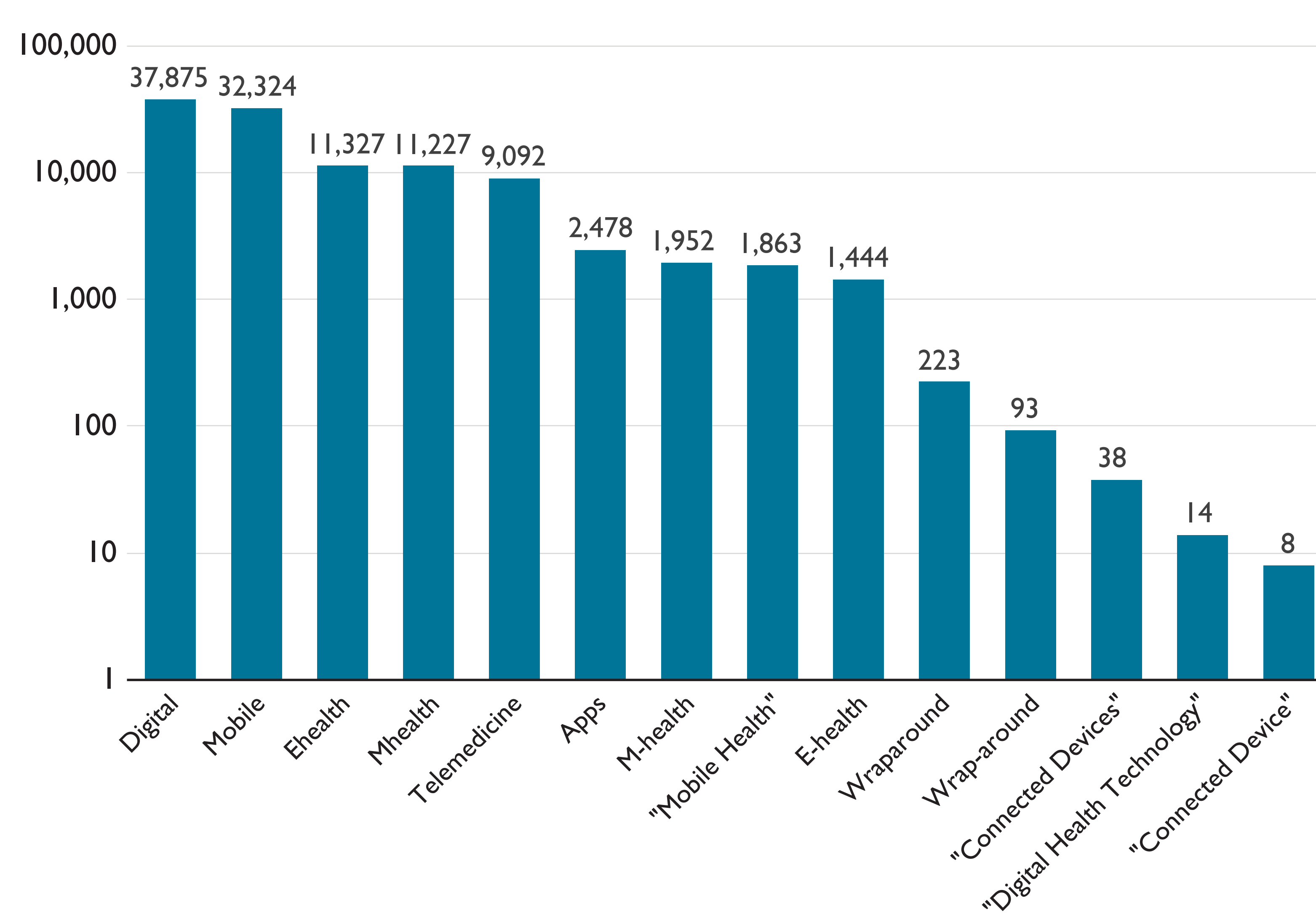


Figure 3. Distribution of Condition (Chronic Versus Acute) of Approvals

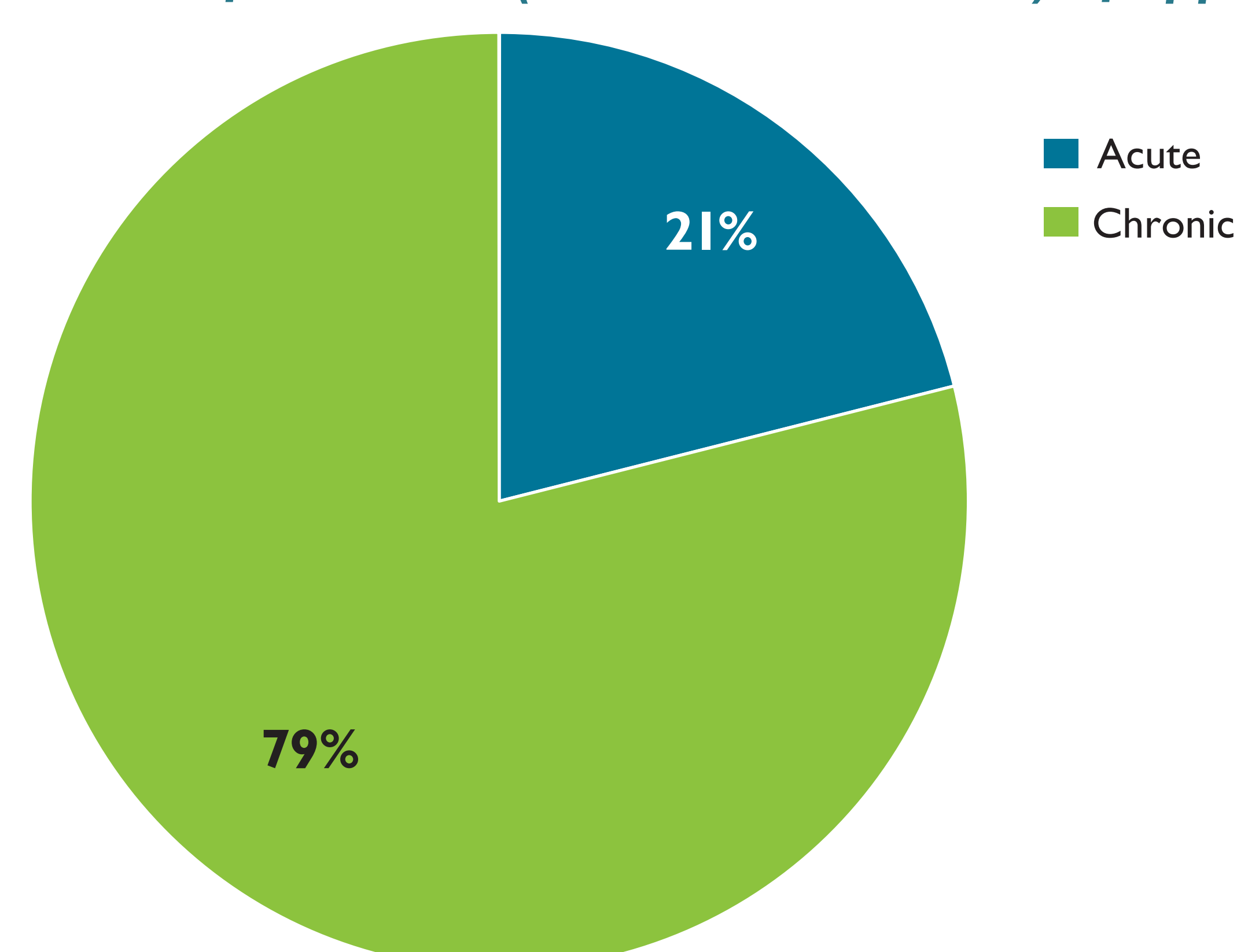
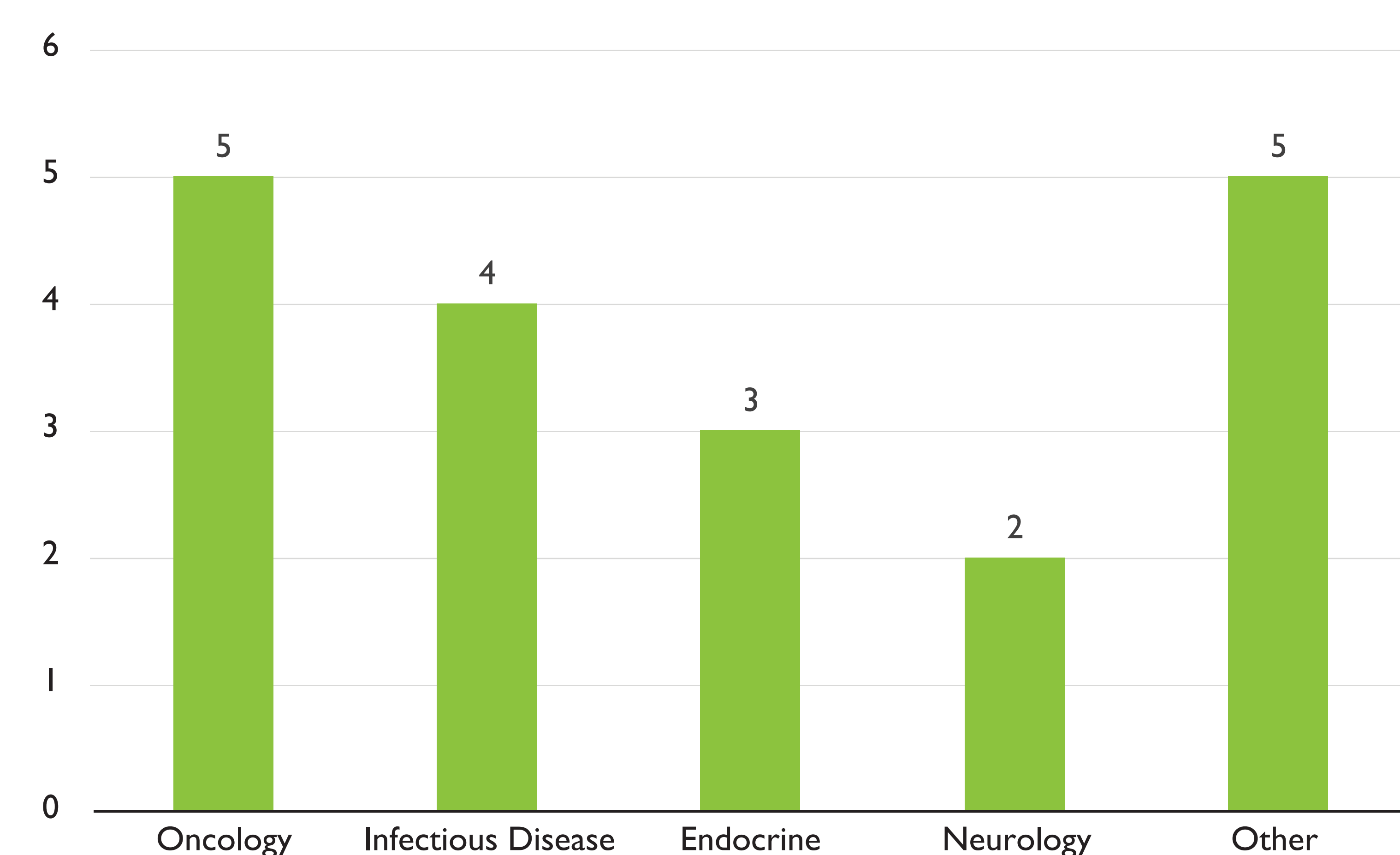


Figure 4. Distribution of Therapeutic Areas of Approvals



DISCUSSION

- The lack of peer-review published studies and real-world implementations of digital wrap-arounds for FDA new market entrants indicates that the pharmaceutical industry is still at the very early stages of incorporating digital wrap-around products associated with the marketing of novel drug products. These results are surprising in spite of the substantial published literature and mass media information on the subject of digital health technologies.
- In general, the pharmaceutical industry is exploring three key types of digital solutions:
 - Connected devices:** Investment in a connected device that can augment the use of their target product. Examples are:
 - Collaboration with Propeller Health to deploy smart inhalers to be used with target respiratory products.
 - Collaboration of injectable diabetic product pharmaceutical manufacturers with Joslin to deploy smart insulin pens and caps to augment and track drug delivery in diabetes.
 - Services:** Investment in patient engagement, disease management, and adherence monitoring web- or mobile enabled platforms 'bundled' with their products to improve patient knowledge, patient self-empowerment and improved medication use behaviors.
 - Digital medicine:** Investment in a single product that has both an active drug as well as a built-in digital health component designed to augment the effect of the drug directly or indirectly. An example is the collaboration between Otsuka Pharmaceuticals and Proteus Health on a digitally enhanced Abilify[®] that allows for concomitant adherence monitoring in 'real time'.
- Pharmaceutical companies are engaging with digital health providers in different ways including:
 - Working with established digital health companies in a collaborative fashion
 - Starting/funding incubators to attract new start digital companies to innovate in this area
 - Partnering with academia to jointly develop their own wraparounds
 - Acquiring digital health companies

LIMITATIONS

- As with any database search, the selection of key words can influence the results. In this case we sought to minimize the impact of this limitation by including searches that had spelling variations as well as multiple databases including PubMed, online searches, etc.
- This study looked at a snapshot in time (2016) and these findings may not reflect the current status of the use of digital wraparounds.
- This study only evaluated novel 2016 FDA approvals and not all the products approved in 2016.

CONCLUSIONS

- A review of recent novel product approvals by the FDA revealed that there were no digital wraparounds associated with these product introductions into the market, even though there were products that had a natural fit with, and could have benefited from a digital health wraparound.
- While there appears to be a commitment by some pharmaceutical companies to plan and develop digital wraparounds to augment their products, it is clear that this effort is still at a very early stage.

REFERENCES

- U.S. Food and Drug Administration <https://www.fda.gov/medicaldevices/digitalhealth/http://professional.diabetes.org/slidelibrary/standard-medical-care-diabetes-2017>

FUNDING

- This research was sponsored by funds from Sygeny Ltd, Helsinki, Finland.

DISCLOSURES

- A Navaratnam, P. Navaratnam, and H.S. Friedman are senior partners at Sygeny Ltd. P. Navaratnam, and H.S. Friedman are senior partners at DataMed Solutions.