A silver opportunity

Global life expectancy is rising relentlessly, and Japan is leading the way. The average life expectancy at birth in Japan is 83.7 years (WHO, 2015) and is not far behind for highly developed nations, such as Switzerland, Singapore and Australia. In this environment, governments are looking at addressing an array of challenges associated with aging to contain and minimize its financial burden on both the social and health care systems.

Declining birth rates in many developed countries and the rise in life expectancy will rapidly increase the percentage of citizens over 65 years old. As of 2014, 26% of Japan’s population was over 65. With a birth rate of less than 8 per 1,000 inhabitants (2015), the over-65 cohort is expected to rise to 31.6% in 2030 and 39.9% in 2060.

Health care budgets around the world are under enormous pressure from rising health care costs. A main driver of this cost escalation is the aging society. The strain on health care budgets has led to cost containment initiatives by many governments, targeting all business stakeholders, including the pharmaceutical industry. The initiatives have put pressure on drug pricing and reimbursement and fueled efforts to accelerate the uptake of generics. Japan recently communicated its aim to increase the use of generic drugs to 80% by 2020, with two Japanese multinationals, Takeda Pharmaceutical Company Ltd. (in collaboration with Teva Pharmaceutical Industries Ltd.) and Daiichi Sankyo Espha (the generics business of Daiichi Sankyo Company Ltd.) already communicating their aims of becoming front-runners in the Japanese generics market.

The Japanese government has focused strongly on chronic diseases, where the anticipated cost burden associated with the aging population is highest. Diseases such as dementia, cancer and diabetes, as well as cardio, respiratory and cerebrovascular pathologies lead the way in driving up costs. These morbidities (or comorbidities) require frequent prescriptions, regular interaction with medical staff, and, in many cases, hospitalization, part- or full-time care center support or palliative care.

Over the last half century, there has been great progress in increasing life expectancy. Of primary importance now is reducing the number of years individuals must live with disease. Japanese men on average live with at least one disease for the final 9 years of their lives, women for 12 years. These numbers have not changed considerably over the last decade or so. Achieving even a seemingly small decrease of 6 to 10 months across the population would have a profound impact on health care and social care budgets.
We see the aging society, or “the silver economy,” as an opportunity for the pharmaceutical industry. We believe innovation for this economy can and will have a lasting impact by improving health and reducing costs in a number of areas, especially the following:

1. Innovation targeting aging and age-related diseases on a molecular level
   a. Therapeutic area-specific molecular innovation
   b. Preventive solutions
   c. Aging biology innovation
2. Innovation targeting aging and age-related diseases with added services
   a. Feedback loops
   b. Other innovative approaches
3. Exploring new territories
   a. Case example: home care

To capture these business opportunities, pharmaceutical companies will need to recognize which innovations are likely to have the biggest impact on reducing the burden of the aging society, but also how they will be reimbursed for their efforts.

1. Innovation targeting aging and age-related diseases on a molecular level

Continued R&D efforts to discover novel molecular treatments for age-related pathologies, such as Alzheimer’s disease, cancer, chronic obstructive pulmonary disease, and cardiovascular and cerebrovascular pathologies, as well as diabetes, will be the industry’s backbone and key to scientific, clinical and commercial success. Beyond traditional R&D, further dedicated efforts in disease prevention and regenerative medicine, which includes gene therapy and tissue engineering, show pronounced promise.

a. Therapeutic-area-specific molecular innovation
F. Hoffmann-La Roche AG (Roche) has been active in recruiting participants over 70 years old for selected geriatric clinical trials, such as the Avastin® trial aimed at treating ovarian cancer. In addition, Roche’s Venclexta®, Mabthera® and Tarceva® have all been tested specifically in individuals over the age of 60, showing the company’s commitment to this side of the age spectrum.

Alzheimer’s disease is an area of great interest. Leading players include Biogen Inc., Eli Lilly and Co., Roche and Takeda/Zinfandel Pharmaceuticals Inc., the latter recently completing recruitment for its TOMMORROW Phase 3 trial57 with its investigative agent Actos®. This trial is an excellent example of how therapies originally aimed at one specific chronic morbidity (diabetes) may be extended and “repurposed” to address another chronic disease, in this case Alzheimer’s. Additionally in the Alzheimer’s space, Eisai Co. Ltd. (Eisai) has signed and commenced a collaboration with Biogen aimed at discovering new chemical entities.

GlaxoSmithKline plc (GSK), Gilead Sciences Inc., Bayer AG and Daiichi-Sankyo have all conducted, or are currently conducting, trials on novel treatments for patients over 60 – for a wide range of morbidities, including HIV, hypertension, androgen deficiency and hypogonadism.

We will likely see many more such examples as drug manufacturers identify new chemical or biological entities, or revive and retest their current drug repositories, to focus on chronic and age-related diseases.

b. Preventive solutions
On the preventive side, Johnson & Johnson (J&J) has been active. J&J created the Janssen Prevention Center,58 where dedicated teams work to identify prevention markers, which direct J&J’s search for preventive solutions, such as vaccines, oral drugs and interventions influencing the human microbiome. Measuring, maintaining and extending healthy lives is the stated focus and aim of J&J's visionary program.
DO-HEALTH, a five-year clinical trial on preventive measures, sponsored by the University of Zurich (with support from Royal DSM, Roche and Nestlé S.A.,) aims to establish whether vitamin D, omega-3 fatty acids and home exercise will help prevent disease at an older age. Further, Takeda and Daiichi-Sankyo, together with the Chemo-Sero Therapeutic Research Institute (Kaketsuken), have initiated an expanded Japanese distribution network of seasonal flu shots for the elderly (regular vaccinations are required under the Japanese Preventive Vaccination Law).

Other global leaders in the immunology field include GSK, Sanofi Pasteur MSD and Astellas Pharma Europe Ltd. All have created initiatives on healthy aging.

c. Aging-biology innovation

In the regenerative medicine area, Japan-based Astellas Pharma Inc. recently formed a dedicated research unit with the goal of delivering cell therapy/transplant innovations aimed at recovering and restoring organ and tissue function lost as a result of aging, among other factors. The company also sees its research in the urology space as crucial, given that treatments for overactive bladder will likely be in increased demand.

Novartis International AG, a leading industry voice and innovator in the field of aging, boasts a wide range of programs focusing on the biology of aging and age-related diseases. Examples include its Afinitor®/everolimus (a rapamycin analogue) anti-aging work on mice and the company’s progress toward addressing various geriatric medical challenges, such as hearing and vision loss. Additionally, Novartis actively researches ways to address the challenges of osteoporosis and muscle loss/wasting in aged individuals, both major causes of loss of independence in the elderly.

Calico, a company founded by Google Inc. in 2013, also focuses heavily on research into the biology of aging, as well as age-related diseases. Strategic collaboration is a key element of Calico’s business plan, and several agreements have been signed to date – namely with AbbVie Inc., the University of Texas Southwestern Medical Center, the Broad Institute and the Buck Institute for Research on Aging. Calico’s collaboration with the California Institute for Quantitative Biosciences recently made headlines when animal studies highlighted that adjusting certain protein levels in aged rodents resulted in the mice living significantly longer. First-in-human trials are expected in the future.

In another collaboration, Ascentage Pharma and Unity Biotechnology Inc. have teamed up to develop new and innovative senolytic drugs based on their experience in age-related diseases and cutting-edge technologies, respectively. In Japan, Daiichi-Sankyo recently established a dedicated research unit named Venture Science Laboratories, focusing and collaborating solely on research targets thought to be related to aging.

2. Innovation targeting aging and age-related diseases with added services

While continued advances to molecular therapies are of paramount importance, some recent examples of inventive strategies have opened up alternative pathways to innovation. In many cases, these paths include, or are based on, creating feedback loops through data collection and analysis – arguably the single most critical requirement for health outcomes monitoring and reimbursement in the decades to come. Other innovative approaches include gamification, bioelectronics and artificial intelligence.

a. Feedback loops

A number of business models highlight how preventive medicine and wellness can be taken directly to individuals who have not yet, or might never become, patients. Arivale Inc. offers customers four health “paths,” one titled Age Optimally. Genetic, blood, saliva, gut microbiome and lifestyle data are collected, analyzed and evaluated, helping individuals make lifestyle and health decisions based on their personal information and scientific data. Personal coaches who interact with physicians in the background are available and support Arivale’s customers to address health risks related to their wellness. Huneo LLC, a start-up company, has specialized in storing vital-sign data of healthy individuals for extensive periods of time, allowing physicians to use the data in the future, if ever needed.
Counsyl, another start-up, helps individuals make decisions about their own and their children's futures, via pre- or post-conception genetic testing, enabling a potentially healthier future by identifying risks for disease. Established testing for the well-known breast cancer gene (BRCA1) is also available. SkinVision and Neurotrack Technologies also focus on early disease detection – for melanoma and Alzheimer’s, respectively. Further, Health Nucleus, a venture formed by Human Longevity Inc., aims to provide self-paying individuals, as well as up to 200 million South Africans and UK residents insured by health insurer Discovery, with whole exome, whole genome and cancer genome sequencing. The company intends to create the world’s most comprehensive database of whole genome, phenotype and clinical data.

In Japan, Daiichi-Sankyo announced it is looking to obtain real world data on, and therewith insights into, non-valvular atrial fibrillation in the Japanese elderly population (75 and over). The company's ANAFIE (All Nippon Atrial Fibrillation In Elderly) study is collecting data to investigate the use of anticoagulants and their impact on outcomes, and thus identify issues that are barriers to ideal treatment in this population. The study further aims to identify risk factors for thrombotic and bleeding events to determine the population in which direct oral anticoagulants may provide benefits.

b. Other innovative approaches

Pfizer Inc. has recently shared updates on its double-blind Alzheimer’s study run in collaboration with Akili Interactive Labs, an expert in gamification. Pfizer’s efforts are aimed at early non-invasive detection of Alzheimer’s via interpretation of a combination of digital and chemical biomarkers. Bayer has initiated digital health care activities in the Asia-Pacific region aimed at the elderly population with its Grants4Apps Singapore project, looking for innovative solutions to improve medication adherence in elderly people with chronic medical conditions.

Other innovative approaches to treat disease include the field of bioelectronics, where GSK recently signed a partnership with Verily Life Sciences (Alphabet Inc.’s life sciences unit) to codevelop products for chronic diseases such as arthritis, asthma and diabetes based on bioelectronic medicines.

Artificial intelligence (AI) and deep learning have been used for product development by some life sciences businesses, namely Life Extension, a Florida-based foundation providing nutritional and hormonal supplements. The company recently signed a collaboration with AI and deep learning firm Insilico Medicine Inc. to develop anti-aging technologies.

3. Exploring new territories

In addition to novel molecular treatments, repurposing of drugs, identification of biomarkers and geroprotectors, further innovation in the areas of medical devices, in vitro diagnostics and telehealth will likely have a pronounced impact on the aging society – especially as they impact home care.

a. Case example: home care

The Japanese government has identified home care as a key area with an immediate need for improvement. Research conducted for the Government illustrates that many elderly can maintain their independent lifestyles with only minimal support. Leading Japanese pharmaceutical manufacturers have for years donated dozens of ambulances and wheelchair-friendly vehicles to Japanese communities. While this is an immensely valuable contribution to the health and social care ecosystem and will certainly contribute to decreasing the incidence of long-term disabilities (e.g., fast transport/treatment on board an ambulance greatly reduces the
risk of long-term disability after a stroke or fall), other more radical innovations will be needed to tackle the aging challenge.

IBM Corp., Apple Inc. and Japan Post Holdings (JP) have begun an initiative customized for the senior population, connecting the elderly and their families directly with health care providers via computer tablets and cloud services. The aim is to improve patient quality of life by bringing app-based experiences and services, such as reminders, medication alerts, exercise and diet updates, and local community activity opportunities, to up to 5 million households by 2020. While Apple and IBM provide IT solutions, JP’s contribution comes from its nationwide infrastructure. This infrastructure is able to reach many citizens, as illustrated by the company’s current service offering to “check in” on the elderly as part of daily mail deliveries. JP has more than 24,000 post offices and financial relationships with millions of customers, largely through providing life insurance services.

Japan’s Eisai has identified a similar opportunity and partnered with NTT IT/NTT East (Nippon Telegraph and Telephone) to roll out an interprofessional program for medical treatment and care, allowing the elderly to continue to live in their communities. The collaboration, named “Hikari One Team SP” (“SP” for Solve Problem), aims to use the experience of all parties to deliver a comprehensive solution and give peace of mind and safety to the elderly and their families at home.

Remote monitoring and telehealth provide further opportunities for pharmaceutical businesses to collaborate with non-traditional players to get closer to their customers. Academic institutions such as the University of California, Irvine have conducted pilot studies in remote monitoring of elderly patients using tools such as the university’s CardioMEMS sensor, capable of remotely monitoring patient pulmonary artery pressure and heart rate.

Japan, a global leader in robotics and AI, has also seen a vast increase in investments into robotics aimed at the home care and nursing home markets. Numerous robots targeting these markets already exist, two examples being Pepper and Paro, which will be part of a US$6 million real-world study by Japan’s Agency for Medical Research and Development investigating the therapeutic effects of such devices in nursing homes.

While the pharmaceutical industry will likely remain hesitant to get involved in robotics, these examples show that potential opportunities for portfolio expansions and innovation may come from new and even radical collaborations that at first seem unlikely. In fact, collaborations with robotics and digital assistant manufacturers could become critical, as they may provide pharmaceutical businesses with much-needed outcomes data that will be required for reimbursement of their therapies and services. Further, not only outcomes data are valuable, but the improved understanding of end customers’ routines, daily struggles, challenges and concerns are as well.
Business models

The examples and discussion above highlight that the pharmaceutical and life sciences industry has already embraced some of the challenges and opportunities the aging society brings. Businesses often try to identify opportunities within reach of their current therapeutic areas and strategies, but in many cases do not go beyond that. While proven business models are indispensable, collaborating with digital, IT and cutting-edge technology businesses experienced in data collection and interpretation will become not only valuable but essential. Access to data still remains the biggest challenge for pharmaceutical companies attempting to gather health outcomes information. Business models will need to (be allowed to) evolve to include alternative paths to prevention or anticipation of disease. Therapeutic effects and the vectors defining or measuring these will need to be broadened. This can only be done via a collective push and comprehensive alignment of all stakeholders.

The current model of separation between health care and social care will need to be challenged. In a world where health outcomes data is key to physician and (elderly) patient confidence and will trigger reimbursement by payers, health care and social care budgets need to be managed in parallel. Governments and legislators will need to urge and request innovative organizations to show their contributions to both of these systems, and align with businesses as early as during the ideation and design phases of a new product or service. Only once this integration and truly cross-functional approach have been achieved will health outcomes data find its true power.

Starting with questions

It is clear there is no single solution to effectively address the growing health needs of the aging society. Pharmaceutical professionals will need to address a multitude of questions to be competitive and to adapt to the ever-changing commercial and regulatory environment. The impact of the aging society will need to be evaluated on a regular basis with dedicated teams closely aligned with regulators, governments, academics, payers and even disruptive players. To rise to the challenge and to make the appropriate strategic decisions, the industry may consider questions such as:

1. What are the current needs of the elderly and what will these be in 10 to 15 years?
2. How can these needs be addressed through molecular innovation, services or new approaches?
3. How can new solutions be delivered best, and with which partners?
4. How can we make the case for the value these solutions will provide and to whom? How will they be reimbursed and paid for?
5. Which data can and needs to be collected, and how?
6. What is the optimal portfolio of molecular innovation, services and new approaches to capture the current opportunity while getting ready for the future?
7. What are the innovative technologies or potential partners that are emerging and how can they be used to deliver disruptive services?

In this patient-centric world, likely one of the best places to start is by asking the affected population itself: what are elderly people worried about, what are their struggles and what is it they need?
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As populations age and chronic diseases become commonplace, health care will take an ever larger share of GDP. Scientific progress, augmented intelligence and a more empowered patient are driving changes in the delivery of health care to a personalized experience that demands health outcomes as the core metric. This is causing a power shift among traditional stakeholder groups, with new entrants (often not driven by profit) disrupting incumbents. Innovation, productivity and access to patients remain the industry’s biggest challenges. These trends challenge the capital strategy of every link in the life sciences value chain, from R&D and product supply to product launch and patient-centric operating models.

Our Global Life Sciences Sector brings together a worldwide network of 11,000 sector-focused professionals to anticipate trends, identify their implications and help our clients create competitive advantage. We can help you navigate your way forward and achieve sustainable success in the new health-outcomes-driven ecosystem.

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