

Biotechnology

Antibiotic and Antifungal Update: August 2020

Developments since our last update on the space include positive results from Phase 3 trials of ibrexafungerp by Scynexis (SCYX BUY), Exblifep by Allegra, and SER-109 by Seres. Other events included mixed results from two more Phase 3 trials of sulopenem by Iterum, a disruption of the Xenleta launch by COVID-19 that led Nabriva (NBRV HOLD) to change its sales force, and the sale of Tetrphase to La Jolla. With respect to policy, legislation is being drafted that provides post-approval funding to industry (PASTEUR bill), but we believe this may not necessarily benefit investors and patients. We continue to believe reimbursement reform in the hospital setting (DISARM bill) and more frequent medical society guideline updates are prerequisites for a turnaround in the space. Most global Pharma companies announced participation in the \$1B AMR Action Fund in July 2020 to support R&D at smaller companies. Although the announcement had minimal impact on stock prices in the space, we believe the new fund serves as evidence of Pharma commitment to infectious diseases and may persuade the U.S. to pass supportive legislation.

- **Antibiotic and Antifungal Sales Patterns:** Branded antibiotic and antifungal sales data are shown in Table 1 and Figures 1 and 2. In some cases, there is evidence of a spike in sales in March. On the other hand, every drug experienced a decline in sales from March to April, exceeding what was seen during the same period in 2019. Our Iqvia data reflect supply, not demand, and therefore increases in March may reflect stockpiling, followed by a decline in inventory the subsequent month.
- **Antibiotic Launches and Regulatory Decisions:** Nabriva terminated its hospital sales force in April due to COVID-19 and announced plans in July to hire a contract sales force focused on the community. The company also recently reached an agreement with Merck to market Sivextro in the U.S. A relaunch is planned for September. We believe the strategic decisions are appropriate, but remain concerned by the financial constraints the company is facing. The FDA issued a Complete Response Letter for Contepo due to an inability to conduct a facility inspection in Europe because of COVID-19. Shionogi launched Fetroja in February and announced an sNDA filing in HABP/VABP (PDUFA 9/27/20). Merck launched Recarbrio in January and announced FDA label expansion to HABP/VABP in June.
- **Antibiotic Phase 3 Updates:** All Iterum Phase 3 trials narrowly missed primary non-inferiority endpoints, but did establish superiority of oral sulopenem over ciprofloxacin in uUTI patients with ciprofloxacin-resistant infections. Discussions with FDA are planned. Seres recently announced the Phase 3 ECOSPOR III trial met the primary endpoint of reduction in *C. difficile* infection recurrence at 8 weeks (41.3% vs. 11.1%). Spero may have oral tebipenem Phase 3 ADAPT-PO results in cUTI in 3Q20. Basilea (ERADICATE), Contrafect (DISRUPT), Entasis (ATTACK), Summit, and Venatorx may have Phase 3 results in 2021. Qpex has not yet advanced its broad spectrum IV/oral beta-lactamase inhibitors into Phase 3.
- **Antifungal R&D Updates:** Scynexis announced positive results from Phase 3 trials of ibrexafungerp in acute Vulvovaginal Candidiasis and plans to submit an NDA in 4Q20. We believe there is a substantial disconnect between valuation and near-term revenue opportunity. Cidara (BUY) initiated the Phase 3 RESPECT prophylaxis trial in transplant patients in May. We expect a positive outcome from the Phase 3 RESTORE treatment trial, which is already underway, in 2021. Amplyx announced encouraging data from a Phase 2 trial of fosmanogepix in Invasive *Candida* infections in June and results from a Phase 2 *Aspergillus* trial may be available YE20. F2G continues to enroll patients with a variety of rare/ resistant mold infections in a Phase 2 trial, with impressive responses to

RELEVANT DISCLOSURES BEGIN ON PAGE 9 OF THIS REPORT.

Topic of Discussion

Update on the Antibiotic and Antifungal Landscape with Prescription and Sales Data

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MENTIONED COMPANIES

CDTX: \$3.78, PT: \$6.00

NBRV: \$0.68, PT: NA

SCYX: \$6.77, PT: \$50.00

SECTOR CHART

Nasdaq Biotechnology Index (63109R10)

08/13/20



date. Mycovia may announce results from Phase 3 trials of oteseconazole in recurrent VVC in 2H20.

- Policy: We believe one of the most important challenges for the space is the financial disincentive around use in the hospital setting (CMS Part A). Legislation addressing this issue is a prerequisite for restoring investor interest in our opinion. We do not believe legislation that provides direct funding to the company after approval (e.g. subscription model or market entry reward) will necessarily be helpful unless the barrier at the hospital level is also addressed.
- AMR Action Fund: Over 20 companies have contributed a total of \$1B to a fund intended to invest in 12-20 biotech companies over a 10-year period. The focus will be on companies with Phase 2-ready programs and the goal is to bring 2-4 new antibiotics to market by 2030.
- Transactions and Financial Updates: Aradigm was acquired for \$3.2M by Grifols in February, with \$3M in earn-out payments and 25% royalties. Melinta completed a restructuring in April and is now a private company. Tetraphase was acquired in July by La Jolla for \$43M upfront and up to \$16M in earn-out payments. Cidara and Spero each raised \$30M in rights offerings in February and March. Contrafect raised \$52M in a May public offering. Nabriva raised \$38M in a registered direct offering in May. Entasis raised \$35M in a June private placement. Amplyx raised \$53M in May and F2G raised \$60M in August.

BRANDED ANTIBIOTIC AND ANTIFUNGAL SALES DATA

U.S. sales as reported by Iqvia are shown below. Actual sales figures are available from a limited number of companies and may differ from Iqvia data. See Table 3 for sales data as reported by individual companies.

| | AVY | BAX | CRE | DAL | DIF | FET | MIN | NUZ | ORB | REC | SIV | TEF | VAB | VIB | XER | ZEM | ZER | ZIN |
|--------|------|------|-------|------|-------|-----|------|------|------|-----|------|-------|------|------|-----|-----|------|-----|
| Jan-16 | 2.6 | - | 2.1 | 1.1 | 6.1 | - | 0.5 | - | 0.7 | - | 0.7 | 9.7 | - | 1.2 | - | - | 1.2 | - |
| Feb-16 | 3.1 | - | 2.4 | 1.6 | 5.9 | - | 0.4 | - | 0.9 | - | 1.0 | 10.2 | - | 1.4 | - | - | 1.3 | - |
| Mar-16 | 3.9 | - | 3.0 | 2.5 | 7.5 | - | 0.9 | - | 1.0 | - | 1.3 | 14.5 | - | 1.8 | - | - | 1.7 | - |
| Apr-16 | 3.5 | - | 2.9 | 1.8 | 6.0 | - | 0.5 | - | 1.0 | - | 1.0 | 11.2 | - | 1.6 | - | - | 1.3 | - |
| May-16 | 3.9 | - | 4.4 | 2.3 | 6.4 | - | 0.6 | - | 1.2 | - | 1.0 | 11.0 | - | 1.7 | - | - | 1.5 | - |
| Jun-16 | 5.1 | - | 4.2 | 3.2 | 7.6 | - | 0.9 | - | 1.4 | - | 1.0 | 13.5 | - | 2.2 | - | - | 1.9 | - |
| Jul-16 | 5.1 | - | 3.2 | 2.3 | 6.0 | - | 0.6 | - | 0.9 | - | 1.0 | 10.3 | - | 1.6 | - | - | 1.5 | - |
| Aug-16 | 0.8 | - | 3.8 | 2.6 | 6.3 | - | 0.7 | - | 1.2 | - | 1.0 | 10.2 | - | 1.5 | - | - | 1.9 | - |
| Sep-16 | 0.3 | - | 4.9 | 3.5 | 7.8 | - | 0.8 | - | 1.6 | - | 1.4 | 13.5 | - | 2.0 | - | - | 2.3 | - |
| Oct-16 | 0.1 | - | 4.2 | 2.9 | 6.2 | - | 0.7 | - | 1.0 | - | 1.0 | 10.1 | - | 2.0 | - | - | 2.1 | - |
| Nov-16 | 0.1 | - | 4.4 | 2.8 | 6.5 | - | 0.6 | - | 1.2 | - | 0.9 | 9.9 | - | 1.5 | - | - | 2.4 | - |
| Dec-16 | 3.4 | - | 5.8 | 3.7 | 7.4 | - | 0.9 | - | 1.5 | - | 1.3 | 13.0 | - | 1.8 | - | - | 2.8 | - |
| Jan-17 | 2.7 | - | 4.8 | 2.6 | 5.7 | - | 0.7 | - | 1.0 | - | 1.0 | 9.9 | - | 1.2 | - | - | 2.0 | - |
| Feb-17 | 3.2 | - | 5.2 | 2.8 | 6.4 | - | 0.7 | - | 1.2 | - | 1.3 | 10.6 | - | 1.5 | - | - | 2.3 | 0.0 |
| Mar-17 | 4.5 | - | 6.2 | 4.0 | 7.8 | - | 0.9 | - | 1.5 | - | 1.6 | 13.3 | - | 2.0 | - | - | 2.8 | 0.1 |
| Apr-17 | 4.1 | - | 5.5 | 3.4 | 6.4 | - | 0.7 | - | 1.2 | - | 1.1 | 10.2 | - | 1.4 | - | - | 2.4 | 0.1 |
| May-17 | 4.2 | - | 5.9 | 3.7 | 6.4 | - | 0.7 | - | 1.5 | - | 1.5 | 10.4 | - | 1.4 | - | - | 2.4 | 0.3 |
| Jun-17 | 5.7 | - | 8.1 | 5.1 | 8.6 | - | 0.9 | - | 1.8 | - | 2.0 | 12.9 | - | 1.7 | - | - | 3.0 | 0.3 |
| Jul-17 | 4.6 | - | 6.1 | 3.7 | 6.3 | - | 0.7 | - | 1.4 | - | 1.6 | 9.9 | - | 1.6 | - | - | 2.4 | 0.2 |
| Aug-17 | 4.5 | - | 6.5 | 4.2 | 6.4 | - | 0.8 | - | 1.6 | - | 1.8 | 9.3 | - | 1.6 | - | - | 2.4 | 0.4 |
| Sep-17 | 6.1 | - | 8.7 | 5.7 | 8.1 | - | 1.1 | - | 2.1 | - | 2.4 | 12.3 | - | 1.6 | - | - | 3.0 | 0.5 |
| Oct-17 | 4.6 | - | 6.8 | 5.0 | 6.2 | - | 0.8 | - | 1.5 | - | 1.9 | 9.3 | 0.0 | 1.4 | - | - | 3.0 | 0.4 |
| Nov-17 | 5.0 | - | 7.3 | 0.8 | 6.2 | - | 0.9 | - | 1.8 | - | 2.0 | 9.0 | 0.1 | 1.3 | - | - | 3.0 | 0.4 |
| Dec-17 | 7.0 | - | 9.9 | 5.6 | 7.5 | - | 0.9 | - | 2.5 | - | 2.4 | 12.9 | 0.2 | 1.7 | - | - | 4.1 | 0.5 |
| Jan-18 | 5.5 | 0.9 | 8.3 | 3.1 | 6.0 | - | 0.9 | - | 1.5 | - | 1.6 | 10.9 | 0.2 | 1.1 | - | - | 2.9 | 0.3 |
| Feb-18 | 6.1 | 0.1 | 8.0 | 3.6 | 6.4 | - | 0.9 | - | 1.8 | - | 2.0 | 11.7 | 0.4 | 1.5 | - | - | 3.0 | 0.5 |
| Mar-18 | 8.1 | 0.2 | 10.5 | 5.6 | 9.3 | - | 1.0 | - | 2.2 | - | 2.8 | 13.4 | 0.6 | 2.1 | - | - | 3.9 | 0.7 |
| Apr-18 | 6.0 | 0.3 | 8.5 | 5.2 | 8.9 | - | 0.9 | - | 1.6 | - | 2.5 | 10.5 | 0.4 | 1.8 | - | - | 3.1 | 0.5 |
| May-18 | 6.6 | 0.4 | 8.9 | 4.2 | 9.0 | - | 0.9 | - | 1.5 | - | 2.7 | 11.1 | 0.4 | 2.1 | - | - | 3.0 | 0.6 |
| Jun-18 | 8.4 | 0.6 | 11.3 | 5.5 | 11.8 | - | 1.1 | - | 1.9 | - | 4.2 | 12.7 | 0.8 | 2.2 | - | - | 4.0 | 0.6 |
| Jul-18 | 6.6 | 0.5 | 9.0 | 4.4 | 9.3 | - | 0.9 | - | 1.7 | - | 3.6 | 10.6 | 1.0 | 1.7 | - | 0.0 | 3.5 | 0.7 |
| Aug-18 | 7.4 | 0.7 | 9.6 | 4.9 | 9.7 | - | 0.8 | - | 1.9 | - | 4.0 | 10.4 | 0.5 | 1.6 | - | 0.1 | 3.8 | 0.6 |
| Sep-18 | 9.6 | 1.1 | 12.4 | 7.7 | 12.1 | - | 1.2 | - | 2.5 | - | 5.1 | 12.2 | 0.7 | 2.2 | - | 0.1 | 4.6 | 0.7 |
| Oct-18 | 7.4 | 0.9 | 10.2 | 3.8 | 10.1 | - | 0.8 | - | 3.2 | - | 3.8 | 11.0 | 0.7 | 2.0 | 0.0 | 0.0 | 3.9 | 0.6 |
| Nov-18 | 7.7 | 0.9 | 9.7 | 5.5 | 9.1 | - | 0.8 | - | 2.4 | - | 3.3 | 10.8 | 0.7 | 1.8 | 0.0 | 0.1 | 3.9 | 0.6 |
| Dec-18 | 10.1 | 1.1 | 12.9 | 4.5 | 10.6 | - | 1.2 | - | 2.7 | - | 3.6 | 13.0 | 0.9 | 2.0 | 0.1 | 0.1 | 4.9 | 0.7 |
| Jan-19 | 8.3 | 0.7 | 10.0 | 3.8 | 9.3 | - | 0.8 | - | 1.6 | - | 2.8 | 11.7 | 0.8 | 1.2 | 0.1 | 0.1 | 4.2 | 0.5 |
| Feb-19 | 8.2 | 0.8 | 9.5 | 3.1 | 9.4 | - | 1.1 | 0.7 | 1.7 | - | 2.9 | 11.0 | 1.0 | 1.3 | 0.1 | 0.1 | 4.2 | 0.6 |
| Mar-19 | 10.8 | 1.1 | 12.9 | 4.6 | 12.2 | - | 1.1 | 0.2 | 2.4 | - | 3.7 | 14.2 | 1.3 | 1.6 | 0.2 | 0.1 | 5.4 | 0.6 |
| Apr-19 | 7.4 | 0.9 | 10.5 | 5.0 | 10.0 | - | 0.9 | 0.5 | 1.7 | - | 3.4 | 11.5 | 0.9 | 1.1 | 0.2 | 0.1 | 4.1 | 0.6 |
| May-19 | 8.0 | 1.1 | 10.4 | 5.7 | 10.1 | - | 0.9 | 0.6 | 2.2 | - | 3.7 | 11.6 | 1.1 | 1.1 | 0.3 | 0.1 | 4.2 | 0.7 |
| Jun-19 | 10.5 | 1.5 | 13.6 | 6.2 | 12.3 | - | 1.2 | 0.6 | 2.7 | - | 4.8 | 14.5 | 1.4 | 1.4 | 0.4 | 0.1 | 6.0 | 0.7 |
| Jul-19 | 8.1 | 1.3 | 11.6 | 5.1 | 9.8 | - | 0.8 | 0.7 | 2.1 | - | 4.5 | 12.0 | 1.1 | 1.1 | 0.3 | 0.0 | 6.2 | 0.7 |
| Aug-19 | 8.1 | 1.4 | 11.6 | 5.8 | 10.9 | - | 1.0 | 0.7 | 2.0 | - | 5.1 | 11.4 | 1.1 | 1.0 | 0.4 | 0.0 | 5.6 | 0.6 |
| Sep-19 | 11.6 | 2.0 | 14.3 | 7.4 | 12.9 | - | 1.3 | 1.4 | 2.8 | - | 5.8 | 13.9 | 1.5 | 1.3 | 0.4 | 0.0 | 7.0 | 0.9 |
| Oct-19 | 8.6 | 1.7 | 12.9 | 7.9 | 11.5 | - | 1.0 | 1.2 | 2.0 | - | 5.1 | 11.5 | 1.4 | 0.9 | 0.5 | 0.0 | 5.8 | 0.7 |
| Nov-19 | 9.0 | 1.3 | 12.4 | 8.2 | 11.4 | - | 1.1 | 1.6 | 1.8 | - | 3.9 | 11.6 | 1.6 | 0.9 | 0.5 | 0.0 | 6.2 | 0.9 |
| Dec-19 | 10.7 | 1.0 | 16.1 | 8.8 | 12.6 | - | 1.2 | 1.8 | 2.1 | - | 4.4 | 13.7 | 1.7 | 1.2 | 0.6 | 0.0 | 7.1 | 0.8 |
| Jan-20 | 8.6 | 0.6 | 13.0 | 6.5 | 10.5 | - | 1.1 | 1.6 | 1.4 | 0.0 | 2.6 | 11.2 | 1.1 | 0.9 | 0.5 | 0.0 | 6.1 | 0.7 |
| Feb-20 | 9.4 | 0.5 | 12.1 | 7.0 | 10.1 | 0.0 | 0.8 | 1.9 | 1.4 | 0.2 | 2.5 | 12.0 | 1.9 | 1.0 | 0.7 | 0.0 | 6.1 | 0.7 |
| Mar-20 | | 0.6 | 16.6 | 10.2 | 13.9 | 0.5 | 1.2 | 3.3 | 1.9 | 0.4 | 3.2 | 16.0 | 3.3 | 1.0 | 0.8 | 0.0 | 8.3 | 0.7 |
| Apr-20 | | 0.4 | 11.5 | 6.4 | 8.6 | 0.3 | 0.9 | 2.1 | 1.3 | 0.3 | 2.7 | 9.4 | 1.9 | 0.6 | 0.5 | 0.0 | 5.7 | 0.4 |
| May-20 | | 0.3 | 11.8 | 6.0 | 8.3 | 0.3 | 1.0 | 2.4 | 1.2 | 0.1 | 1.9 | 9.2 | 1.7 | 0.7 | 0.6 | 0.0 | 6.1 | 0.5 |
| Jun-20 | | 0.4 | 15.6 | 10.0 | 10.6 | 0.5 | 1.2 | 3.2 | 1.6 | 0.3 | 3.1 | 12.2 | 2.0 | 0.6 | 0.8 | 0.0 | 8.3 | 0.6 |
| L12M | | 11.7 | 159.7 | 89.3 | 131.1 | 1.7 | 12.6 | 21.9 | 21.7 | 1.3 | 44.8 | 144.2 | 20.3 | 11.2 | 6.4 | 0.4 | 78.4 | 8.3 |

Source: IQVIA; AVY Avycax BAX Baxdela; CRE Cresemba DAL Dalvance DIF Difcid FET Fetroja MIN Minocin NUZ Nuzrya ORB Orbactiv REC Recarbrio SIV Sivextro TEF Teflaro VAB Vabomere VIB Vibativ XER Xerava ZEM Zemdri ZER Zerbaxa ZIN Zinplava

Figure 1 - Monthly Iqvia Sales Data (\$M; Unadjusted)

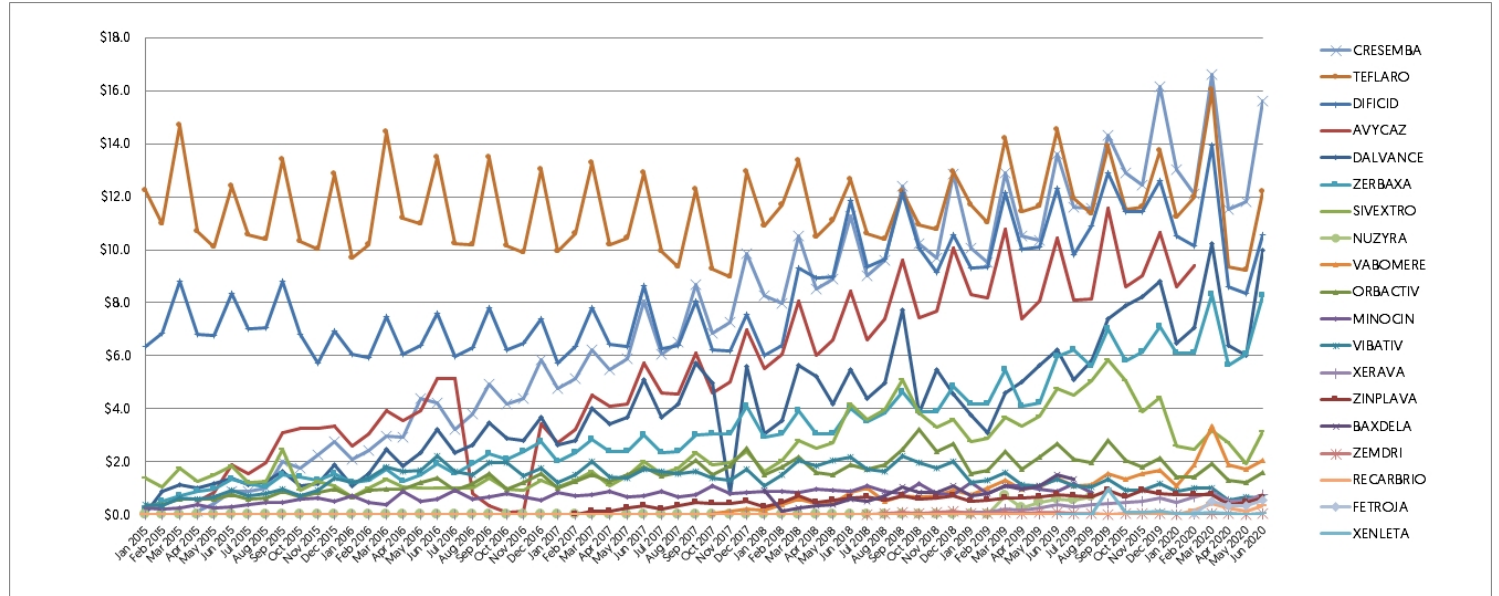
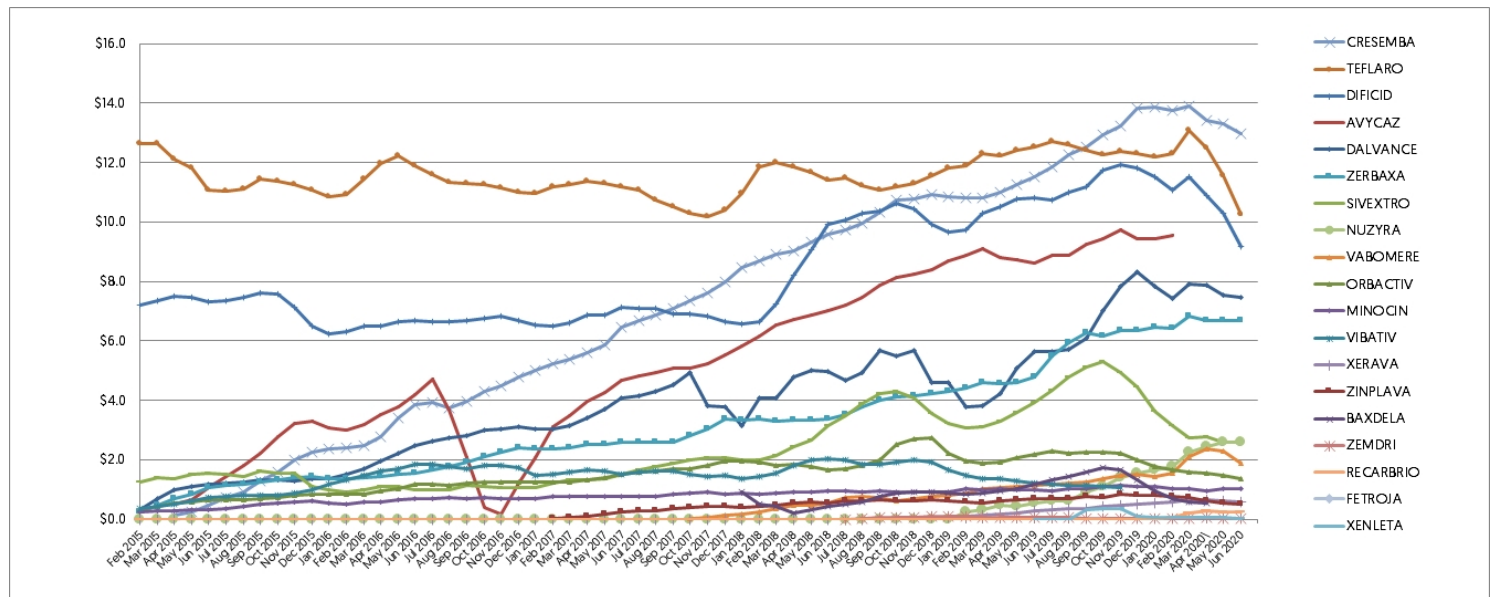


Figure 2 - Monthly Iqvia Sales Data (\$M; 3-Month Ave)



CARBAPENEM RESISTANT ENTEROBACTERIACEAE (CRE) MARKET

Challenging infections caused by CRE have typically been treated with colistin (also known as polymyxin E), polymyxin B, tigecycline, aminoglycosides, high dose carbapenems, or combinations thereof. Several new drugs with safety and/or efficacy advantages have reached the market in recent years. Avycaz was approved in the U.S. in 2015, followed by Vabomere in 2017, Zemdri in 2018, and Recarbrio and Fetroja in 2019.

We have attempted to model the market in our reports over the past few years using data from Iqvia (eaches=vials). Our estimates of the number of courses of treatments in the CRE market are shown below (Figure 3). Evidence suggests that adoption of the new drugs has been relatively slow, despite advantages over older drugs. Our belief is that there has been an underlying shift in the treatment of CRE away from colistin primarily to Avycaz and polymyxin B.

We acknowledge critical limitations of our analysis, including the fact that colistin and polymyxin B are also used against infections caused by other pathogens, in particular *Acinetobacter baumannii* and *Pseudomonas aeruginosa*. Additionally, colistin is also inhaled by Cystic Fibrosis patients. We have removed certain channels from our colistin estimates in an attempt to exclude inhaled use by this patient group (Chain stores; Food stores; Independent pharmacies, and Mail order). Lastly, the method of physical distribution of Avycaz changed in 1Q20 and sales data are no longer available from Iqvia. We therefore believe it will be a challenge to model this market going forward.

COVID-19 had a significant impact on sales, including a spike for Vabomere in March and a profound drop for polymyxin B in April.

Figure 3 - Sales of Drugs Relevant to the CRE Market (Treatment course estimates)

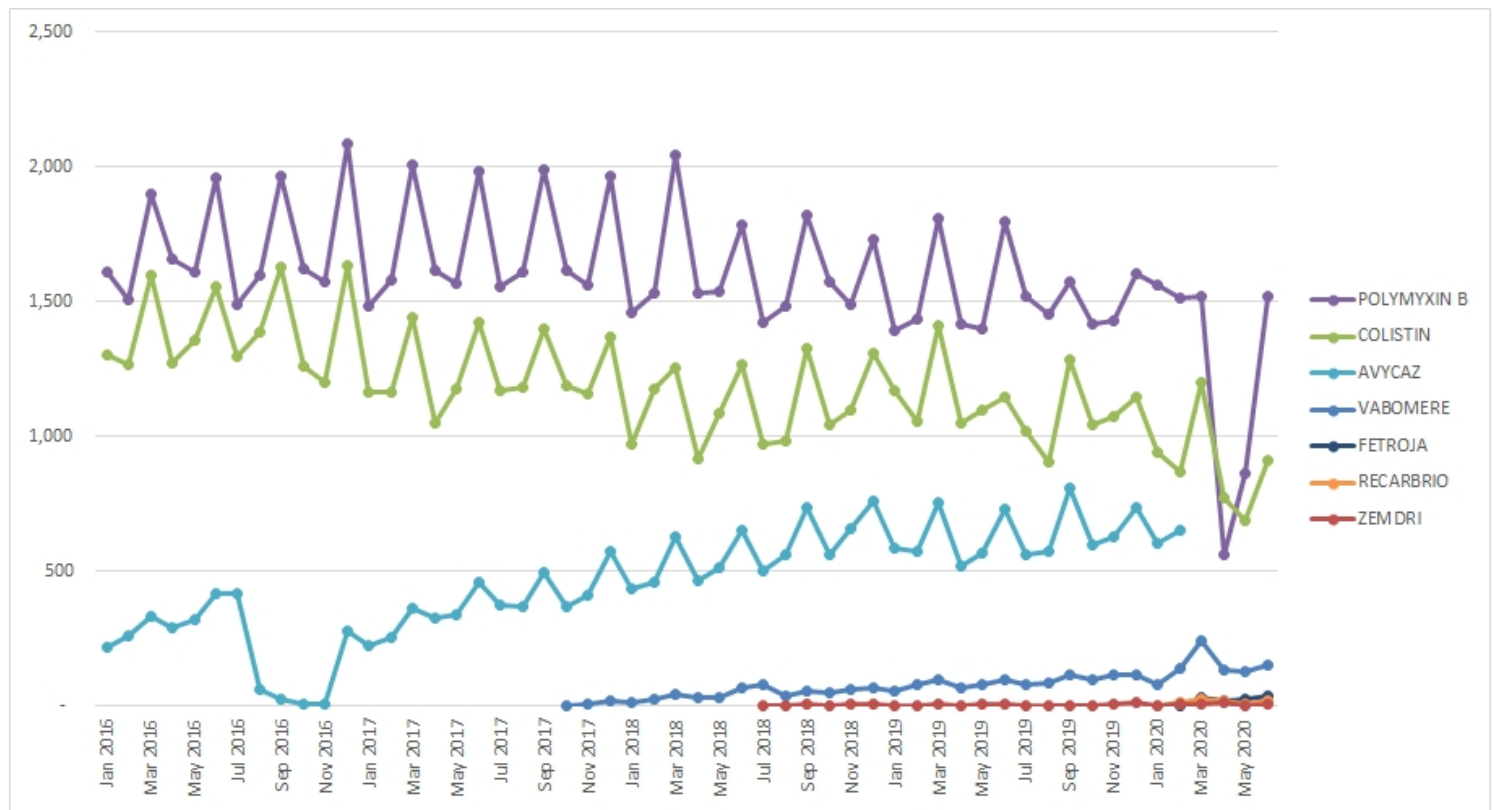


Table 1 - Antimicrobial Company Valuations

| TICKER | PRICE | 52 HI | 52 LO | YTD RETURN | 2019 RETURN | 2018 RETURN | MKT CAP \$M | EV \$M | CASH \$M | L12M OPEX | DEBT \$M | DEVELOPMENT STATUS |
|----------|-------------|-------------|-------------|---------------|----------------|----------------|----------------|-----------|-------------|--------------|-------------|-----------------------|
| BSLN-SWX | \$ 50.90 | \$ 61.20 | \$ 29.28 | 5% | 17% | -47% | 606.7 | 701.1 | 114.7 | 146.7 | 209.1 | Market |
| CDTX | \$ 3.78 | \$ 4.45 | \$ 1.22 | 5% | 63% | -65% | 155.4 | 81.8 | 74.3 | 63.3 | 0.7 | Phase 3 Underway |
| CFRX | \$ 5.40 | \$ 13.40 | \$ 2.69 | -13% | -59% | 51% | 146.5 | 133.0 | 16.7 | 29.6 | 3.2 | Phase 3 Underway |
| ETTX | \$ 2.91 | \$ 9.25 | \$ 1.75 | -41% | 22% | | 42.5 | (7.2) | 50.8 | 54.5 | 1.0 | Phase 3 Underway |
| INSM | \$ 29.58 | \$ 34.94 | \$ 12.09 | 21% | 82% | -58% | 2,945.5 | 2,693.6 | 641.9 | 382.0 | 390.0 | Market |
| ITRM | \$ 0.89 | \$ 7.65 | \$ 0.92 | -78% | -10% | | 18.9 | 45.8 | 12.3 | 75.6 | 39.2 | Phase 3 Complete |
| MCRB | \$ 23.56 | \$ 33.00 | \$ 2.52 | 481% | -24% | -55% | 1,796.7 | 1,770.8 | 63.9 | 105.5 | 38.0 | Phase 2/3 Complete |
| NBRV | \$ 0.68 | \$ 2.77 | \$ 0.49 | -45% | -10% | -76% | 97.6 | 55.0 | 50.1 | 82.7 | 7.5 | Market |
| PRTK | \$ 4.30 | \$ 6.41 | \$ 2.50 | 8% | -21% | -71% | 185.5 | 250.4 | 188.2 | 124.4 | 253.2 | Market |
| SCYX | \$ 6.77 | \$ 14.40 | \$ 5.00 | -25% | 89% | -79% | 66.9 | 50.9 | 37.6 | 50.2 | 21.6 | Phase 3 Complete |
| SMMT | \$ 3.49 | \$ 5.49 | \$ 1.18 | 121% | 39% | -90% | 46.9 | 29.3 | 17.6 | 55.7 | - | Phase 3 Underway |
| SPRO | \$ 12.66 | \$ 14.48 | \$ 5.25 | 35% | 56% | -48% | 260.7 | 194.0 | 71.4 | 96.9 | 4.6 | Phase 3 Underway |
| SYN | \$ 0.56 | \$ 0.75 | \$ 0.25 | 17% | -9% | -97% | 10.2 | 2.5 | 8.1 | 14.4 | 0.3 | Phase 2 |
| NBI | \$ 4,203.06 | \$ 4,600.54 | \$ 2,947.85 | 9% | 24% | -9% | | | | | | |
| MAX | | | | 481% | 89% | 51% | | | | | | |
| MEAN | | | | 30% | 0% | -63% | | | | | | |
| MEDIAN | | | | 5% | -10% | -71% | | | | | | |
| MIN | | | | -78% | -88% | -97% | | | | | | |

Source: Factset Data; Factset Consensus Revenue Ests

Table 2 - BRANDED ANTIBIOTIC AND ANTIFUNGAL PRICING AND SALES (U.S. ONLY)

| Drug Company | Unit | WAC | Dosage | WAC/Course* | Price Change | U.S. Sales |
|-----------------------|-----------------|----------|--|---|----------------------------|---|
| Ambisome Astellas | 1x50mg Vial | \$260 | 3-5mg/kg qd | \$25,935 5mg/kg 14 days | 5% increase 1/1/2020 | 2Q20 Iqvia sales \$24.9M 2Q20 Astellas Report \$22M |
| Arikayce Inmed | 28x 590mg Vial | \$11,626 | 590mg qd | \$139,512 | 6% increase 1/1/2020 | 2Q20 Iqvia sales \$1.1M 2Q20 Inmed Report \$42.5M |
| Avycaz Abbvie | 1x2.5g Vial | \$359 | cIAI 2.5g q8h, 5-14 days cUTI 2.5g q8h, 7-14 days | \$5387-15085 | 9.5% increase 1/1/2019 | Iqvia not reliable Abbvie acquired Allergan |
| Baxdela Melinta | 10x300mg Vial | \$1,325 | 300mg q12h 5-14 days | \$1325-3710 | Launch price 10/20/2017 | 2Q20 Iqvia sales: \$1.2M |
| | 20x450mg Tablet | \$1,488 | 450mg q12h 5-14 days | \$781-2188 | 5% increase 4/1/2019 | |
| Cresamba Astellas | 1x372mg Vial | \$315 | 372mg q8h load 2days 372mg qd | \$15,400 45 days | 6% increase 1/8/2019 | 2Q20 Iqvia sales: \$39.0M 2Q20 Astellas Report \$36M |
| | 14x186mg Tablet | \$1,296 | 372mg q8h load 2days 372mg qd | \$9,257 45 days | 6% increase 1/8/2019 | |
| Dalvance Abbvie | 1x500mg Vial | \$1,581 | 1500mg or 1000mg followed one week later by 500mg | \$4,743 | 3% increase 1/3/2020 | 2Q20 Iqvia sales: \$22.4M Abbvie acquired Allergan |
| Difficid Merck | 20x200mg Tablet | \$4,059 | 200mg oral q12h 10-14 days | \$4,058 10 days | 5% increase 1/3/2020 | 2Q20 Iqvia sales: \$27.5M |
| Eraxis Pfizer | 1x100mg Vial | \$180 | 200mg load; 100mg qd 14 days after + culture | \$2,880 15 days | Launch price 10/26/2009 | 2Q20 Iqvia sales: \$2.6M |
| Fetroja Shionogi | 1x 1g Vial | \$183 | 2g q8h 7-14 days | 15,400 14 days | Launch price 2/24/2020 | |
| Minocin Melinta | 1x100mg Vial | \$162 | 100mg q12h 10-14 days | \$3240-4536 | 5% increase 8/24/2018 | 2Q20 Iqvia sales \$3.0M |
| Noxafil Merck | 1x300mg Vial | \$530 | 300mg BID Load; 300mg QD | | Launch price 3/18/2014 | 2Q20 Iqvia sales: \$14.0M 2Q20 MRK Report \$73M |
| | 60x100mg Tablet | \$4,112 | 300mg BID Load; 300mg QD | \$16,600 80 days | 5% increase 1/4/2019 | |
| Nuzyra Paratek | 1x100mg Vial | \$355 | CABP: 200mg IV load 1 day 100mg IV or 300mg oral QD 7-14 days total ABSSI: 200mg IV load 1 day or 450mg oral load 2 days 100mg IV or 300mg oral | CABP 7-14days \$3,192-6,088 ABSSI 7-14day \$3192-6,205 | 3% increase 7/1/2020 | 2Q20 Iqvia sales: \$7.8M 2Q20 PRTK Report \$8.1M |
| | 6x150mg Tablet | \$1,241 | 7-14 days total | | 5% increase 7/1/2020 | |
| Orbactiv Melinta | 1x400mg Vial | \$996 | 1200mg single dose | \$2,988 | 3% increase 7/2/2018 | 2Q20 Iqvia sales: \$4.1M |
| Recarbrio Merck | 1x1.25g Vial | \$268 | 1.25g q6h | \$12,864 12 days | Launch price 1/6/2020 | 2Q20 Iqvia sales \$0.7M |
| Sivextro Merck | 10x200mg Vial | \$3,077 | 200mg qd for 6 days | \$1,846 | 3% increase 1/3/2020 | 2Q20 Iqvia sales: \$7.8M |
| | 6x200mg Tablet | \$2,317 | 200mg qd for 6 days | \$2,318 | 3% increase 1/3/2020 | |
| Teflaro Abbvie | 10x600 mg Vial | \$2,017 | 600mg q12h 5-14 days | \$2018-5650 | 5% increase 1/3/2020 | 2Q20 Iqvia sales: \$30.8M Abbvie acquired Allergan |
| Vabomere Melinta | 1x2.0g Vial | \$165 | 4.0g q8h 5-14 days | \$4950-13860 | Launch price 9/25/2017 | 2Q20 Iqvia sales: \$5.6M |
| Vibativ Cumberland | 1x750mg Vial | \$479 | 10mg/kg qd 7-14 days | \$3353-6706 | 2.5% increase 4/30/2020 | 2Q20 Iqvia sales: \$1.9M |
| Xenleta Nabriva | 1x150mg Vial | \$102 | 150mg q12h 5-7 days | \$1025-1435 | Launch price 9/1/2019 | 2Q20 Iqvia sales \$0.1M |
| Xerava* Tetraphase | 1x50mg Vial | \$49 | 1mg/kg q12h 4-14 days | \$785-2750 4-14 days | 12% increase 5/30/2019 | 2Q20 Iqvia sales: \$1.8M |
| Zemdri* Cipla | 1x500mg Vial | \$315 | 15mg/kg qd 4-7 days cUTI | \$3780-13230 4-14 days | Launch price 7/17/2018 | 2Q20 Iqvia sales: \$0.1M |
| Zerbaxa Merck | 10x1.5g Vial | \$1,252 | cIAI 1.5g q8h, 4-14 days cUTI 1.5g q8h, 7 days HABP 3.0g q8h 14 days | \$1504-10525 4-14 days | 10% increase 1/3/2020 | 2Q20 Iqvia sales: \$20.0M 2Q20 MRK Report: \$32M |
| Zinplava Merck | 1x1000mg Vial | \$3,800 | 10mg/kg single dose | \$3,800 | Launch price 12/8/2016 | 2Q20 Iqvia sales: \$1.5M |

Source: Company reports; Needham & Company, LLC estimates; *Assume 75-80kg for weight-based dosing and batching; IMS/Iqvia, Symphony Relembactam: average treatment duration in RESTORE IMI 1 trial was 11.4 days

RISKS

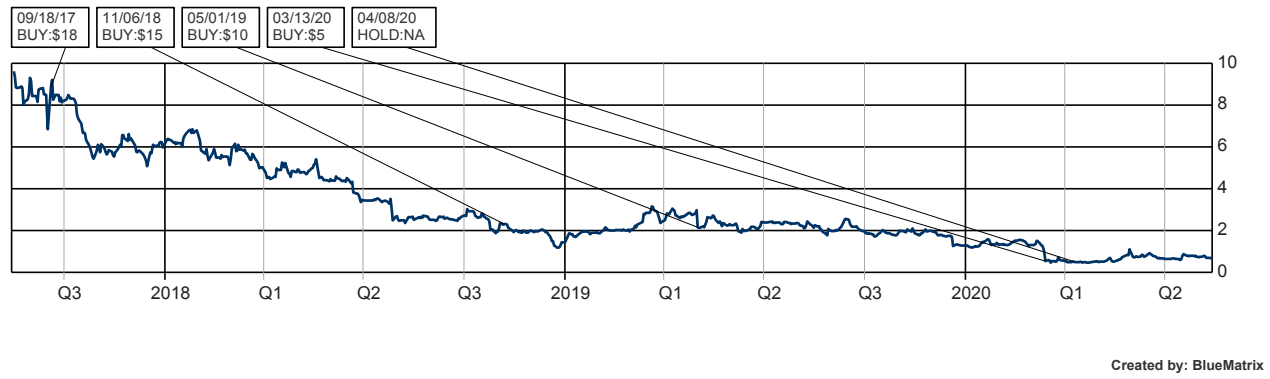
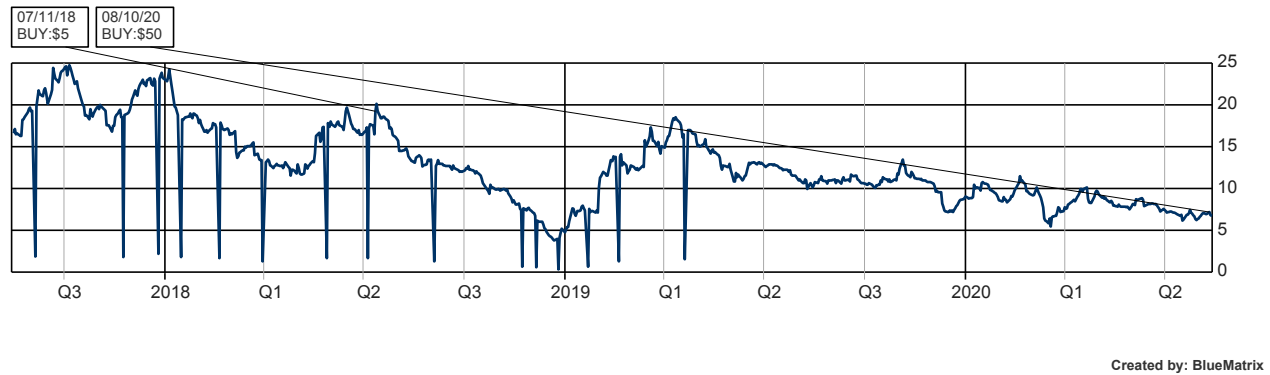
Development Risk: The products under development may fail to demonstrate efficacy in clinical trials.

Regulatory Risk: The products under development may not obtain marketing approval from regulatory agencies.

Commercialization Risk: The companies described within this report may not be successful in commercializing products and may be unable to generate sufficient revenue to continue operations.

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Rating and Price Target History for: Cidara Therapeutics, Inc. (CDTX) as of 08-12-2020

Rating and Price Target History for: Nabriva Therapeutics plc (NBRV) as of 08-12-2020

Rating and Price Target History for: SCYNEXIS, Inc. (SCYX) as of 08-12-2020

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I, Alan Carr hereby certify that the views expressed in this research report accurately reflect my personal views about the subject company (ies) and its (their) securities. I, also certify that I, have not been, and will not be receiving direct or indirect compensation in exchange for expressing the specific recommendation(s) in this report.

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| Buy | 71 | 24 |
| Hold | 26 | 2 |
| Underperform | < 1 | 0 |
| Rating Suspended | < 1 | 100 |
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