



HEALTH ▸ HYGIENE ▸ HOME

CONSUMER HEALTH FUTURES

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EXPERTS



Bertalan Mesko

Dr. Bertalan Mesko, PhD, is The Medical Futurist and the Director of The Medical Futurist Institute. Bertalan analyses how science fiction technologies can become reality in medicine and healthcare, and has presented at Harvard, Stanford and Yale Universities and Singularity University's Futuremed course at NASA Ames campus. With a PhD in genomics, Bertalan is also an Amazon Top 100 author and a Private Professor at Semmelweis Medical School, Budapest.

Maneesh Juneja

Maneesh Juneja is a Digital Health Futurist who explores the convergence of emerging technologies to see how they can make the world a healthier and happier place. He has one bold vision that drives him: Finding ways to use data to improve the health of 7.7 billion people on Earth. His research extends beyond just understanding technology trends, but also includes economic, political and cultural trends. In 2019, some of the topics he is looking at include new models of care, digital biomarkers, and our relationship with machines as they become more intelligent. He has given talks in North America, South America and Europe to a range of audiences, with the aim of helping them understand how their organisations can survive and prosper in an increasingly uncertain world.



Jane Scott

Professor Jane Scott is Professor of Public Health Nutrition Research at Curtin University. Prior to this role, she worked as a clinical dietitian at Royal Perth Hospital, joined the University of Glasgow as its inaugural Senior Lecturer in Public Health Nutrition in the Faculty of Medicine and held the position of Professor of Nutrition and Dietetics in the School of Medicine at Flinders University. Professor Scott is an Advanced Accredited Practising Dietitian and in May 2013 was inducted as a Fellow of the Dietitians Association of Australia, with her research interests in public health nutrition and nutritional epidemiology. She is recognised internationally for her research into determinants of infant feeding practices and has published widely in leading international journals.



Marie-Claire Arrieta



Marie-Claire Arrieta is a Microbiome Scientist and Assistant Professor at the University of Calgary. Originally trained as a medical microbiologist in San José, Costa Rica, Arrieta moved to Canada to pursue graduate studies, completing MSc and PhD programs at the University of Alberta. Her doctoral work explored the role of intestinal permeability in the pathogenesis of inflammatory bowel disease. Through her work, she became interested in the concept of the gut as the engine of diseases that occur in organs far away from the gut. Following this, she completed a postdoctoral fellowship, studying the relationship between the gut microbiome, the gut's immune system and asthma.

Maria Konovalenko

Maria Konovalenko is studying biology of aging in a joint PhD program between University of Southern California and the Buck Institute for Research on Aging. Her research is focused on two topics including aging of stem cells in respiratory epithelium, and the roles of mTOR pathway and cellular senescence in aging. Maria has been involved in fighting aging since 2008. Maria's background is in molecular biophysics. She got both her Bachelor's and Master's degrees from Moscow Institute of Physics and Technology. Maria's goal is to make people live as long and as healthy as possible using the advances of science and technology.



FOREWORD

Change is the only constant in life and I see change every day in the world of consumer health. Globally, we're witnessing the multiplication and diversification of healthcare issues driven by a cocktail of constantly shifting biological, environmental, socioeconomic and lifestyle factors.

At the same time, consumer approaches to health and their expectations of healthcare solutions are changing. Empowered by technology and the wealth of information now at their fingertips, individuals are taking their health into their own hands, proactively seeking wellness and pre-empting potential ill-health.

Meanwhile, the growing sophistication of healthcare products already on the market, means that when consumers reach for curative solutions, their expectations regarding the speed and effectiveness of these are, quite rightly, high.

At RB we have a strong heritage in innovation, and we also have an immovable belief in person-centric healthcare. This is why we have partnered with The Future Laboratory and world-leading experts in the fields of digital health, microbiome science and the biology of aging to explore how the lives of people around the world are changing so we can predict the implications for consumer health.

The result exposes the substantial innovation requirement within consumer healthcare and acts as a critical roadmap for where we must focus our innovation efforts to deliver health and wellbeing at every stage of life.

What is also abundantly clear is that doing more of the same is simply not an option. Healthcare needs are now too big, too numerous and too complex to be met by one entity, with solutions developed over long periods of time behind closed doors. Instead we must evolve our approach to innovation and explode disciplinary and organisational silos to drive collaboration in the healthcare market.

This is our call to arms for innovators to partner with us. These partnerships are critical in delivering new consumer health solutions today and for the future.

We are passionate about collaborating with academics, healthcare professionals, entrepreneurs, start-ups and large companies to develop new physical and digital healthcare products and services. Through forging new and extensive partnerships, we hope to bring together unique and diverse perspectives, expediting the process of translating ground-breaking research into real products that meet the health challenges of today, tomorrow and the future.

Read on to find out more about RB at www.rb.com/innovation and get in touch via partnerwithus@rb.com



David Evendon-Challis,
VP Innovation - RB



THE : FUTURE : LABORATORY

PART 1: OVERVIEW

The Global Health Challenge

As the health needs of patients and populations continue to grow in both number and complexity, health systems across the globe will come under increasing pressure.



The worldwide proportion of the burden of chronic disease is expected to rise to 57% by 2020,¹ with emerging markets hardest hit in line with population growth.² In developing countries, pressure on healthcare systems will be exacerbated by ageing populations and an increase in people living with diseases related to old age. By 2050, the proportion of people living with dementia is predicted to double, with 1.4% of the global population affected – translating to some 131.5m people.³



Growth in global healthcare spending is projected to almost double to an annual rate of 5.4% between 2018 and 2022 compared to just 2.9% between 2013 and 2017.⁴ At the same time, healthcare resources are under fire, with funding in many countries being depleted and a global shortage of 15m health workers forecast by 2030.⁵ A fundamental shift in attitudes to health combined with radically more efficient solutions is therefore essential in order to avoid crisis.

‘We have to fill the digital gap in healthcare or risk failure,’ says Dr Bertalan Meskó, Digital Health Futurist and Director of The Medical Futurist Institute. ‘In the next five to 10 years, we’ll witness a paradigm shift as technology empowers consumers who want to be involved and engaged to take control of their health.’

This report by strategic foresight consultancy The Future Laboratory, in partnership with leading global consumer health company RB, explores how environmental, cultural and technological shifts will affect people’s health needs over the next two decades. It will examine how the healthcare industry will need to evolve and partner to support consumers throughout their lives, and the innovative solutions that will enable people to take their health into their own hands.

PART 2

CONSUMER HEALTH FUTURES

Health is described as ‘a state of complete physical, mental and social wellbeing’ by the World Health Organization (WHO). This description lies at the heart of future healthcare, with governments, organisations and consumers taking a proactive 360-degree approach to wellbeing. How this approach is manifest will depend largely on life stage.

◀ LIVING A HEALTHY LIFE

In the coming decades, societies will become increasingly sophisticated, but lifestyle and quality of life will continue to be affected by chronic conditions and everyday pain.



Chronic conditions will define the next decade, accounting for almost three-quarters of deaths worldwide by 2020. The number of people living with diabetes globally is expected to rise by 51%, reaching 629m by 2045.^{6,7} Muscle and joint pain, meanwhile, will continue to have an impact on daily lives, with an estimated one in five adults worldwide now suffering from pain and another one in 10 adults diagnosed with chronic pain annually – an issue that is set to be exacerbated by an ageing global population.⁸

As Digital Health Futurist Maneesh Juneja says: ‘The existing model of care is broken, unsustainable and not fit for purpose, given ageing populations are contributing to a rise in the number of people living with long term conditions, such as chronic pain.’

As a need for reform is realised, consumers, healthcare systems and businesses will need to create new collaborative approaches that integrate health and wellness into the very fabric of consumers’ everyday lives. These solutions will be shaped by shifting consumer needs and demands, which are set to be affected by three global drivers over the next 10 to 20 years: increasing urbanisation, a popular desire to take health into our own hands, and widespread digitalisation.



Urban Mindsets

Rapid urbanisation is increasing the burden on healthcare systems by facilitating less healthy lifestyles.

The future of humanity is an urban one. By 2030, consumers in large cities will account for 50% of the world's population, generating 81% of global consumption.⁹ This shift will have a positive economic impact, but risks negatively affecting people's lifestyles by propagating unhealthy behaviour.

Proximity to convenience food outlets, increasingly sedentary lifestyles and a lack of green space will contribute to an obesity epidemic that will affect nearly 25% of the global population by 2045.¹⁰ Threats to health will be increased by inner-city pollution; more than 80% of urban areas already have levels of air pollution higher than those recommended for health reasons.¹¹ At the same time, mental health will suffer. City dwellers have an almost 40% higher risk of depression than those in rural areas, and more than 20% more anxiety.¹²

With exercise and increased physical activity being an integral means of preventing and treating chronic pain, lifestyle shifts from rural to urban will increase the burden on healthcare systems. Further pressure will be added by the rise in chronic diseases associated with higher levels of obesity and exposure to pollutants.

Self-help

With global healthcare systems under pressure and in response to feelings of exhaustion, people are beginning to take health matters into their own hands.

The speed of modern life is increasing and so are stress levels. Employee stress has risen by nearly 20% in just three decades, with 48% of adults believing that stress and busy lifestyles play a large role in stopping them from eating healthily.^{13,14} As a result, consumers are seeking solutions to help them cope, with three in four people (75%) expecting brands to make more of a contribution to their wellbeing and quality of life.¹⁵

Over the next two decades, this development will mean personal health will increasingly be affected by consumers looking for convenient and seamless healthcare solutions.

‘When it comes to pain management, speed of relief will be key, whether people are seeking treatments for physical or mental ailments,’ according to John Creek, Director of Disruptive Innovation at RB. Among healthcare brands, he continues: ‘It’s a fight for which combination of solutions can best deliver on speed of relief.’

The ultimate convenience, however, will be found in prevention. This will be true on an individual level, as a personal desire for efficiency accelerates a shift towards a new mindset that will see consumers take health into their own hands. On a societal level, meanwhile, rising healthcare costs and increasingly stretched healthcare systems will make this change an economic necessity.



Digital Citizenship

Unprecedented access to technological innovations, such as smart devices and artificial intelligence (AI), is empowering consumers.

Technology, such as smartphones and wearables, is enabling people across the globe, including those in many emerging markets, to get online. Global smartphone use is forecast to increase by 33% from 2018 to 2023, while a steady pace of growth in the wearables market will see sales totalling 229.5m units within the next two years.^{16,17}

Personal healthcare innovations will grow in tandem, with the number of consumers using apps to track health data more than doubling since March 2014.¹⁸ As wearables become increasingly sophisticated through the addition of AI, consumers will be able to create eco-systems of connected devices, enabling access to hyper-specific personal data on demand. The power is in the data not the devices - it will enable people to self-diagnose and manage their conditions remotely, placing digital citizens in full control of their own health.

'Let's say you're diagnosed with diabetes or high blood pressure in 10 years' time,' says Maneesh Juneja. 'Healthcare systems will track your data in real time and know if you're deviating from your recommended diet or treatment plan, then send you a digital nudge.'



◀ WHAT THIS MEANS FOR HEALTHY LIFE SOLUTIONS

These three forces will combine to drive health sector innovation in four major areas over the next decade: AI Diagnosis, Personalised Medicine, Nano-tracking and Targeting, and Virtual Relief.

AI Diagnosis

Artificial intelligence is already being harnessed to detect disease earlier and more accurately. Over the next two decades, through responsive tracking and active diagnosis, artificially intelligent technology is set to become a health confidant for consumers.

According to healthcare start-up Babylon Health, its app achieves a score of 81% on a diagnosis exam, compared to a five-year average score for human clinicians of 72%. This accuracy will enable a future when consumers can self-diagnose more and more conditions with confidence. [Recent analysis on the near-term value of AI applications in healthcare estimates that this technology could save up to £113bn \(\\$150bn, €131.7bn\) annually for the US healthcare economy within the next seven years.](#)¹⁹

AI algorithms will soon become more predictive in nature, able to assess a person's vital measurements in real time, including heart and respiratory rate, as well as hydration, blood pressure and blood sugar levels, in order to predict chronic health conditions even before they appear.





Early iterations of this technology are already being developed. 'Google and Amazon have both published patents for their smart speakers to create an audio-signature of a user in their home,' says Maneesh Juneja. 'One day, the speaker might be able to detect our emotional and physical state. Imagine when these speakers can detect when we are coughing or sneezing, infer you are coming down with the flu, and the AI can then seamlessly place an order for the most appropriate medication.'

The use of AI will be welcomed by digital citizens, with 54% of consumers across Europe, the Middle East and Africa willing to talk to an advanced computer or robot with AI to answer health questions, diagnose conditions and recommend treatments. This number rises to 94% of respondents in Nigeria and 85% in Turkey, where a lack of legacy issues and less red tape enable greater flexibility.

'Healthcare should be invisible and preventative, focusing on living a longer and healthier life, not just catching diseases early when they are already present,' says Dr Bertalan Meskó. 'AI is the key technology that can help realise this future.'

Personalised Medicine

People's growing desire to self-diagnose and track increasingly sophisticated data about themselves is pointing towards a future of personalised healthcare.

Engineers at Rutgers University have already developed a microchip designed to be integrated into personal devices, such as an Apple Watch, to analyse sweat for different biomarkers and identify signs of ill health. The device ascribes a barcode to microparticles such as bacteria, viruses and environmental pollutants, notifying the wearer of their presence in the body.

Maneesh Juneja believes that this trend will be taken one level deeper in the near future, as diagnosis, treatment and ongoing management become personalised on a genetic level:

'If you can sequence your genome and understand your genes, then the drug, dose and formation that works exactly for you can be identified, ensuring you're prescribed the right drug at the right time at the right dose, with the right treatment regime.'

According to Maneesh Juneja and Dr Bertalan Meskó, levels of personalisation will advance further through 3D-printing, which will enable the supply of hyper-personalised drugs.

'Imagine a future in which you get a personalised prescription that you can download, and the drug gets printed in a unique quantity, shape and dosage that's tailored to your body,' says Maneesh Juneja.

For Dr Bertalan Mesko, this personalisation will soon also extend to non-prescription treatments: 'It will be possible to customise over-the-counter (OTC) products. In this future, pharmacies could become a hub for this kind of personalised medicine,' he says.



Nano-tracking and Targeting

Nanotechnology – the use of materials at a molecular or subatomic level – has wide implications for healthcare, including diagnosis, condition management and drug delivery. In the next two decades, ingestible digital medications are likely to be widely adopted, with the US Food and Drug Administration (FDA) recently approving the world’s first digital drug.

Ingestible smart pills, modified to include sensors made from naturally occurring materials, will monitor things such as stomach acid and body temperature, notifying patients and healthcare professionals if action needs to be taken.

‘Wearable, ingestible and digestible sensors stand to provide access to real-time, high-fidelity data on individuals, helping anyone understand their health,’ says Dr Bertalan Meskó. ‘Even more importantly, this understanding has been shown to fuel behavioural change.’

As we head further into the future, this technology will become increasingly complex.

‘Bioelectronics is just a vision at the moment,’ says Maneesh Juneja. ‘But in the future a miniaturised implantable device could be injected into the body, reading and correcting electrical signals that pass along the nervous system.’

Already, bioelectronic devices have proved effective in reducing pain for patients with lupus. In the future, this kind of technology will revolutionise pain management, with bioelectronics able to block pain messages to the brain. New knowledge about the causes of pain is enabling the creation of next-generation medicines designed to target specific parts of the body, or only work in areas affected by injury or inflammation.

In a bid to combat chronic inflammatory pain, Jelena Janjic, Associate Professor of Pharmacology at Duquesne University, is using nanotechnology to target the immune system. Drawing on the field of cancer research, Janjic’s idea is to insert tiny amounts of over-the-counter pain medication into minute carriers called nanoparticles, and then inject these into patients’ own immune cells, which would travel through the body to places where there is inflammation to relieve pain.

Such developments have been facilitated by a greater understanding of types of pain, which, over the next two decades, will inform new super-targeted health solutions. As genome sequencing and molecular diagnostics result in a better understanding of the precise nature of diseases and pathways, these kinds of solution will extend beyond pain management to encompass other types of health issues too.



Virtual Relief

In the next decade, virtual reality will offer a key means of pain treatment:

‘Studies have shown that VR can reduce pain in a quantifiable way, but currently only when medical professionals act as guides for patients while using such a new technology,’ says Dr Bertalan Meskó. ‘When a burn victim can fly through snowy mountains in VR, for example, they objectively feel better, and pain is reduced.’

Maneesh Juneja predicts that in the near future VR pain management will become mainstream.

‘A recent study from Cedars-Sinai Medical Center in Los Angeles successfully used VR experiences as a form of pain therapy. Imagine how powerful that could ultimately be in the hands of consumers,’ he says.

BreatheVR is one product paving the way. Using the Samsung Gear VR and Oculus Rift headsets, it lets users see their breathing represented by leaves rising and falling in a calming meadow. By repeating this process, users develop a pattern of diaphragmatic breathing, important for the treatment of chronic pain.

◀ A HEALTHY START IN LIFE

A healthy start can have a life-long impact on a person's physical, mental and social development.²¹

'The first 1,000 days from conception represent a period of plasticity,' says Jane Scott, Professor of Public Health Nutrition Research at Curtin University. 'It's a critical time as there's an opportunity to programme our future health. Poor nutrition is associated with chronic disease development and metabolic problems later in life.'

The importance of pre-natal and early years nutrition is set to grow concomitant with increased awareness among consumers and the fast pace of scientific discovery; for example, surrounding the importance of the microbiome.

'We have been learning about the microbiome for only 15 years,' says Marie-Claire Arrieta, Microbiome Scientist and Assistant Professor at the University of Calgary. 'But we have already identified numerous links between the microbiome and health issues such as asthma, allergies, diabetes and obesity, and the list is growing.'

Understanding how domestic lifestyles are set to change over the next two decades will be key to delivering the products and services required to provide long-term positive health outcomes, with three major forces making an impact: changing family dynamics, transformation to global diets, and the creation of new pre- and post-natal demands.

THE HUMAN MICROBIOME

The human body is host to several communities of micro-organisms, such as bacteria, single-celled organisms called archaea, fungi, viruses and other microbes. Together, these form the body's microbiota. The human microbiome is a collective name for all the genes within the microbiota.

The microbiome has a greater complexity than the human genome itself. It has extensive functions such as development of immunity and defence against pathogens. The microbiota also contributes to nutrition, including the production of short-chain fatty acids important for energy metabolism, synthesis of vitamins and fat storage. It can also influence human behaviour and mental health. Vital to human wellbeing, the microbiome is now a key focus for 21st-century healthcare.

New Family Dynamics

Family structures and dynamics are changing with increases in divorce rates, as well as non-marital cohabitation, single parenthood and same-sex parenting.

In the next 20 years, changes in household and family structures will accelerate. Almost one third of households with children in Japan (32%) and Austria (31%), and more than one quarter in the United States (27%), will be headed by a single parent in 2030.²²

As family structures change, so too will the dynamics within them, with more families choosing to live apart and abandon traditional gendered roles and responsibilities.

These shifts will have a major impact on infant nutrition and the microbiome, as new family structures make it harder for parents to have direct control over their children's diets, increasing the need for a high-quality weaning solution.

'There's almost an outsourcing of feeding of children to others through nursery and childcare settings, and even other family members,' says Professor Jane Scott. 'Regardless of intentions, they may or may not follow instructions or provide the right kind of food'.

Dave Evendon-Challis, VP Innovation at RB comments on this: 'Taking into account these new dynamics, the whole approach to instilling healthy habits needs to be reviewed. It's not enough to simply communicate how to be healthy because we can see from the prevalence of obesity that messages alone do not work. We have to find new ways to mitigate the risk of obesity and resulting co-morbidities through ingredients in food for example and the use of smart technology during weaning. This applies to allergy presentation too, so we are looking at these areas differently to find solutions earlier in life.'





Changing Diets

From the search for convenience to ethical and health concerns, the diets of global consumers are being transformed as nutrition is prioritised.

‘Processed foods make up a significant proportion of the food that we eat now,’ says Marie-Claire Arrieta.

44% of countries affected by poor nutrition also suffer from high levels of obesity.²³ Growing awareness of the health risks of easily accessible, convenient food is driving change in diets around the globe, as poor nutrition produces exploding rates of cancer, diabetes and heart disease.

In Hong Kong, 22% of the population reports practicing some form of a plant-based diet, while in China new dietary guidelines released by the government are encouraging the nation’s 1.4bn people to reduce their meat consumption by 50% within the next 10 years.^{24,25}

A combination of ethical and health concerns is driving similar dietary changes elsewhere, as a growing number of Millennial and Generation Z consumers switch to plant-based diets or adopt niche clean eating trends for these reasons, with the global substitute meat market expected to grow 7.7% annually over the next six years, reaching £5.7bn (\$7.5bn, €6.6bn) by 2025.²⁶

Pregnancy Wellbeing

Information overload, alongside societal shifts, such as rethinking traditional gender roles, are creating new pre- and post-natal demands.

Pregnancy advice can vary drastically from hospital to hospital, country to country and culture to culture. As technology and globalisation encourage borderless living, this conflicting advice is instantly accessible regardless of geography, raising questions about correct approaches and stoking confusion among mothers to be and pregnant women.

Social media and the emergence of influencers have served to exacerbate the issue. 'It really is affecting nutrition,' says Professor Jane Scott. 'People who are unqualified are ready to offer all sorts of advice. These people might have millions of followers, and it's just magnifying the dangers.'

At the same time, depression and anxiety during pregnancy, due to numerous factors, is increasing. According to a recent study, young women in the UK are now 51% more likely than their mothers to experience depression and anxiety during pregnancy.²⁷ Each of these factors is leading expectant parents to demand new-found clarity around pregnancy.



◀ WHAT THIS MEANS FOR HEALTHY START SOLUTIONS

Over the next two decades, infant nutrition solutions will become increasingly important for the future health of infants across the globe. This, alongside new fields of scientific research and technological developments, will define the health needs of infants and mothers, welcoming the innovations: Probiotic Personalisation, Regional Nutrition, and Vaginal Seeding.

Probiotic Personalisation

The human microbiome market will be worth £2.4bn (\$3.2bn, €2.7bn) within the next five years.²⁸

‘Start-ups are now trying to harness microbiome science, for instance by analysing what bacteria people (adults) have in their faeces,’ says Marie-Claire Arrieta. ‘Further in the future, we will see more functional tests of the microbiome.’ Such tests can enable parents and children to better understand their gut, and make dietary and lifestyle changes to benefit their current and future wellbeing.

As research on the microbiome continues to grow in scope and complexity, new findings will be harnessed to create next-generation probiotics that provide infants with a particular combination of microbes designed to prevent conditions that they might be at risk of.

‘A number of biotech companies are designing next-generation probiotics that could one day be prescribed post-birth to prevent asthma in a child or to treat obesity,’ says Marie-Claire Arrieta. ‘Clinical trials of solutions combining different cocktails of microbes designed to treat or prevent certain health conditions are under way.’

Seres Therapeutics is one start-up innovating in this area. Designed to be administered post-birth, its Ecobiotic drugs contain combinations of selected microbes that may catalyse a shift of the microbiome from a state that supports disease to a state that supports health. The company is undergoing multiple stages of pre-clinical and clinical testing to optimise their safety and efficacy before being considered for approval.

Microbiome research and therapeutics firm Commense, meanwhile, has licensed a live biotherapeutic product for preventing childhood asthma and potentially other childhood allergic diseases from the University of British Columbia, with its approach involving the administration of four types of bacteria post-birth.

Regional Nutrition

With diets varying greatly from country to country, taking a regional approach to the hunt for cheap, high-quality weaning food will provide benefits.

‘It’s not about changing people’s diets completely, but about finding something that can be easily manufactured and which is not alien to people’s existing diets,’ explains Professor Jane Scott. ‘The solution might be nut-based, it might contain a small amount of animal protein – but an ultimate solution will vary from region to region.’

With 87% of younger Millennial parents (18–24) and 84% of older Millennial parents (25–34) believing it’s important to expose children to a variety of foods so they do not develop allergies,²⁹ more experimental, as well as nutritionally fortified, baby foods will become increasingly popular, with added nutrients tailored to specific regions.

‘I can imagine that the food industry is going to continue to fortify foods with extra ingredients such as fibre in a palatable way that drives consumption,’ says Marie-Claire Arrieta.

The need for this kind of innovation will become increasingly important over the next two decades as climate change comes to impact nutrition. Rising levels of carbon dioxide will serve to make crops less nutritious, affecting different regions in different ways. Experts predict that such changes could result in about 122m people becoming protein-deficient³⁰ by the middle of the 21st century, while the number of people with zinc deficiency will increase by 175m.





Vaginal Seeding

As the number of babies delivered by Caesarean section rises, vaginal seeding – where vaginal secretions of the mother are applied to the surface of the baby post-birth in order to replicate exposure during vaginal birth – is becoming a more common practice.

C-section births increased from 16m (12.1% of all births) in 2000 to 29.7m (21.1% of all births) in 2015, with excess weight gain during pregnancy a key driver of this trend.³¹ ‘Babies born via C-section have a higher risk of asthma due to the impact on the microbiome,’ explains Marie-Claire Arrieta, with babies born this way exposed to fewer bacteria than those born naturally, which can affect gut health throughout life.

‘The limited number of studies on vaginal seeding show that this practice seems to restore some of the difference associated with C-sections when it comes to the microbiome,’ says Marie-Claire Arrieta. ‘However, clinicians, in particular gynecologists, are really worried about the potential of infection by doing this. This has to do with potential pathogens in vaginal secretions.’

Creating a product that replicates the beneficial aspect of exposure to vaginal secretions could help remove the risk of transmitting disease. Biotech brand Commense has obtained a license from New York University for an approach focused on replenishing and bolstering the microbial exposure that a baby experiences during passage through the birth canal. The solution is likely to take the form of a gauze containing vaginal flora that is swabbed over the face and body of a baby after birth.



◀ AGEING WELLNESS

The world's population is ageing, and this demographic transformation is set to have a major impact on healthcare for all sectors of society.

The number of older people – those aged 60 or over – is expected to more than double by 2050, rising from 962m worldwide in 2017 to 2.1bn. And it's a phenomenon that will have a global impact: while Europe is now the region with the greatest percentage of population aged 60 or over (25%), in 30 years all regions of the world except Africa will have reached this milestone.

As rising global lifespans are being applauded as a triumph of economic, medical and technological development, issues ranging from brain disease to chronic pain threaten to undermine the potential benefits of an extended life. Against this backdrop, the focus will need to shift from chronological to biological age to ensure longevity is matched with good health.

Three major forces will define the health needs of older consumers over the next two decades: fundamental changes to the world of work, the rise of social isolation, and a growing reliance on technology.

Silver Workers

As working lives are extended, fundamental changes to the world of work will usher in the era of the silver worker.

As people not only live longer, but also healthier lives, older consumers will find themselves able to remain in work for longer. The seeds of this future are already visible, with 58% of Millennial consumers in the US planning to work in retirement and almost one in five (19%) planning to do so full-time.³³ In Japan, meanwhile, the government has approved plans for raising the optional age for drawing public pensions to 71 or older.

Workplaces will need to adapt to these demographic changes to ensure the wellbeing of older workers. Once this happens, there are significant additional health benefits for those who stay in work.

While studies have shown that working can aid resilience in later life by boosting cognitive function, physical changes need to be overcome first to ensure that older consumers can enjoy these benefits.³⁴

‘There are many physical changes to contend with,’ says Maria Konovalenko, Biology of Ageing expert. ‘Chronic inflammation is a serious problem for older people, but we can begin to solve these issues as our understanding of basic mechanisms grows.’



Later-life Loneliness

Social isolation and loneliness are on the rise, threatening the health and wellbeing of older adults worldwide.

By 2025/2026, 2m people over 50 in the UK will suffer from loneliness, representing a 49% increase on the number recorded in 2015/2016. A US study from SeniorCare.com revealed that 52% of respondents reported being lonely, while in Japan it is predicted that 40% of the country's inhabitants (all households) will be solo dwellers by 2040.^{34,36,37}

The negative health impact of loneliness is real and wide-ranging, with studies showing that its effect on mortality is comparable to better known risk factors such as obesity or smoking. According to the UK's Royal College of General Practitioners, loneliness makes a person 50% more likely to die prematurely than people with a healthy social network, while lonely people are also more susceptible to illness, chronic inflammation, cardiovascular issues and depression.

'Social connections represent a significant component of longevity,' says Maria Konovalenko. 'Loneliness is massively detrimental to health, while people who live long, healthy lives have supportive communities.'





Connected Minds

Hyper-connectivity and growing reliance on technology are changing the expectations of older consumers.

By 2025, an average connected person anywhere in the world will interact with connected devices nearly 4,800 times per day – about one interaction every 18 seconds – up from an expected 601 in 2020.³⁸ In a rapidly ageing population, seniors stand to benefit from adopting technology that can actively help to improve quality of life.

There are signs that this is beginning to happen, with 42% of US adults aged 65 and older owning smartphones in 2017, up from just 18% in 2013.³⁹ In years to come, as digitally focused Millennials begin to enter old age themselves, technology will have an even greater impact on this demographic.

‘Technology is going to have a massive impact on older consumers’ expectations,’ says Sarah Smith, Head of Science & Technology Consumerisation at RB. ‘For healthcare, the expectation is that they will be able to have assurance about healthcare issues, treatment, access to health professionals, all made a lot easier because of digital.’

◀ WHAT THIS MEANS FOR AGEING WELLNESS SOLUTIONS

As the global population ages, society will become increasingly dependent on older consumers and healthy ageing will emerge as a priority for societies globally. Global demographics will demand a shift in both the mindsets of older consumers and society as a whole, as the social context of ageing is dramatically reframed, facilitating the emergence of a wealth of health innovations designed for older consumers: Slowing the Process, Health-focused Homes, and Digital Companionship.

Slowing the Process

As the fight against the negative impacts of ageing is prioritised, older consumers will embrace a preventative approach to health.

‘If we slow down ageing, even just by a little bit, we will be able to extend the healthy period of life,’ says Maria Konovalenko. ‘Preventing ageing in this way could enable us to postpone or reduce some of the age-related pathologies that people suffer from in later life.’

As ageing symptoms vary from person to person, with people ageing in different ways and at different rates, health-tracking and enhanced personal data will facilitate the emergence of personalised ageing prevention solutions.

‘Once people can access their health data in a highly digestible and interpretable way through health apps, and we develop a set of clinically verified biomarkers or parameters they can track, that will be game-changing,’ says Maria Konovalenko. ‘Then we could test different diets, for instance, and monitor whether someone’s biological age would change.’

This opportunity will be further enhanced by developments in epigenetics, a field of science that examines additional information, or marks, layered on top of DNA, caused by the addition of methyl to a DNA molecule that occurs as people age. Looking at these marks enables the determination of a person’s epigenetic age, a more accurate assessment of their life expectancy than their chronological age. Studies have shown that the epigenetic clock can predict when someone will die more accurately than their actual age, even after accounting for known risk factors.



Health-focused Homes

As more devices connect through the Internet of Things (IoT), the homes of older consumers will become equipped with a suite of connected products that can monitor health and assist where necessary. The functionality of these suites will range from recognising when someone has fallen over to voice-recognition software able to detect the verbal clues given off by people in the early stages of degenerative diseases.

‘Amazon’s Alexa is being installed beyond our homes, even into our cars. Researchers are exploring whether voice data could one day help us detect early signs of Alzheimer’s and Parkinson’s,’ says Maneesh Juneja. ‘It begs the question, what new source of health data can we track and what could we learn about things that are impacting our health?’

A recent patent from Google is hinting at this future, with the brand exploring an optical sensor that can monitor cardiovascular health. The device, which could be embedded in a bathroom mirror, works by tracking blood flow dynamics in the body. For example, changes in skin colour could indicate a problem that might initiate additional monitoring through other sensors or wearable devices.

Digital Companionship

‘One of the key challenges facing our ageing population,’ says Sarah Smith, ‘is how do you remain part of, and an active contributor to, society, and maintain social connections which are so important to people’s health?’

Newly connected seniors, along with digitally savvy Millennials set to enter old age, will be able to maintain these connections like never before through new technological innovations. These innovations will encompass all kinds of technology, from AI-enhanced robotics to VR.

Catalia Health’s Mabu, for instance, is a conversational robot that can provide user-tailored conversation as well as data about health issues. CT Asia Robotics’ Dinsow robot, meanwhile, helps older consumers to stay active and engaged by connecting them with their families.

Over the next two decades, robotic technology is likely to be combined with virtual and augmented reality concepts to enhance the experience for users. In future, elderly consumers will interact with their friends, family and robotic companions in a virtual setting, eradicating geography and mobility as barriers to maintaining social connections.

While not explicitly aimed at older consumers, platforms like vTime represent the early stages of these solutions to social isolation. Using low-cost Google Cardboard headsets, vTime brings users’ digital avatars together in a virtual setting, enabling them to interact and socialise with each other regardless of geography. As these platforms become increasingly immersive, they can enable seniors to maintain social connections and reap the health benefits associated with doing so.



PART 3: CONCLUSION

Over the next two decades, accelerating demographic, cultural and technological shifts will fundamentally alter both the lives and the health needs of consumers across the globe.

As consumers become hyper-connected, highly urbanised and accustomed to radical levels of convenience, changing lifestyles, needs and expectations will create challenges and opportunities for healthcare. Meanwhile, accelerated population growth, as well as ageing populations and the resulting increase in patient numbers, will lead to a heightened need for innovation across health and medicine.

Bridging the gap between consumer expectations of living longer in an optimal state of wellbeing, and the increasing complexity of healthcare due to significant lifestyle and environmental changes, will be key to future human prosperity from pre-birth to old age.

The following key innovations and spaces are emerging:

Living A Healthy Life

- ▶ Personalised medicine, tailored and optimised for individuals' needs in terms of quantity, shape and dosage
- ▶ Nano-tracking and nano-targeting will enable consumers to monitor their health on a molecular level, and target conditions and symptoms such as chronic pain and inflammation at source
- ▶ Health platforms that embrace new technologies, such as AI and VR, will provide diagnostic insights and information

A Healthy Start In Life

- ▶ Next-generation pre and probiotics that support microbiome health will be complemented by at-home microbiome tests
- ▶ Regional infant nutrition solutions that compliment specific local diets will also help to account for potential negative nutritional impacts of climate change
- ▶ Vaginal seeding solutions will replicate natural birth and remove some health risks associated with C-sections

Ageing Wellness

- ▶ Digital platforms will seamlessly monitor older consumers' health and enable them to stay socially connected
- ▶ Longevity plans will be tailored to individuals, based on biomarkers and epigenetics
- ▶ New approaches will rejuvenate the body and delay the onset of age-associated conditions

'It's fascinating to witness how disruptive innovations are beginning to change healthcare,' says Dr Bertalan Meskó. 'Enormous technological changes are heading our way and they will prove transformative, but if we are unprepared for this future, then the opportunity to thrive will be lost.'

The need to be prepared applies to both brands and consumers alike – and what is promising for brands is that consumers are beginning to seek out these kinds of innovations themselves.

'What technology and other innovations are allowing people to do is take ownership of their own health,' says Maneesh Juneja. 'This is welcoming the emergence of a new proactive, pre-emptive approach among consumers.'

Brands that help facilitate this switch from a reactive to a proactive approach to health through innovation will enable consumer expectations to be met, transforming health systems worldwide in the process.



◀ INTERESTED IN COLLABORATING TO DRIVE INNOVATION IN CONSUMER HEALTH?

We've picked the brains of some of the brightest minds in health, science and technology to explore the trends and innovations that are set to shake up the future of consumer health.

However, the truth is that this is only the tip of the ice-berg. We've looked ahead to the next 30 years but with health, you need not only to be thinking about what's next, but also what's possible.

We're developing a strong innovation pipeline of early warning, preventative and proactive self care solutions because we want to address some of the biggest health challenges of today, tomorrow and the future.

Our vision is a world where people are healthier and live better, but we cannot achieve this alone. We understand that collaboration will be critical to driving innovation in healthcare.

This is our call to arms. We are looking to partner with pioneering organisations, small businesses, healthcare professionals and entrepreneurs from across the globe. We're seeking people who share our passion for spearheading the future of consumer health, and understand the importance of developing Health Care Practitioner intelligent innovations.

We work closely with our partners, consulting on all levels to make new products a success. And our portfolio of global, trusted brands, shows we have a proven track record for doing just this.

Phil Bolton,
Director, Health Outside Innovation

Interested in collaborating with us?

Get in touch at: www.rb.com/innovation or partnerwithus@rb.com

What RB can offer as a partner:



A consumer-focused approach to innovation



Leading research and development capabilities



World class procurement and supply chain



Experts in medical, regulatory and consumer science



A proven track record in bringing innovation to market at speed



Global market access, marketing expertise and leading consumer health brands

Case study

In April 2019, RB launched Neuriva™, a science-backed dietary supplement and complementary digital training and support programme.

From the outset, Neuriva was the product of partnerships. Working with a world-class ingredient discovery company, RB identified the opportunity to leverage ground-breaking science to support brain health through a dietary supplement.

To translate this cutting-edge science into a credible and compelling proposition for consumers, RB collaborated with multiple partners in the form of brain experts, dieticians, sports nutritionists and nurse practitioners and most importantly, consumers to gain in-depth understanding of their health and healthcare requirements.

This approach helped RB understand that today's consumers expect more than a pill, which ultimately led to the development of the complementary digital training and support programme that now comes with Neuriva and which provides a personalised, digitally driven solution. This is the first brain health supplement of its kind, with a product and a service that is rooted in science. This is our approach to innovation and an example of how critical it is for us to work in partnership to innovate.

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