

Longer Term Investments

Medical devices

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- The aging population and growth of the over-65 age group will create more opportunities for companies selling medical products and devices.
- Other drivers of the medical device industry include better penetration in emerging markets due to improved infrastructure, new innovative treatments, increased affordability due to rising per-capita GDP, and a growing prevalence of "lifestyle diseases" like obesity due to urbanization.
- We identified five key markets for implantable or wearable devices, including consumer products such as hearing aids, dental implants and corrective lenses. We estimate their total market size at USD 98.6 billion, with sustainable mid-single digit growth.
- We recommend exposure to the theme via a diversified portfolio of stocks across our preferred markets and segments.



Source: Fotolia

Medical devices can contribute much to successful treatment of many conditions. Some reduce the risk of a treated condition worsening, perhaps as an alternative to drug therapy, some improve users' quality of life or functionality, while some can solve problems that are untreatable with drugs. Devices like joint replacements effectively offer long-term, permanent solutions (i.e. a cure).

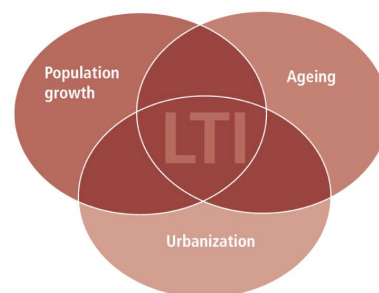
Medical devices are primarily used by the over-65's, whose growth will outpace the broader population over the coming decades. Demand is also supported by the rise of "lifestyle diseases" like obesity, itself related to urbanization.

The medical device industry has matured but still represents a substantial opportunity, in our view. Penetration in emerging markets is low, but local government policy is typically supportive of higher healthcare spending. Consumer medical device companies can benefit from rising affordability in these markets.

We think implantable or wearable devices, including consumer medical devices like hearing aids, dental implants and corrective lenses are the most attractive markets.

Introduction to the Longer Term Investments (LTI) series

- › **The Longer Term Investments (LTI)** series contains thematic investment ideas based on long term structural developments.
- › Secular trends such as population growth, ageing, and increased urbanization create a variety of longer term investment opportunities.
- › Investors willing to invest over multiple business cycles can benefit from potential mispricings created by the typically shorter term focus of stock markets.



Medical devices for long-term treatment

Despite advances in drug development, many medical conditions are still best treated with a physical intervention: a medical device. Some of these prevent conditions from worsening or developing complications, potentially contributing to lower total healthcare costs. This is similar to chronic drug treatment, but in cases such as a hip replacement, the device effectively solves the medical problem on a permanent or near-permanent basis and represents a cure.

Medical devices address a wide range of underlying health issues. As many of these conditions are more prevalent among the elderly, it is no surprise that devices are usually used by older patients. For example:

- two thirds of hip implant patients are over 65
- most cardiovascular surgery patients are in their late 60's
- the average age of a first-time hearing aid user is approximately 70

We focus here on devices used inside the body (implantable medical devices) and those worn or carried by the user (which we refer to collectively as "consumer medical devices"). We estimate the combined present size of the relevant markets at USD 98.6 billion, and think they could grow in the mid single digits over the long term.

Investors can gain exposure to the theme by investing in a diversified portfolio of stocks across our preferred markets and segments. The main risks to investing in medical devices relate to technological obsolescence, the impact of the shift to value-based healthcare systems and product-specific risks, including failure, withdrawals and related legal liabilities.

Trends in the medical devices market

Rising over-65's population supports device market growth

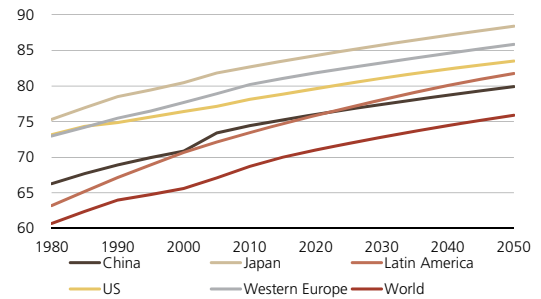
The primary driver of growth in the medical devices market is the aging of the global population. Global life expectancy has continued rising, and is expected to reach 76 years by 2050, up from 70 in 2015 (Fig. 1). The number of people aged 65 or over, who account for the majority of medical device use, will rise by over 60% in the next 15 years, from just over 600 million in 2015 to nearly 1 billion by 2030. Secondary drivers include the rising incidence of "lifestyle" diseases such as obesity and heart disease, side effects of which often require treatment with devices. Urbanization, especially in emerging markets, is a strong driver of obesity (see our report "Longer-Term Investments: Obesity" published 13 March 2017).

Many devices have become standards of care

The medical device industry has grown substantially over the last two decades, and in many cases devices are now the standard of care.

Fig. 1: Life expectancy rising worldwide

Life expectancy at birth, years



Source: UN, UBS. As of September 2014

Recommended reading

- "Longer-Term Investments: Emerging Markets Healthcare," 28 March 2017
- "Longer-Term Investments: Obesity," 13 March 2017

Source: UBS

This has led industry sales growth to slow and become more correlated with the growth of the over-65 population (Fig. 2), and in some segments with economic growth. Consumer medical device companies have not been immune since, although penetration is lower, costs are often borne out of pocket: broader penetration comes with higher economic sensitivity. Therefore, for the industry as a whole, we see the aging population, rather than higher penetration, as the primary driver of future sales.

Emerging markets penetration has room to grow

Emerging markets have substantially lower healthcare budgets on a per-capita basis (Fig. 3), which has limited the ability to pay for medical devices. However, in some regions, particularly rural areas, better infrastructure, and not just money, will be needed to support greater medical device use. Infrastructure can include people (e.g. suitably qualified surgeons) as well as hospitals and equipment.

Despite recent fears of slowing growth in emerging markets, we believe structural policies put in place by many governments will ultimately support growth in healthcare spending above GDP. For example, the Chinese government has broadened healthcare insurance coverage and is working on an ambitious program of reforms including raising medical cost subsidies, deregulating drug prices and improving quality of care in rural hospitals. The government's targets imply that Chinese healthcare spending would increase sevenfold over the period 2011–20. These policies are all supportive of medical device sales. For more details, please see our report "Longer-Term Investments: Emerging Markets Healthcare" published 28 March 2017.

Rising affordability, infrastructure investment and demographics should thus support future growth of spending on medical devices in the emerging markets in years to come.

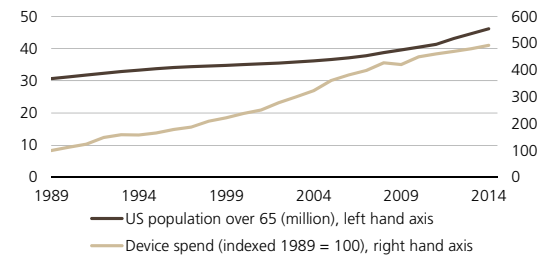
Innovation at a reasonable cost

Healthcare systems worldwide are under pressure to deliver better clinical outcomes, despite budget constraints. In Europe this has often meant rationing treatment, while in Japan more costs are being shifted to employers and patients. Even the US healthcare system is beginning to move away from a fee-for-service model toward value-based healthcare: new reimbursement approaches being explored aim to use resources more efficiently by shifting the cost of over-treatment, re-admissions and adverse clinical outcomes from the payer to the provider. These initiatives will likely lead to greater focus on the clinical benefits and cost-effectiveness of devices. Innovations in the industry that lower costs, such as less invasive surgical procedures, will lead to changes in the standard of care. We expect these initiatives to continue, regardless of changes in the broad structure of the US healthcare system.

Further, consolidation of the US hospital market has increased hospitals' buying power, with more central purchasing instead of by indi-

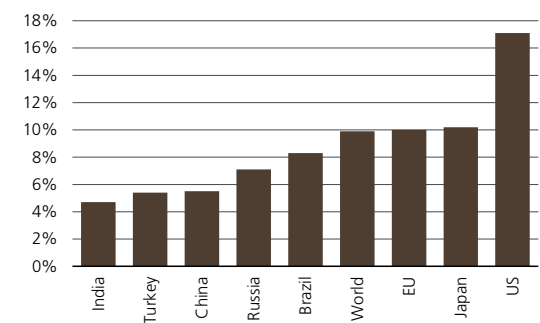
Fig. 2: US medical device penetration has risen substantially

US medical devices spending compared to over 65s population



Source: OECD, Barclays research. As of July 2016

Fig. 3: Emerging markets spend less on healthcare
Healthcare spending as a percentage of GDP, 2014



Source: World Bank, UBS. As of March 2017

vidual surgeons, as hospital groups look to leverage their scale by standardizing processes and procedures across facilities. In response, the medical device industry has also seen consolidation, for example Medtronic's 2015 purchase of Covidien, to gain scale and be able to provide more products that hospitals need.

Overall, we see the outcome of these trends as a greater focus by hospitals on the clinical and cost-effectiveness of devices, demanding data on outcomes to support purchase decisions. We are already beginning to see this trend at work. For example, Boston Scientific's WATCHMAN device, approved in the US in 2015, has been shown to reduce the risk of stroke, while producing similar value for money to daily treatment with generic drugs over a seven-year period (see Box 1).

Defining the "medical device industry"

There is no universally-agreed upon definition of what constitutes the "medical device industry." We have chosen to focus on devices implanted into, worn or carried on the body, that are used to treat a medical condition. Some devices treat conditions that have no alternative treatment (e.g. orthopedic reconstruction). Some alternative treatments are inferior or not suitable for all patients (e.g. dental implants), and in other cases they are not medically necessary, but do provide a quality of life enhancement for the user (e.g. corrective lenses or some hearing aids). We see these sectors as most likely to benefit from the long-term demographic trends identified above.

In total, we estimate the collective size of our target markets at around USD 98.6 billion (Fig. 4), with potential for growth in the mid single digits over the long term. Key markets include:

- **Orthopedic implants and sports medicine.** This segment includes replacement joints, spinal fusion, plates used to repair injured bones, and surgical equipment for sports medicine.
- **Cardiovascular devices.** These include pacemakers and implantable cardioverter-defibrillators, stents, and products used to treat damaged heart valves.
- **Consumer medical devices.** A mixed subsector including hearing aids, dental implants and corrective lenses. These products are typically chosen and paid for by a user who may consider themselves a consumer, rather than a "patient."

In the appendix below we provide overviews of each subsector. We excluded medical and hospital supplies from our target markets; though some products can be innovative, many are commoditized and less linked to innovation. Equally, we excluded hospital capital equipment, such as operating room equipment, scanners (e.g. MRI) and radio-oncology machines, as these markets are more cyclical. We also excluded technologies used primarily for cosmetic purposes that do not also have a medical benefit, and diagnostics.

Box 1: WATCHMAN reduces stroke risk at manageable cost

Boston Scientific's WATCHMAN device is implanted into the heart of patients with atrial fibrillation, a type of arrhythmia. It acts to close the left atrial appendage, a part of the heart where blood clots can form, and prevent their escape into the circulatory system, where they can cause strokes. The device is an alternative to daily treatment with anti-coagulant drugs. One study (Reddy *et al*, JACC, 2015) showed that WATCHMAN was more cost-effective compared to preventative treatment with new oral anti-coagulants (for example Bayer's Xarelto) over a five-year period. Even when compared to the older generic drug warfarin, WATCHMAN was still cost effective over a seven-year period. While not all patients would prefer an implanted device to a daily pill, WATCHMAN could offer a choice for patients who prefer not to have to take pills every day, and over a longer period could save money for healthcare systems despite the upfront cost of the procedure. The device could also offer an option for patients for whom warfarin treatment is unsuitable; this is currently being studied in clinical trials.

Fig. 4: Key medical device markets
Global market size estimates, USD billion

Market opportunity	Current size (USD bn)	Long-term growth rate
Orthopedics and sports medicine	43.5	Low-mid single digit
Spine	9.0	Low single digit
Knees	7.3	Low-mid single digit
Trauma	6.7	Low single digit
Hips	6.4	Low-mid single digit
Extremities	5.5	Mid single digit
Sports medicine	5.5	Mid single digit
Endoscopy	3.0	Low-mid single digit
Cardiovascular	33.8	Mid single digit
CRM & HF	11.2	Low single digit
Coronary vascular	9.6	Low single digit
Peripheral vascular	4.0	Mid single digit
Structural heart	3.7	Mid single digit
Electrophysiology	3.3	Mid single digit
Neuromodulation	2.0	Mid single digit
Consumer medical devices	21.3	Mid single digit
Dental implants	3.6	Mid single digit
Hearing aids	5.5	Mid single digit
Corrective lenses	12.2	Mid single digit

Note: CRM = cardiac rhythm management; HF = heart failure

Source: UBS estimates. As of March 2017

Link to sustainable investing

To identify whether a Longer Term Investment (LTI) theme qualifies as a Sustainable Investment theme, we follow a two-step process. The first works top-down. LTIs are assessed according to whether they match one or more of the sustainability topics within the environmental, social or governance categories (Fig. 5). In general, these themes must contribute to environmental sustainability (e.g. a low-carbon economy), resource efficiency (e.g. energy, water), sustainable society (e.g. health, education, poverty reduction, equality and social inclusion, etc.) or sustainable corporate governance. The second, bottom-up step, consists in considering a thematically aligned representative universe of companies. A large majority of included companies (80% or more) must align with one or more of the ESG categories. For each individual company, a minimum business involvement threshold is applied, e.g. 25% of revenues must be derived from the thematic activity under consideration.

In our view, investing in medical devices developed at a reasonable cost fits our sustainable investing framework. Medical devices can improve quality of life for patients and users, enabling people to return to work sooner after an illness or accident, and to contribute to the economy later in life. As well as directly boosting productivity, this can have the additional benefit of reducing costs for either ongoing or future care, offsetting the sometimes high initial cost of procedures. This provides a link to the social side of Environmental, Social and Governance (ESG) investing.

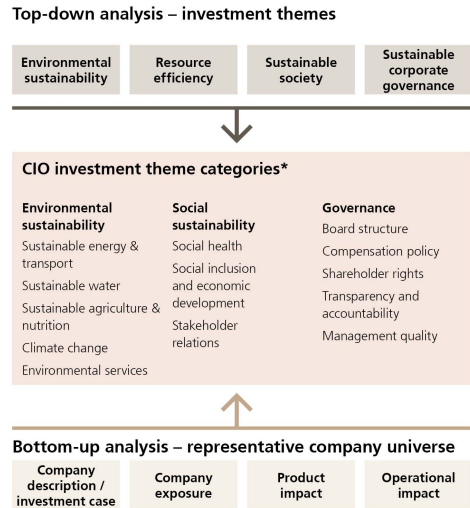
MSCI ESG Research ratings (see Fig. 6) ranks companies between AAA (best) and CCC (worst). The assessment encompasses the three ESG pillars. Each pillar has sub-categories: in the case of the environment, they are climate change, natural resources, pollution and waste, and environmental opportunities; in the social sphere, human capital, product liability, stakeholder opposition, and social opportunities; and for governance, corporate governance. The research also identifies 37 key ESG issues. For example, under climate change, companies are assessed based on their carbon emissions, energy efficiency and product carbon footprint.

On balance, we think that investors with an SI focus should be selective when investing in medical devices.

Investment Conclusion

We expect the underlying trends of population growth and aging, combined with increasing prevalence of lifestyle and age-related diseases like obesity, to support long-term, mid single-digit volume growth on average across our favored medical device markets, offset by a marginally negative like-for-like pricing environment. Urbanization and rising per-capita GDP in emerging markets will also support deeper penetration of more consumer-focused medical devices like dental implants and corrective lenses. We recommend a diversified exposure to minimize stock-specific risks.

Fig. 5: Overview of longer-term investment topic clusters



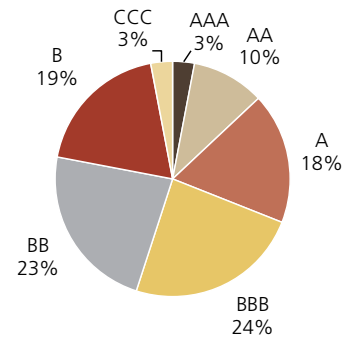
* For simplicity, all topic clusters include several subcategories not included in the graph. For example: sustainable water includes water utilities, treatment, desalination, infrastructure & technology, water efficiency and ballast-water treatment. Within each subcategory are further specifications; e.g. water treatment includes filtration, purification and waste treatment. In total, we have more than 100 categories (potential SI investment themes) in our thematic database
Source: UBS

Risks

Major risks to investing in the medical device theme include:

- Technological obsolescence/disruption:** new technologies offering superior medical outcomes may cannibalize existing product sales. New drugs may be developed that reduce the risk of the conditions treated by medical devices, shrinking the available market over time. Conversely, some consumer medtech markets may see slower replacement cycles as older technology is deemed to be "good enough" by users, reducing the need to upgrade to the latest products.
- Focus on healthcare system efficiency:** while pricing pressure is not new to the medical device industry, a lack of innovation could erode the industry's pricing power, because companies can no longer justify higher prices for new products without demonstrable clinical benefits at a reasonable incremental cost to the healthcare system. In general, the shift from fee-for-service to value-based care can be expected to be a hurdle to reimbursement of devices. Consolidation of the hospital industry could also pressure device manufacturers.
- Product risks:** medical device companies face the risk of product failures, withdrawals, and intellectual property disputes. Compared to pharma and biotech companies, the industry is less exposed to patent expiries, as brand history and loyalty play a much greater role in product choice. Product withdrawals for implantable medical devices can be highly damaging to a company's reputation and financial position, especially if corrective surgery is required, although this is rare.

Fig. 6: MSCI ESG research corporate coverage
Rating distribution in %, 5,720 companies



Note: AAA = best possible ESG rating; CCC = worst
Source: MSCI ESG research, UBS, as of 23 Feb 2017

Appendix: Key medical device markets

In the following pages we provide overviews of the markets for each class of medical devices we have included in our theme. We estimate the current combined size of the relevant markets to be USD 98.6 billion, and think they could grow in the mid single digits over the long term.

Implantable medical devices

Orthopedic implants

Orthopedic implants are used to repair bones or joints damaged either by age-related diseases or injuries. The causes of bone disease vary although osteoarthritis, which is linked both to aging and obesity, is a significant factor. More than 1.1bn people worldwide suffer from osteoarthritis, low back or neck pain, according to *The Lancet's* Global Burden of Diseases Study 2015, and nearly three quarters of US adults over 65 are affected in some way.

We estimate the orthopedics and spine market is worth around USD 43.5 billion. The main growth driver is the aging population, although lifestyle factors such as obesity also play a part. The cartilage in joints such as hips and knees naturally erodes with age and, since adult cartilage does not naturally regenerate, it must be replaced when damaged. Bones and joints can also be damaged in accidents or sporting injuries.

Obesity, itself driven by the trend towards urbanization, is also a risk factor for orthopedic surgery, as excess weight places greater pressure on the knee joints, increasing the risk of damaged cartilage. One study (Mihalko *et al*, J AAOS, 2014) estimated that obese patients (i.e. those with a BMI over 30, see Fig. 7) had a 8.5x higher need for knee replacement surgery than those with normal body weight. Obese patients are also at greater risk of injuries.

Reconstruction, or the replacement of damaged joints (mostly hips and knees), is the largest segment of the market (Fig. 8). Trauma refers to the use of plates and screws to fix bones damaged in accidents. Spinal fusion aims to stabilize damaged vertebrae in order to resolve pain; more advanced technologies include motion-preserving spinal discs. Most spine patients are over 50. The broader orthopedic market also includes sports medicine and arthroscopy, or tools and products for minimally-invasive surgery on joints and soft tissue. A recent innovation in reconstruction is the use of robotic surgical procedures that may help to improve the accuracy of implant placement, resulting in fewer costly revisions.

Fig. 7: Obesity defined as BMI > 30

Classification of patients by BMI

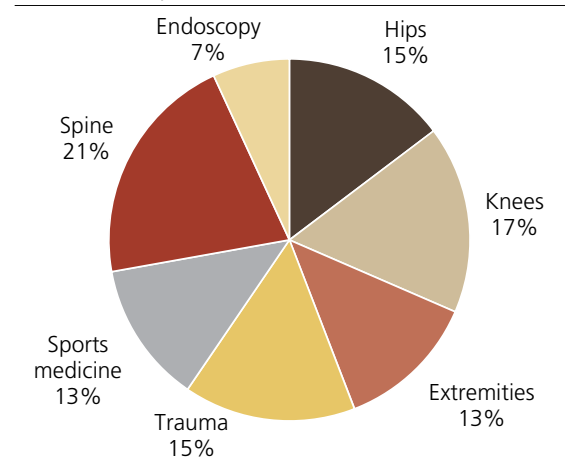
Classification	BMI (kg/m ²)
Normal range	18.50 - 24.99
Overweight	≥25.00
- Pre-obese	25.00 - 29.99
Obese	≥30.00
- Obese Class I	30.00 - 34.99
- Obese Class II	35.00 - 39.99
- Obese Class III	≥40.00

Note: BMI = body mass index, calculated as a patient's weight (in kg) divided by the square of his height (in m)

Source: UBS

Fig. 8: Global orthopedic market

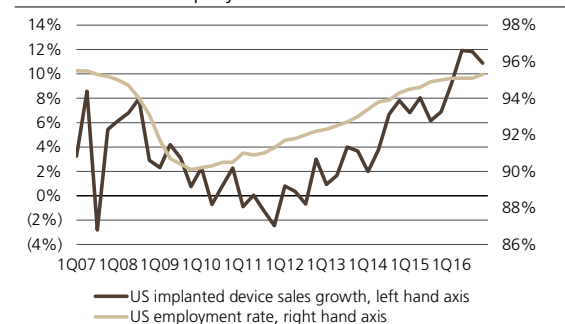
Global market, total USD 43.5 billion



Source: UBS Investment Bank. As of March 2017

Fig. 9: Elective procedures create economic sensitivity

Quarterly sales growth of US implantable medical devices vs the employment rate



Note: index of US sales of implantable cardiac rhythm management devices, orthopedic implants as proxy for discretionary medtech volume.

Source: Bureau of Labor Statistics, UBS. As of March 2017

The orthopedic market is mature in developed markets, and well consolidated. Market growth in the major categories of large joint reconstruction, trauma and traditional spinal fusion procedures is in the low to mid single digits, with mid single-digit volume growth offset by slightly negative like-for-like pricing. Orthopedics is in the vanguard of healthcare system's efforts to make hospitals accountable for the overall quality and cost-effectiveness of care by introducing new reimbursement structures, such as the Comprehensive Care for Joint Replacement (CCJR) trial that started in the US in 2016. While the move to a single "bundled" payment may be seen as a pricing constraint, we expect the greatest impact of the trial program will be on post-acute care, which can account for up to 50% of the total cost of joint replacement. Within reconstruction, there are pockets of higher growth such as reconstruction of extremities (shoulders, elbows and wrists), and newer technologies in spine treatment such as complex fusion and motion-preserving discs. Within large-joint reconstruction, knee procedures are currently growing more rapidly driven by innovative new surgical techniques, including robotic surgery and personalized implants, that are hoped to improve outcomes. Sports medicine and arthroscopy are also growing more rapidly.

Reconstruction is one of the most economically sensitive segments of the medical device market, as most hip, knee and spinal surgeries are elective and can be put off if a patient loses their job or insurance coverage (Fig. 9). Trauma is non-cyclical and mature, growing roughly in line with population growth.

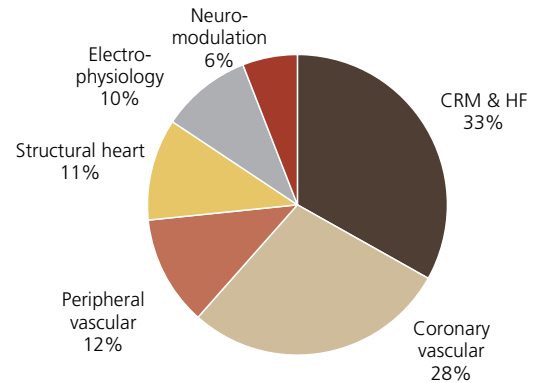
Cardiovascular devices

The cardiovascular devices market covers a wide range of products used to treat conditions in the heart and circulatory system, such as abnormal heart rhythms, vascular disease and valve disease. Incidence of many of these problems increases with age. We estimate the total cardiovascular market is worth an annual USD 33.8 billion.

Cardiac rhythm management (CRM) devices and heart failure (HF) products constitute the largest single segment of the market (Fig. 10). These products include pacemakers (used to maintain or speed up the heartbeat), implantable cardioverter-defibrillator (ICDs, used to correct arrhythmias) and a wide range of devices used to monitor and prevent cardiovascular disease. These markets are largely mature, although new technologies are emerging in the heart failure monitoring space. For example, St Jude Medical/Abbott's CardioMEMS heart failure monitoring system is a device implanted in the pulmonary artery that can provide early warnings of worsening heart failure, allowing the patient to seek treatment before symptoms become apparent. Clinical data suggests CardioMEMS reduces hospitalization for heart failure, saving an average of USD 10,500 total healthcare costs in the six-month period following implantation, according to one study (Desai *et al*, JACC, 2017).

The coronary and peripheral vascular segments include balloons for coronary angioplasty (a procedure to unblock clogged arteries), drug-eluting stents (metal scaffolds placed inside arteries following angioplasty treatment to prevent restenosis), and atherectomy devices used

Fig. 10: Global cardiovascular market
Global market, total USD 33.8 billion



Note: CRM = cardiac rhythm management; HF = heart failure
Source: UBS Investment Bank. As of March 2017.

to remove plaque, typically due to cholesterol, from artery walls. Stents and related products are a mature market growing in the low single digits, with negative pricing.

Age-related degeneration of the heart tissue can lead to aortic stenosis, a condition where the aortic valve does not open fully, limiting blood flow from the heart to the body, and leading to heart failure and higher risk of death. Traditionally, treatment involves open heart surgery to replace the damaged valve, a highly invasive procedure that is not suitable for all patients, but a newer minimally-invasive technique known as trans-aortic valve replacement (TAVR) has made surgery possible via catheters inserted through the femoral artery. Clinical data have shown TAVR produces the same reduction in mortality risk as traditional surgery, while reducing time (and therefore cost) in both the operating room and intensive care unit. The potential for TAVR to develop into a multi-billion dollar market makes the structural heart segment one of the fastest-growing cardiovascular markets currently. Longer-term, minimally-invasive approaches to other more common heart valve dysfunctions, such as mitral valve replacement, will also become drivers of the structural heart market. We expect growth to settle in the mid to high single digits.

Unlike orthopedic procedures, which are largely elective, most conditions addressed by cardiovascular devices are immediately or potentially life-threatening. Economic sensitivity is therefore less than in the orthopedic market, although overall healthcare utilization can fall during times of economic stress, leading to fewer patients being diagnosed and treated. Overall, we estimate the cardiovascular devices market has mid single-digit growth potential, since the more mature categories face modest pricing pressure, while new technologies such as TAVR can expand addressable markets.

Consumer medical devices

We have grouped together three consumer-focused segments, i.e. corrective lenses, hearing aids and dental implants (see Fig. 11). Purchase decisions for these products tend to lie with the user: often the choice is made to improve quality of life (e.g. corrective lenses) or achieve a better outcome compared to an alternative (e.g. dental implants vs. bridges). Collectively, we estimate worldwide sales in these markets to be USD 21.3 billion, with a slightly higher growth outlook than implantable devices.

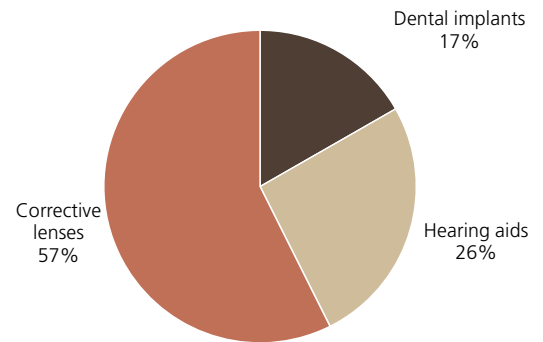
Corrective lenses

The aim of corrective lenses is to improve vision quality. According to market leader Essilor, more than 4.5 billion people globally have poor vision, but less than two billion of these currently benefit from vision correction. Of those with uncorrected vision, over 90% live in emerging markets.

The corrective lenses market is currently worth about USD 12bn (Fig. 12). The market benefits from several relevant long-term market trends, including urbanization in emerging markets, which leads to

Fig. 11: Overview of three major consumer medical device markets

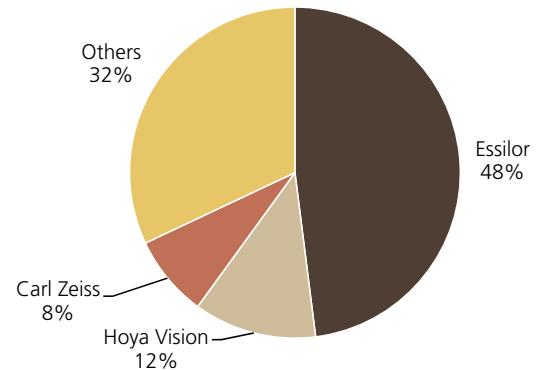
Global market, total USD 21.3 billion



Source: Company data, UBS estimates. As of March 2017

Fig. 12: Corrective lenses global market share

Global market USD 12.2 billion



Source: Company data, UBS estimates. As of March 2017

lifestyle changes like higher education levels and more use of computers, and the aging global population. Volume growth in developed markets is 2–3%, driven by a combination of aging (which leads to presbyopia) and a rising incidence of myopia (near-sightedness), particularly among the young. The natural replacement cycle (around every three years) provides an opportunity for existing users to move to higher-priced lenses, which should support higher average selling prices for the industry over time. In general, this "mix effect" contributes about 2–3% annually to industry growth.

Lower penetration in emerging markets means growth in these regions is currently about double that of developed markets: rising per-capita GDP supports increased market access (as more ophthalmologists set up shop) and enables more consumers to pay for premium lenses.

As people age, their vision often deteriorates. Presbyopia describes the condition where a lens can't focus, causing sufferers to lose the ability to see objects up close. This typically begins in the mid-forties and gets worse over time. The best solution for presbyopia sufferers is progressive lenses, which allow the wearer to see sharply at any distance. These lenses can generate a premium of more than 50% compared to normal lenses. Despite being invented in the 1950's, progressive lenses have yet to become the standard treatment for presbyopia, and still account for less than one third of lenses sold in most developed markets, although use is steadily increasing.

Several factors have contributed to the increasing prevalence of myopia (near-sightedness) in developed markets. According to the National Eye Institute, the prevalence of myopia in the US grew from 25% of the population aged 12–54 in 1971–72 to nearly 42% by 1999–2004. This has been widely attributed to more time spent reading (so-called "near work") and rising use of computers, leading to eye fatigue. These lifestyle trends look set to continue, especially in emerging markets where urbanization supports higher education levels, more office-based jobs and wider use of electronic devices. According to Essilor, more than 90% of 20–65 year olds in developed markets use digital devices every day and nearly two thirds spend four hours or more per day using computers.

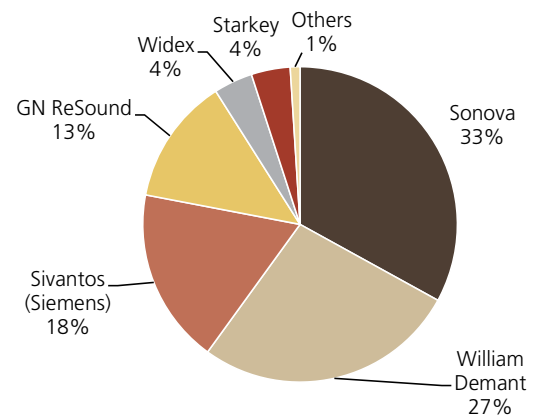
The corrective lenses market comprises many small companies and a few large players, who benefit from scale and global reach in R&D and marketing. While some countries provide partial insurance coverage for vision correction, glasses are usually an out-of-pocket purchase, so the corrective lens market exhibits some cyclicalty.

The demographic, social and economic trends supporting the use of corrective lenses look set to persist over the decades, as does the greater use of premium lenses. With these multiple drivers, we see the corrective lens market as attractive over the medium to long term.

Hearing aids

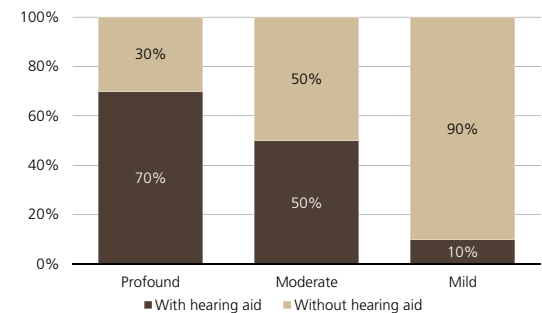
The WHO estimates that 360 million people, or one third of people aged 65 or over, suffer from disabling hearing loss. Hearing ability nat-

Fig. 13: Hearing aids global market share
Total market USD 5.5 billion



Source: UBS Investment Bank. As of March 2017.

Fig. 14: Hearing aid penetration rates
Percent of hearing-impaired using hearing aids, by degree of hearing loss



Source: Sonova. As of February 2016

urally deteriorates with age due to the degeneration of sensory cells in the ears. While aging is estimated to account for 85% of hearing loss cases, other causes include exposure to loud noise such as music, explosions or gunfire.

We estimate the hearing instrument market is currently worth around USD 5.5 billion (see Fig. 13), and is growing at low to mid single-digit rates. Trend volume growth is typically 2–4%, although in any specific year growth can fluctuate around this level as product cycles wax and wane. Hearing aid penetration is still relatively low, even among those with moderate to severe hearing loss (Fig. 14).

The wide use of bluetooth headsets has reduced the stigma associated with wearing a hearing aid, but many people are still reluctant to accept they need one: patients spend an average of 3–7 years deciding to get a device. For many patients, financial considerations limit the ability to buy a hearing aid, despite partial government assistance in some markets. Recent moves to improve access to hearing aids by allowing their sale over the counter may help to increase penetration, but could come at the cost of lower average selling price (ASP). Therefore, we see demographics (growth of the over-65 population) rather than increased penetration as the main future volume driver. Volume growth is partially offset by slightly negative like-for-like pricing. After accounting for the pricing benefit of new products, we estimate mid single-digit growth over the medium term.

Hearing aid quality has improved over the years: the introduction of digital hearing aids (starting in the late 1990's) was a step-change for the industry, followed by development of binaural hearing aids, which improve the overall sound reproduction for users with two devices, in the mid-2000's. The most recent innovation is greater integration of connectivity, allowing easier use with mobile phones and other electronic devices.

Historically, the hearing aid industry was characterized by a small number of manufacturers (no significant new company has entered the market since 1967) selling via a large number of independent audiologists. Recently, larger chains and "big-box" retailers have gained more importance in the distribution channel, which could pressure average selling prices for manufacturers. The industry has responded with vertical integration (manufacturers expanding their own retail networks), a trend which we expect to continue. The shift toward distribution in larger, more price-focused chain stores may make it easier for a new entrant to gain a foothold in the market, particularly if consumers embrace new devices featuring communications technology, where branding and connectivity with other devices is more important. More positively, lower average selling prices (ASP) may boost volume growth.

With few alternative treatment options for the hard of hearing, reliable demographic drivers and a wealthy core customer base (the over 65's) we see the hearing aid market as attractive over the medium to long term.

Dental implants

Dental implants offer an alternative to traditional treatment for replacement of lost teeth. Medically, implants are superior to traditional bridges as they help to preserve the underlying jawbone; they can also have aesthetic advantages. It is estimated that approximately half the population in developed markets are missing at least one tooth. We have included dental implants in the "consumer" category since they are not reimbursed and the decision to opt for an implant, vs. traditional treatment with a crown or bridge, is taken by the patient.

We estimate the dental implant market to be worth around USD 3.6 billion annually. Growth has decelerated from double digits in the last decade to mid single digits currently, as implant penetration has risen in developed markets.

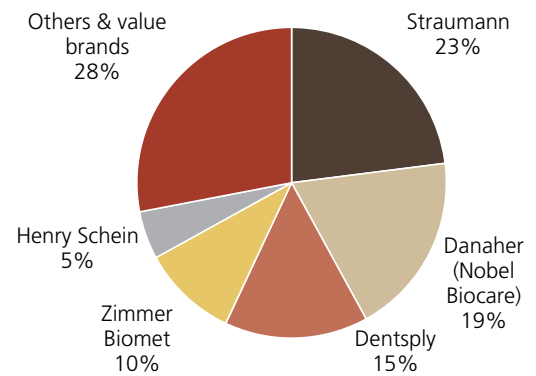
While penetration is still generally low (still below 15% of tooth restorations in the US, for example), many patients cannot afford dental implants, which can cost USD 3,500 for a single tooth replacement and up to USD 10,000 for a full denture in the US, and instead receive traditional treatment. Urbanization in emerging markets, which supports the desire and financial ability to improve one’s looks, and continued penetration of developed markets, are near-term drivers of the market. In the long term, we expect the market to grow in mid single digits as the value segment of the industry grows in importance.

As implant penetration has risen, the market has become more cyclical. Also, a value segment of companies has emerged which are less innovative but can provide functional implants at a reduced price. Value players now account for one third of the global implant market (Fig. 15), and established premium-quality implant makers have launched or acquired their own discount brands.

We expect this trend to continue, but should support increased penetration of implants. As long as premium manufacturers are able to innovate and differentiate their premium brands to maintain price, we think the industry can grow in the mid single digits in the long term.

Fig. 15: Dental implants global market share

Total market USD 3.6 billion



Source: UBS Investment Bank. As of March 2017

Appendix

Terms and Abbreviations

Term / Abbreviation	Description / Definition	Term / Abbreviation	Description / Definition
A	actual i.e. 2010A	COM	Common shares
E	expected i.e. 2011E	GDP	Gross domestic product
Shares o/s	Shares outstanding	UP	Underperform: The stock is expected to underperform the sector benchmark
CIO	UBS WM Chief Investment Office		

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