

ASX Announcement

27 October 2023

Cochlear Capital Markets Day

Cochlear Limited will today host a Capital Markets Day for analysts and investors at its global headquarters at Macquarie University. Please find attached the presentation materials.

Details of the event are as follows:

Date: 27 October 2023
Time: 9.00-12.00pm AEDT
Webcast: <https://publish.viostream.com/app/s-d63eg9m>
Location: 1 University Avenue, Macquarie University, Sydney

The webcast allows participants to listen in to the presentations and to view the presentation slides.

Presentation documents, including an archived copy of the webcast, will be available on our website:

<https://www.cochlear.com/au/en/corporate/investors/results-and-presentations/capital-markets-day>

For further information, please contact:

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This announcement is authorised by the Company Secretary.

Hear now. And always



Corporate strategy

Cochlear Capital Markets Day | 27 October 2023

Dig Howitt
CEO & President

This material is intended for analysts and investors

Acknowledgement of Country

Worimi, Welcome,

On behalf of Cochlear, it is a pleasure to acknowledge the Wallumattagal Peoples of the Darug Nation, who are the Traditional Custodians of the Macquarie Park area. We would like to pay respect to Elders, both past and present and to leaders emerging.





Our mission

We help people hear and be heard.

We **empower** people to connect with others and live a full life.

We **transform** the way people understand and treat hearing loss.

We **innovate** and bring to market a range of implantable hearing solutions that deliver a lifetime of hearing outcomes.

Agenda



Corporate strategy



Dig Howitt
CEO & President

Product and services innovation



Jan Janssen
Chief Technology Officer

Developing a treatment pathway for adults



Dean Phizacklea
SVP Global Strategic Marketing

Cochlear's US business



Lisa Aubert
President, Cochlear North America

Manufacturing and supply chain



Greg Bodkin
SVP Global Supply Chain

Cochlear at a glance



Business segments

Cochlear Implants*

58% Cochlear implant systems



Services*

30% Sound processor upgrades, accessories and other



Acoustics*

12% Bone conduction systems and sound processor upgrades



Global presence

>\$1.9b in sales revenue* across
~4.8k employees across
180+ countries
50+ countries



6

manufacturing locations

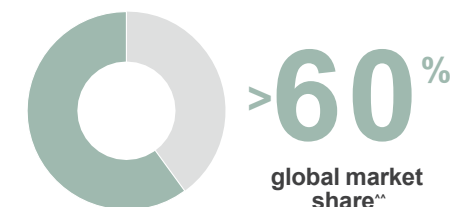


Market leader

\$240m+ in annual R&D investment
750k+ implants sold helping
~650k people to hear**

AAA
MSCI ESG rating
Healthcare equipment
& supplies**

99.87%
Cochlear implant reliability



* Based on sales revenue (FY23) ^Nucleus® Profile™ Plus Series implant cumulative survival percentage within four years ^^Cochlear estimate for cochlear and acoustic implants

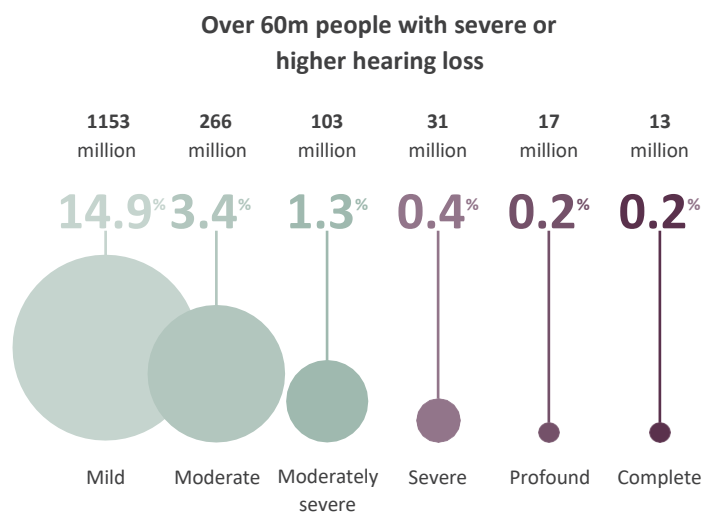
#Includes cochlear and acoustic implants. ** Measures a company's resilience to financially material environmental, societal and governance (ESG) risk

Growth opportunity

Growing awareness of the cost-effectiveness and quality of life benefits of our products has the potential to underpin long- term industry growth.

Hearing loss is prevalent and under-treated

The World Health Organization estimates that there are over 60 million people worldwide who experience severe or higher hearing loss,¹ yet fewer than 5% of the people that could benefit from an implantable hearing solution have received one.²



Globally 1.5 billion people live with hearing loss

Source: World Health Organization; 2021

* Cochlear estimate

Cochlear implants are a cost-effective solution for all age groups

Cochlear implants provide life changing outcomes for recipients, empowering them to connect with others and live a full life. They also provide a cost-effective solution for all age groups, delivering significant returns on the investment made by the healthcare system.

Significant return on investment for healthcare systems investing in cochlear implants



For a pre-lingual deaf child, the return to society is more than 13 times for every dollar spent on a cochlear implant solution based on the cost savings in education and improved productivity as an adult.³

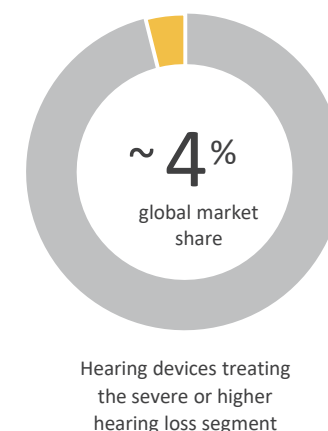
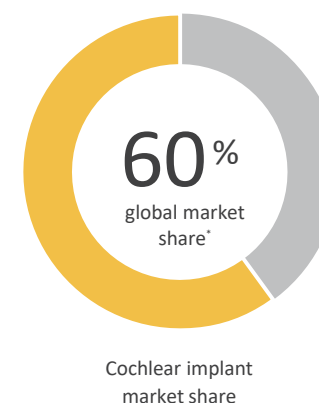


The effective use of implants is cost-effective in adults and seniors with an estimated return on investment of 10:1.⁴

Cochlear implants can deliver superior outcomes to hearing aids for indicated patients

Cochlear implants can provide a significant improvement in hearing outcomes and quality of life when compared to hearing aids for many people with a severe or higher hearing loss.

We are the market leader in cochlear implants but a small player in the severe or higher hearing loss segment where hearing aids dominate



Growth opportunity

Product indications are broadening and funding is expanding

Product indications and funding are expanding as payers increasingly recognise the improved outcomes and cost-effectiveness of our implantable solutions.

Recent changes to reimbursement or indications

US:

lowered the age of cochlear implantation from 12 to 9 months and included single-sided deafness as an indication for Cochlear's Nucleus® implant

US, UK, Germany and Australia:

Cochlear™ Osia™ 2 System reimbursement achieved across a number of countries

New Zealand:

cochlear implant funding to reduce the adult waiting list

Japan, UK and Belgium:

expansion of reimbursement criteria for cochlear implants to include severe hearing loss

Australia:

reimbursement for remote programming of cochlear and bone conduction implants

US:

the Centers for Medicare & Medicaid Services expanded coverage for cochlear implants to cover a broader spectrum of hearing loss

France:

reimbursement approved for Baha® sound processors

Good hearing is essential to healthy ageing

Hearing loss is particularly prevalent in people over the age of 60, with one in four suffering moderate or higher hearing loss.⁵

There is a growing understanding of the importance of properly treating hearing loss in this age group. It affects communication and is associated with cognitive decline, social isolation, anxiety and depression.⁶

Growing understanding of the link between good hearing and healthy ageing



Cognitive decline

Hearing loss associated with accelerated cognitive decline and dementia in older adults.⁷



Depression

Significant association between hearing impairment and moderate to severe depression.⁸



Falls

Higher risk of dizziness causing falling.⁸



Social isolation

Hearing loss linked to withdrawal from social interactions, which can have a significant impact on psychological well-being and physical health.⁹



Ability to work

Hearing loss can affect sufferers' ability to work or stay in the workforce.¹⁰



Loss of independence

Seniors with hearing loss less likely to be able to self-care.⁸

Key market segments



Our efforts are targeted at improving awareness, expanding access and building on the clinical evidence that demonstrates the effectiveness of our products across four key market segments.

Cochlear implants: Children in developed markets

Cochlear implantation has been established as the standard of care for newborns across the developed markets, with bilateral implants indicated across most countries as evidence supports the benefit of binaural hearing.



Addressable market*
~160,000 people
Current penetration
>80% under 3-year-old children

Cochlear implants: Adults and seniors in developed markets

Adults and seniors in the developed markets provide the biggest opportunity for us to address the unmet need for hearing implants given the large, and growing, market size as the population ages and the low levels of penetration.



Addressable market*
>6m people
Current penetration
~6%

Cochlear implants: Children in emerging markets

Our emerging markets business has been growing rapidly as awareness of cochlear implants increases and wealth grows across many emerging economies.



Addressable market*
>1.3m people
Current penetration
<10%

Acoustic implants: Next generation bone conduction hearing solutions

The bone conduction market is under-penetrated and currently has limited geographic reach. We have developed a product that we believe provides the opportunity to drive deeper category penetration.



Addressable market*
>3m people in developed markets
Current penetration
<1%

Our strategy

Our goal is to deliver value by helping more people to hear, which contributes to building a healthier and more productive society.

At Cochlear, we are strongly connected to our mission to help people hear and be heard. It's the passion that drives the organisation and focuses the strategy.

With every hearing implant, we begin a lifelong journey with our recipients. We have a responsibility to be here to support that lifetime of hearing which means we need to deliver sustainable financial growth, benefiting all our stakeholders.

How we create value

Our strategy is focused on improving awareness of and access to implantable hearing solutions for people indicated for our products.

In helping more people to hear, we create value for our stakeholders by building a healthier and more productive society, providing a lifetime of hearing solutions for our recipients, having thriving employees and being environmentally responsible. Doing these things well should enable us to achieve sustainable financial returns over time.



We help more people to hear, creating value across five pillars

A healthier and more productive society

Delivering societal benefit through improved health outcomes, educational cost savings and productivity gains.



A lifetime of hearing solutions

Innovating to build a market-leading portfolio of products and services that improve hearing outcomes and provide a lifetime of hearing solutions for recipients.



Thriving people

An engaged, capable, high-performing and diverse workforce that delivers on our strategy and supports the creation of sustained value.



Environmental responsibility

Minimising the impact of our operations on the environment.



Sustained value

Maximising spending to grow the market while maintaining our competitive position. Ensuring we operate fairly, honestly and legally.

What we aim to achieve over the longer term

Grow the hearing implant market

Help at least 8% more people to hear each year with a cochlear or acoustic implant.

Retain market leadership

Develop market-leading technology and deliver a world-class customer experience to recipients and professional customers.

A stronger organisation

Retain employee engagement levels at or above 80%.

Minimise environmental impact

Net-zero carbon emissions in our operations by 2030 and across our value chain by 2050.

Consistent and sustainable growth

Sustainable and responsible business practices, targeting growth in sales revenue of around 10% per annum and an 18% net profit margin.

A healthier and more productive society

Delivering societal benefit through improved health outcomes, educational cost savings and productivity gains.



Strategic priorities

Grow the hearing implant market

- Strengthen the referral pathway for adults
- Develop the acoustic implant segment
- Broaden reimbursement and improve indications
- Expand access in emerging markets

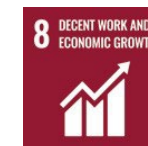
Our target

Help at least 8% more people to hear each year with a cochlear or acoustic implant

How payers and society more broadly benefit

- Appropriate funding for a cost-effective intervention
- Standard treatment pathway for implantable hearing devices for all age groups
- Improved education and productivity opportunities
- Understanding of the link between good hearing and healthy ageing and the need to act

Relevant UN Sustainable Development Goals



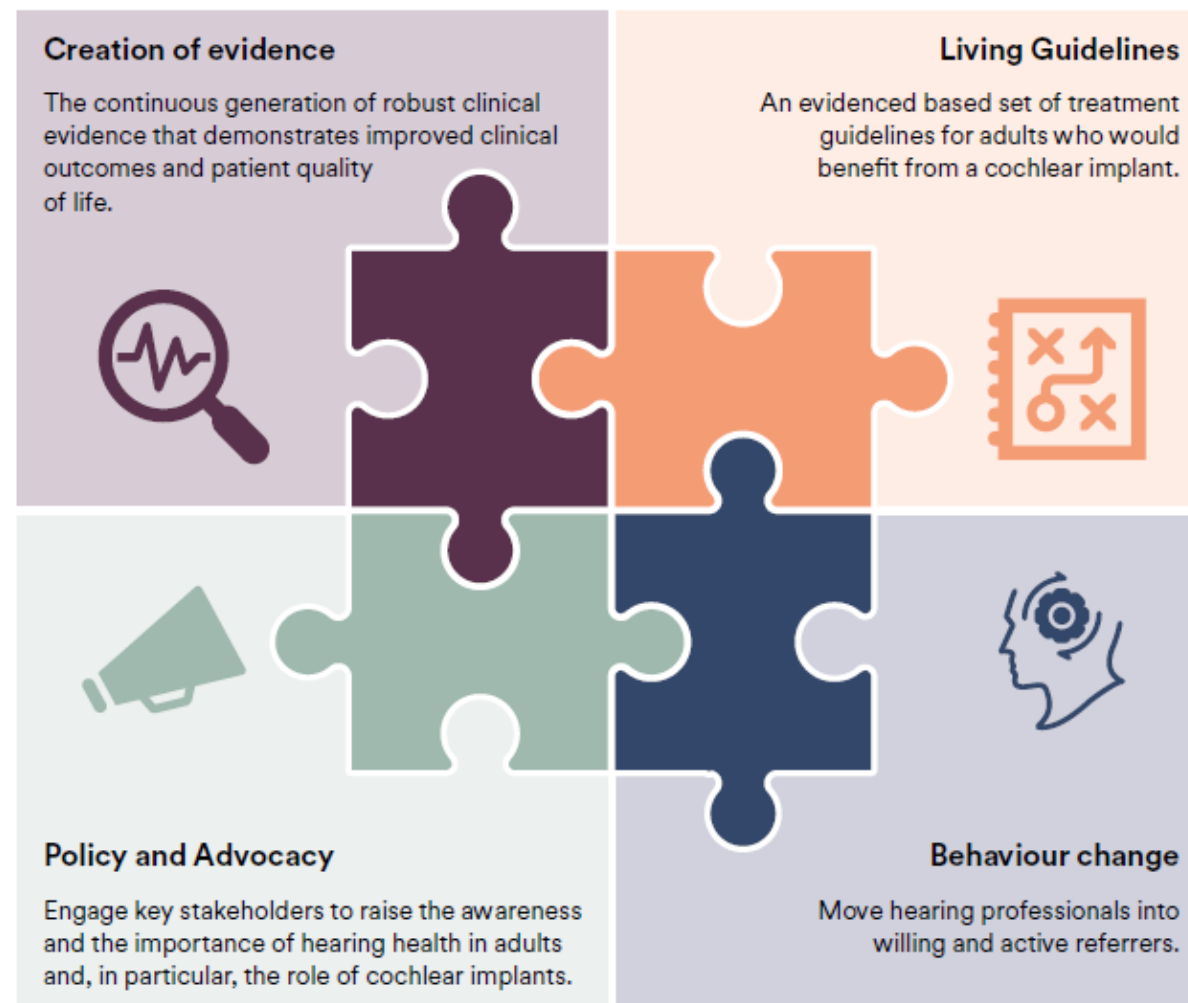
Strengthen the referral pathway for adults



Standard of care initiatives aim to establish a consistent process for diagnosing and referring adult cochlear implant candidates by all healthcare professionals

- Adults and seniors in the developed markets provide our biggest opportunity given the large, and growing, market size as the population ages and the low levels of penetration – ~6m candidates and ~5% penetration*
- Awareness of cochlear implantation among primary and hearing health care clinicians is inadequate, leading to poor identification of eligible candidates
- DTC activities and sales teams focused on increasing awareness with both professional customers and candidates
- We are making investments in long-term initiatives to develop a standard clinical pathway for adults that aims to establish a more sustained referral model. These investments are geared towards:
 - **Building clinical and economic evidence** that compels early adult referral and coverage
 - **Developing consistent referral guidelines** to enable early identification and referral
 - **Driving awareness and advocacy** through hearing professionals and patient advocacy groups

Key elements of developing a treatment pathway for adults



* Prevalence of developed market adults and seniors with > 70dB hearing loss. Excludes hybrid and SSD candidates.

Develop the acoustic implant segment



Cochlear Osia® System has the potential to become the first choice in acoustic implants, competing more effectively with reconstructive surgery while expanding geographically

MAINTAIN TECHNOLOGY LEADERSHIP

The only active bone conduction system that allows patients to undergo MRI scans at both 1.5 T and 3.0 T without the need for surgery*



GROW THE MARKET



Geographic expansion



Compete with reconstructive surgery



Indication expansion (eg paediatrics in US)

Broaden reimbursement and improve indications



The economic benefits associated with cochlear implants extend beyond healthcare budgets with significant net economic gains to society from improved health outcomes, educational cost savings and productivity gains.*

- Growing evidence of the cost-effectiveness of cochlear implants. Our products can improve the quality of life of thousands of people each year and further reduce the cost to society of untreated, or poorly treated, hearing loss by billions of dollars*
- Developed market opportunities to:
 - Continue to expand reimbursement in Europe, Canada and parts of Australia where funding caps restrict access, leading to waiting lists
 - Expand indications to include bilateral implants and single-sided deafness across many markets
- Our market access teams work with governments and payers to recognise the benefits of treating hearing loss so we can continue to increase access to our products

FY23 indication and funding expansion

US:

The Centers for Medicare & Medicaid Services expanded coverage for cochlear implants to cover a broader spectrum of hearing loss + expanded private insurance cochlear implant coverage for single-sided deafness

Emerging markets:

Expanded newborn hearing screening in Thailand and Malaysia and Karnataka in India

Osia® 2 System:

Achieved funding in Australia and New Zealand

Cochlear implants:

Additional funding for cochlear implants in Australia, Canada, Argentina, Mexico and the Netherlands

* Tordrup et al 2022. Global return on investment and cost effectiveness of WHO's HEAR interventions for hearing loss: a modelling study. The Lancet. [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(21\)00447-2/fulltext](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(21)00447-2/fulltext)

** <https://www.cms.gov/medicare-coverage-database/view/ncacal-decision-memo.aspx?proposed=N&ncaid=306> ***Neve et al 2021

Expand access in emerging markets

We are continuing to identify opportunities in emerging economies to grow the hearing implant market, with a focus on improving rates of implantation in children

- Emerging markets represent ~20% of cochlear implant revenue
- Growing rapidly as awareness of cochlear implants increases and wealth grows drives both new implants and sound processor upgrades
- Most countries however remain very under-penetrated (<10% for children and few adult implants). Our priorities for this segment are focused on market expansion with activities targeted at:
 - **Building awareness** – public education campaigns, direct-to-consumer marketing and hearing screening
 - **Expanding funding** – driven by the compelling health economics of implantation in children
 - **Expanding our presence** – distributor relationships combined with an expanding direct presence
 - **Developing professional capability** – surgeon training and audiology education
 - **Maximising penetration** through a tiered product offering
- More volatility due to macroeconomic / geopolitics factors and tender lumpiness
- Lead markets, like China, already seeing broad adoption of neonatal newborn hearing screening, enabling early intervention and providing better lifetime outcomes, and basic medical insurance that covers cochlear implants



A lifetime of hearing solutions

Innovating to build a market-leading portfolio of products and services that improve hearing outcomes and provide a lifetime of hearing solutions for recipients.



Strategic priorities

Retain market leadership

- Advance the product and services pipeline, with annual R&D investment of 12% of revenue
- Deliver our latest sound processor upgrade technology to existing recipients
- Strengthen our lead in customer service and support
- Maintain high standards of product quality, safety and reliability

Our target

Develop market-leading technology and deliver a world-class customer experience to recipients and professional customers

How payers and society more broadly benefit

- High quality and reliability
- Improving hearing outcomes and quality of life for new and existing recipients
- The right care is available at the right time and is easy to use
- Reduced cost to serve for professional customers
- Expanded product indications

Relevant UN Sustainable Development Goals



Advance the product and services pipeline, with annual R&D investment of 12% of revenue

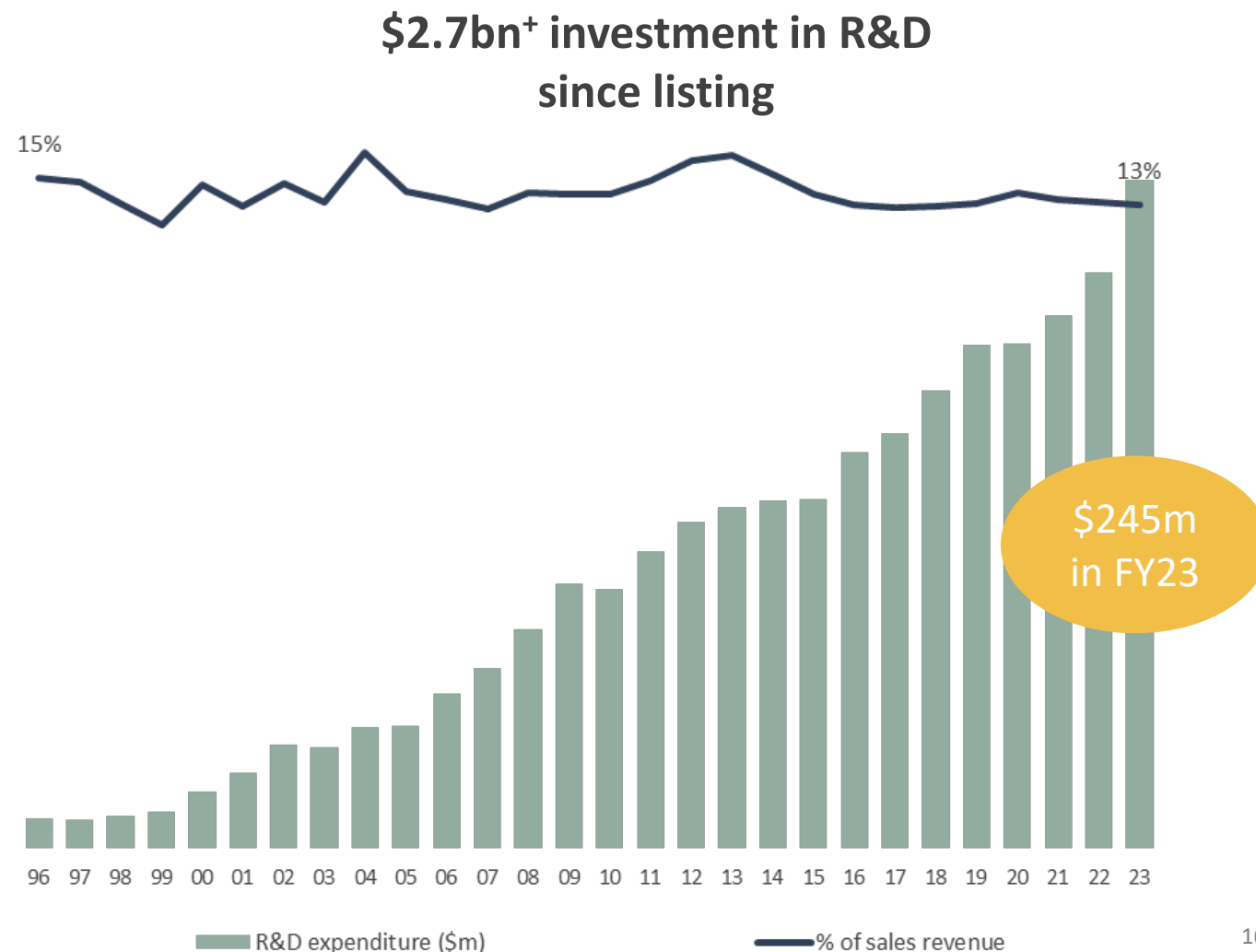


R&D investment strengthens our market-leading technology position and helps drive market growth

- Continued R&D investment at ~12% of revenue
- Portfolio of 1,700+ patent and patent applications worldwide
- Global innovation network with 550+ R&D employees
- Primary R&D located in Australia with Advanced Innovation in Belgium and a software hub in Sweden

Innovation focus areas

- Hearing outcomes
- Lifestyle and ease-of-use
- Connected care
- Expanding the portfolio



Providing a market leading portfolio of product and services



Cochlear's market-leading portfolio aims to improve hearing outcomes for recipients and provide a lifetime of hearing solutions. Our scale enables us to develop all aspects of the product and service portfolio, leading to improved outcomes and lower cost of care

Cochlear implant portfolio



Cochlear™
Nucleus® System

Acoustic solutions portfolio



Cochlear
Osia® System

Cochlear
Baha® System

Recipient support tools



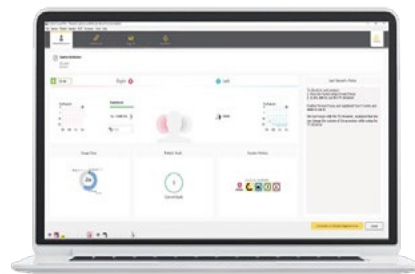
Cochlear Nucleus, Baha and Osia Smart Apps

Cochlear CoPilot App

Cochlear Connected Care solutions



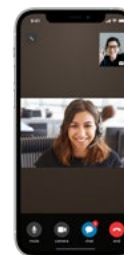
Cochlear Nucleus
SmartNav System



Cochlear Custom Sound® Pro
Fitting Software



Cochlear™ Link



Cochlear
Remote Assist



Cochlear Remote Check
solution for cochlear implants

Deliver our latest sound processor upgrade technology to existing recipients



The growing recipient base underpins growing demand for Services

- In FY23 we delivered latest generation sound processors to over 48,000 prior generation cochlear implant recipients, up 19%, growing demand for Services which makes up 30% of revenue
- Our goal is to see our recipients continue to improve their hearing outcomes as our sound processor technology improves with:
 - **Improved hearing outcomes** with sound processing technology designed to provide clearer sound and reduced background noise
 - **Connectivity** to the world and people, by integrating with smartphone technology to allow direct streaming, control and monitoring with apps
 - **Lifestyle benefits**, with each generation being smaller and lighter, easier to use and with longer battery life

Cochlear Nucleus sound processors



2005

2009

2016

2022

Freedom

Offered input processing technologies designed to mimic natural hearing and is the industry's first water resistant sound processor

Nucleus 5

Was 36% smaller than the Freedom sound processor and offers an average hearing improvement of 30% in noisy environments. Includes AutoPhone, the industry's first automatic phone detection ability.

Kanso

At launch, Kanso was the smallest and lightest off-the-ear sound processor available. Kanso was designed to help recipients hear with clarity using SmartSound® iQ with SCAN* and dual microphones, and is compatible with Cochlear™ True Wireless™ devices. Kanso is dust and splash resistant.

Nucleus 8

Designed to make communicating with people easier, the Nucleus® 8 Sound Processor delivers our latest hearing technology. It senses changes in the environment and automatically adjusts listening settings.

Ready for next generation Bluetooth® LE Audio technology and able to connect directly to what's being broadcast at public venues such as airports, conference centres and theatres supporting Bluetooth Auracast™.



reddot design award

Winner of the prestigious Red Dot Design Award for Nucleus 5 and Nucleus 8.

Strengthen our lead in customer service and support



Connected care is our vision for hearing care – where Cochlear, the recipient and hearing care professionals work together to ensure the right care is available at the right time and is easy to use

- Deliver convenient, evidence-based care for patients at every stage of their journey, spanning surgical care, self-managed care, in-clinic care and remote care
- Targeting to reduce cost to serve and increase clinic efficiency for professional customers
- Opportunity for AI to improve recipient outcomes and the care they receive, from algorithms that can better enhance speech in noise, to personalised rehab and AI fitting. For health care professionals, the focus of AI is on improving accuracy and productivity, streamlining the care model

Cochlear's connected care solutions

Surgical Care

Surgical Care solutions can enhance patient outcomes through intraoperative tools and insights and improve the surgical experience.

Self-managed Care

Self-managed Care solutions empower patients to proactively manage their hearing in everyday moments and build listening skills.



In-clinic Care

In-clinic Care solutions streamline patient management and care, giving clinicians the time and flexibility to optimise every appointment.

Remote Care

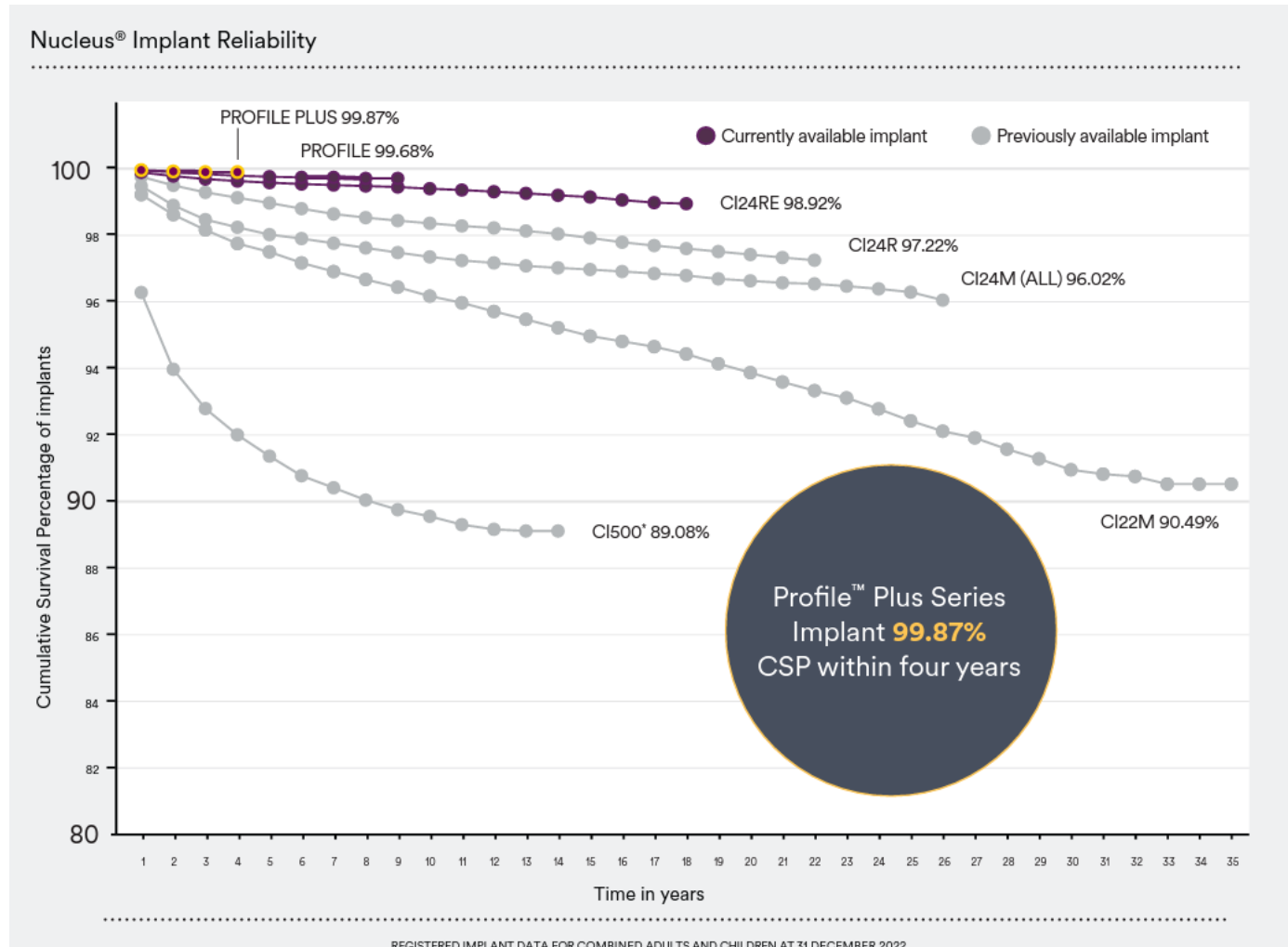
With Remote Care clinicians can monitor patients and deliver quality care when it's needed, without a trip to the clinic.

Maintain high standards of product quality, safety and reliability



Our market-leading products are the result of our world-class manufacturing process and meet stringent, internationally recognised standards

- Cochlear's implants are the most reliable over time*
- Our world-class manufacturing processes meet stringent, internationally recognised standards. Our Quality Management System provides the framework, processes and procedures for ensuring:
 - Safety and efficacy of our products
 - Compliance with regulatory requirements
 - Product design, manufacture and marketing consistently meet customer and regulatory requirements
- We monitor the performance of our products throughout their lifetime via an extensive post market surveillance process. Information gathered throughout the product lifecycle is used to improve current and future products



* Based on implant generations released within a comparable period with 5+ years of CSP data

Thriving people

An engaged, capable, high-performing and diverse workforce that delivers on our strategy and supports the creation of sustained value.



Strategic priorities

A stronger organisation

- Strengthen and nurture the organisational culture
- Attract, develop and retain talent
- Champion a culture of diversity and inclusion
- Support the wellness and safety of our teams

Our target

Retain employee engagement levels at or above 80%

How payers and society more broadly benefit

- Engaged, capable and high-performing employees
- Diverse, equitable and inclusive workplace
- Engaging development and career opportunities
- Strong health, wellbeing and safety culture

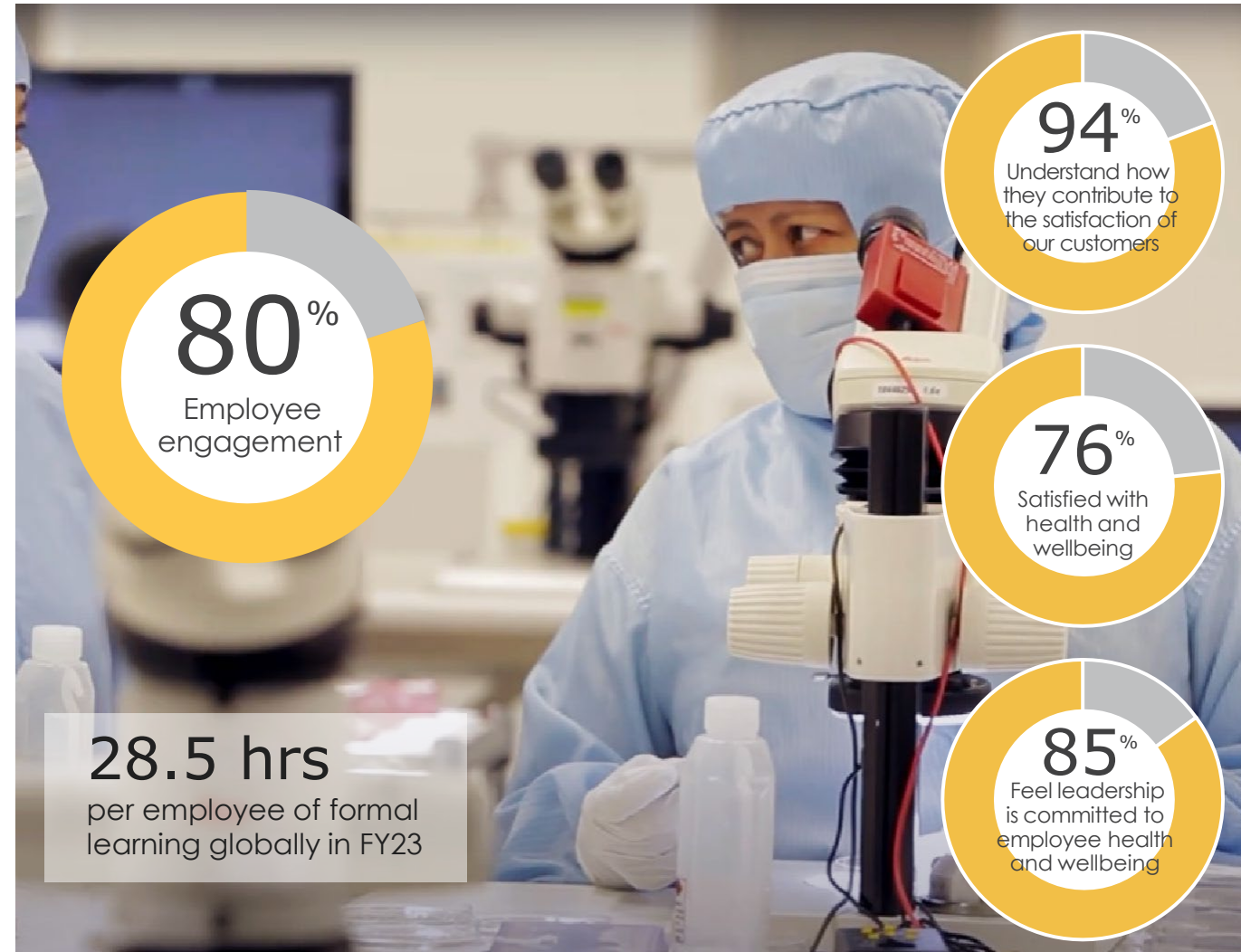
Relevant UN Sustainable Development Goals



Strengthen and nurture the organisational culture

Shaping a culture that will enable us to grow and deliver for our customers in the future

- **Building enterprise leadership** - strengthening enterprise leadership with a focus on inclusive leadership, building critical skills and capabilities at both an individual and organisational level
- **Attracting, developing and retaining top talent** - continued efforts to engage and retain our talent, focussing on career progression and development, pay and recognition and ensuring all our employees feel a sense of belonging, regardless of their background and experiences.
- **Supporting wellness and safety** - taking a holistic approach to the wellness of our people through maintaining both a physically safe and mentally healthy work environment.



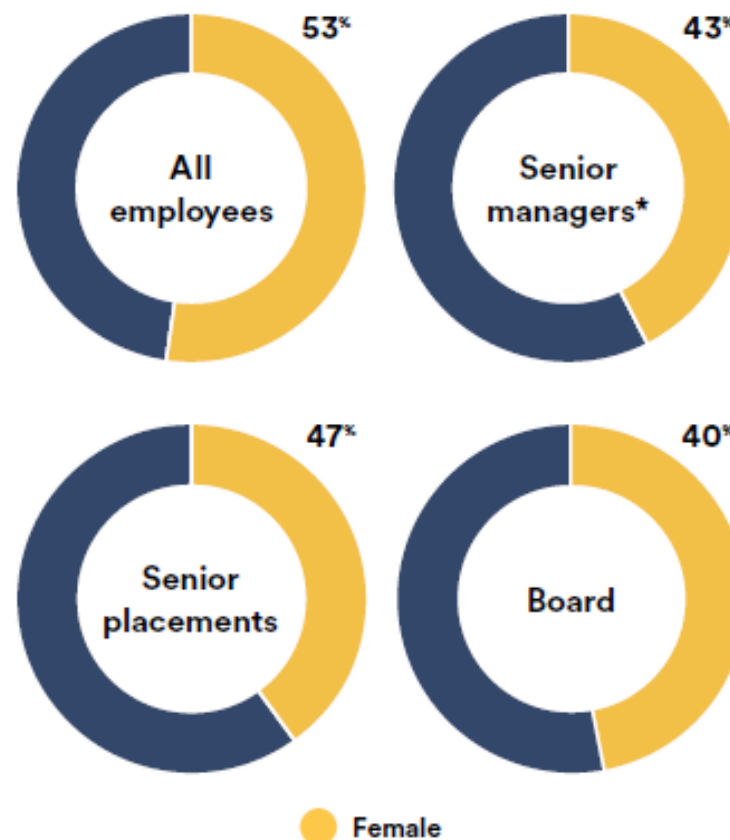
Champion a culture of diversity and inclusion

A diverse, equitable and inclusive organisation improves employee engagement, our performance and productivity as well as customer engagement

Diversity and inclusion (D&I) strategy closely integrated with our work on culture

- D&I strategy is aimed at creating an environment where our people feel safe, valued, included and empowered to do their best work. The strategy is built around target setting and policies, hiring and development, training and communication and engagement
- Focus to date has been on gender diversity with targets set and achieved
- Working to maintain, embed and build on these achievements through hiring and development including:
 - Improving gender diversity in our senior leadership succession pipeline – in FY23 females made up 47% of senior placements during FY23
 - Growing diverse pipeline of entry level talent – 62% of Summer Interns and 50% of Graduates female; commenced partnership with CareerTrackers providing Australian First Nations students with ongoing internship placements

Targeting to maintain at least 40% female representation at senior management and Board level



Environmental responsibility

To be a sustainable business, we aim to minimise the impact of our operations on the environment.



Strategic priorities

Minimise environmental impact

- Advance the implementation of initiatives to reduce our Scope 1, 2 and 3 carbon emissions
- Embed sustainability into product design, development and manufacturing
- Deliver a global approach to managing the environmental impacts of packaging

Our target

Net-zero carbon emissions in our operations by 2030 and across our value chain by 2050

How payers and society more broadly benefit

- Climate resilience
- Efficient use of natural resources

Relevant UN Sustainable Development Goals



Advance the implementation of initiatives to reduce our Scope 1, 2 and 3 carbon emissions



We are committed to taking an active role in the global effort to tackle climate change and are using climate science to better understand our impacts and define our strategy

Scope 1 and 2 emissions

- Our manufacturing facilities account for 70% of the total energy consumption
 - Reduced emissions by 68% from our FY19 baseline by increasing renewable energy use in our manufacturing sites
 - Using 96% renewable energy at our manufacturing facilities, 100% renewable energy in five of our six facilities
- Implementing other initiatives to further reduce our fossil fuel use and energy consumption

Scope 3 emissions

- Business flights are our single biggest source of reported carbon emissions
 - Reduced by 91% in FY23 with a 47% reduction in business flights per FTE from our FY19 baseline and offsets purchased for ~80% of our remaining business flights
- For other Scope 3 emissions, we have initiated a complete inventory in line with the GHG Protocol, with results expected during FY24. We will develop a reduction plan in line with the Science Based Target Initiative methodology.

Our emission reduction targets

2025	• 25% reduction in our absolute Scope 1 and 2 emissions* • 50% reduction in business flight emissions (Scope 3)*
2030	• Net-zero emissions in our operations (Scope 1 and 2)
2050	• Net-zero emissions across our value chain (Scope 1, 2 and 3)

Our targets are in line with the Science Based Target Initiative methodology, consistent with the reductions required to limit warming to 1.5 degrees above pre-industrial levels

* From a FY19 baseline

Enhancing environmental management and compliance



We continue to integrate environmental considerations into our business, focused on minimising our impact, complying with regulation and improving efficiency

Sustainable design and packaging

- We incorporate a sustainability mindset into our product development, packaging and logistic processes, with a focus on increasing the environmental efficiency of our products
- Focused on minimising packaging while still meeting medical device safety standards. Eg: introducing recyclable PaperFoam (99% recyclable) and biodegradable packaging across all our products, shipping optimisation to reduce distance travelled

Product life cycle assessments

- Initiated our first life cycle assessment – using the Cochlear™ Nucleus® 8 Sound Processor – to measure environmental impacts during all stages of the product's life
- The results of the assessment will help us define a baseline for sustainable product innovation and enable us to make better decisions throughout the life cycle of our products in areas including:
 - Waste management
 - Environmental impact of packaging
 - Material preferences for products and packaging
 - Carbon footprint



Sustained value

Maximising spending to grow the market while maintaining our competitive position. Ensuring we operate fairly, honestly and legally.



Strategic priorities

Consistent and sustainable growth

- Deliver sustainable financial returns
- Improve efficiency and agility
- Maintain high levels of corporate governance and an ethical and sustainable supply chain
- Vigilance around data security and privacy

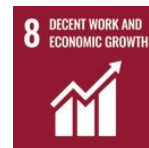
Our target

Sustainable and responsible business practices, targeting growth in sales revenue of around 10% per annum and an 18% net profit margin

How payers and society more broadly benefit

- Consistent financial performance
- Disciplined capital management
- Strong corporate governance
- Ethical and sustainable supply chain

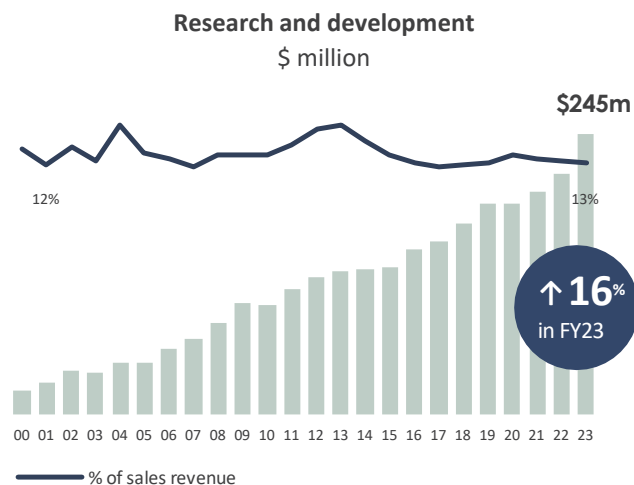
Relevant UN Sustainable Development Goals



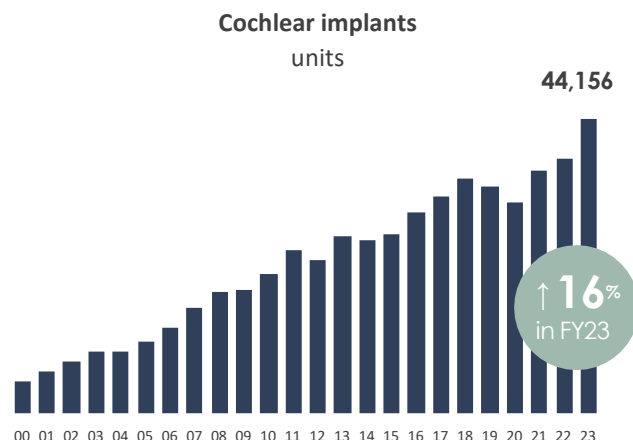
Financial history

Cochlear has a long track record of investing to grow, delivering growing sales revenue, profits* and dividends

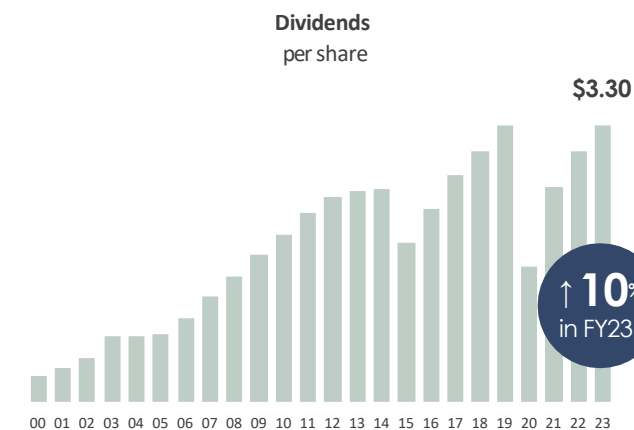
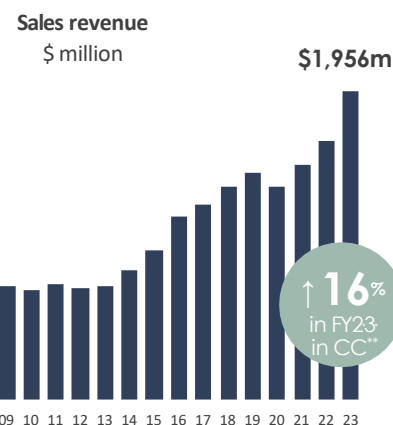
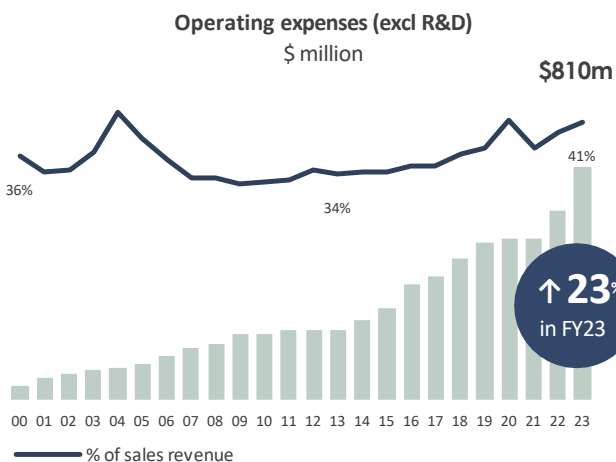
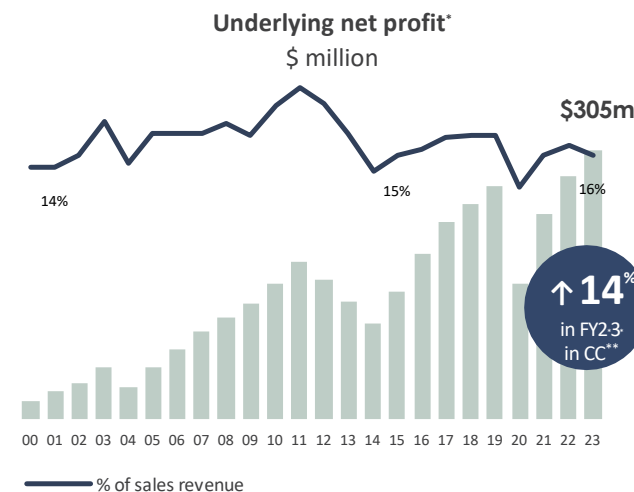
Consistent investment in R&D and market growth activities



Long-term growth in sales revenue



Growing profits and dividends



Delivering sustainable financial returns



Our long-term approach to investing, combined with disciplined capital management, has delivered consistent growth in sales revenue, profits and dividends over many decades

We plan and invest over long timeframes

- Over the coming years we expect to continue to invest consistently to improve the adoption of our products
- We see a significant opportunity to grow by strengthening the clinical pathway for adults and seniors through improving awareness and access for those who would benefit from a cochlear implant
- Improving these pathways takes time, requires us to trial novel approaches and adapt quickly as we learn. We need to constantly challenge ourselves on how best to prioritise and optimise this growth investment and measure progress
- We have set high level targets to guide our investment, aiming to balance financial objectives and expectations with the organisation's capacity to grow at a manageable pace

High level financial targets

Sales revenue growth	10% pa
R&D investment	12% of sales revenue
Underlying net profit margin*	18%
Maintain a strong balance sheet	~\$200m in net cash
Dividend policy	Payout 70% of underlying net profit
Nb: the outcomes for any individual year may vary as a result of prevailing trading conditions	

* Excluding one-off and non-recurring items

Being agile and efficient



We are investing in strengthening our business processes and IT platforms to improve efficiency and agility. Successfully executing this transformation program will enable us to scale more effectively and provide even better solutions for our customers

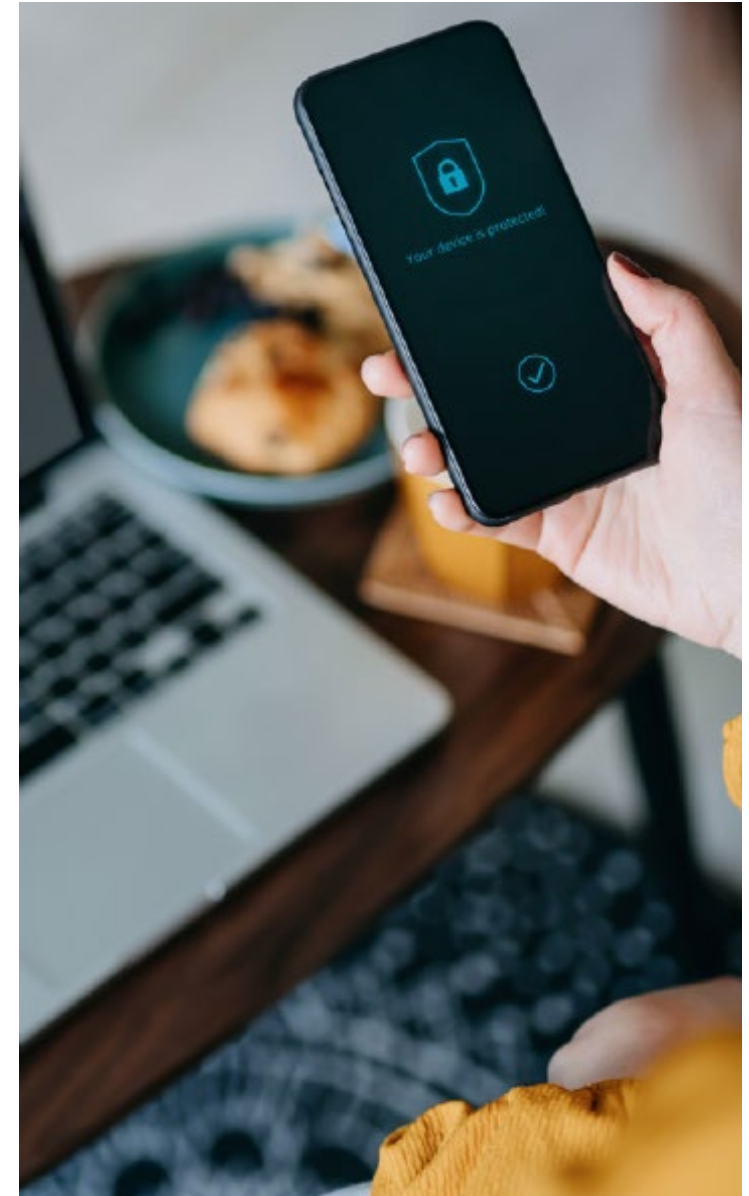
- Investing \$150m over five years to replace core systems and unify global operating processes
- Salesforce Healthcloud has been implemented for sales, customer service and marketing
- Workday has been implemented for human capital management
- These systems provide better data and are platforms for leveraging AI to enhance customer experience and drive efficiency
- The next steps are to replace the ERP for finance and supply chain
- In manufacturing the Lean methodology has been used for over 15 years to drive productivity and quality improvements and maintain gross margin at 75%



Creating value responsibly

We recognise that high standards of corporate governance and transparency are important for the creation, maintenance and enhancement of long-term sustainable value

- The Board is committed to high standards of corporate governance practice and fostering a culture of compliance which values ethical, lawful and responsible behaviour, personal and corporate integrity, accountability, transparency and respect for others
- Continuing to strengthen capability and transparency in areas including:
 - **Responsible supply chain:** We have a framework of policies, procedures and processes in place to manage risks relating to human rights, labour practices, corporate governance, safety and wellbeing and environmental sustainability in our supply chain
 - **Cyber security:** We handle and store personal information, including health information, for our customers and employees. With expanding information privacy and security regulations, we recognise data security as a key element of our relationship with our stakeholders
 - **Data privacy:** We commit to processing and protecting the personal information of all our stakeholders in a compliant and ethical way



Our strategy is strongly aligned to the mission and focused on delivering value to our stakeholders



We help more people to hear, creating value across five pillars	 A healthier and more productive society	 A lifetime of hearing solutions	 Thriving people	 Environmental responsibility	 Sustained value
Strategic priorities focus our time and resources	Grow the hearing implant market	Retain market leadership	A stronger organisation	Minimise environmental impact	Consistent and sustainable growth
We have longer term targets	Help at least 8% more people to hear each year with a cochlear or acoustic implant.	Develop market-leading technology and deliver a world-class customer experience to recipients and professional customers.	Retain employee engagement levels at or above 80%.	Net-zero carbon emissions in our operations by 2030 and across our value chain by 2050.	Sustainable and responsible business practices, targeting growth in sales revenue of around 10% per annum and an 18% net profit margin.
We provide clear stakeholder benefits	Payers and society more broadly • Appropriate funding and indications for a cost-effective intervention • Standard treatment pathway for implantable hearing devices for all age groups • Improved education and productivity opportunities • Understanding of the link between good hearing and healthy ageing and the need to act	Our customers • High quality and reliability • Improving hearing outcomes and quality of life for new and existing recipients • The right care is available at the right time and is easy to use • Reduced cost to serve for professional customers	Our people • A collaborative, values-driven culture that inspires innovation and customer focus • Engaged, capable and high-performing employees • Diverse, equitable, safe and inclusive workplace • Engaging development and career opportunities	All stakeholders • Climate change mitigation and resilience • Conservation of natural resources • Reduced pollution and waste • Healthier communities	Our shareholders • Consistent financial performance • Disciplined capital management • Strong corporate governance • Ethical and responsible supply chain

Hear now. And always



Product and services innovation

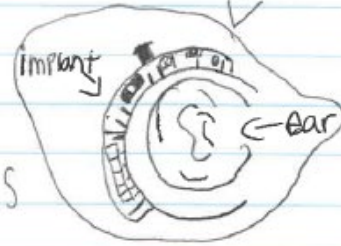
Cochlear Capital Markets Day | 27 October 2023

Jan Janssen
Chief Technology Officer

April 28, 2023

Dear Cochlear Corporation,
I would like if you could make a cochlear implant that is waterproof with no case. I think it would be very good to have one. This is what I think it should look like.

It will also have a light for when it is dark.



I do not like when I have to put on a case because people go in the pool first.

I hope you can help.

Sincerely
♥ Ophelia

Delivering a lifetime of hearing outcomes with market-leading implantable hearing products and services



Innovation focus areas



**Hearing
Outcomes**



**Lifestyle and
ease-of-use**



**Connected
Care**



**Expanding the
portfolio**



Innovation focus areas



**Hearing
Outcomes**



**Lifestyle and
ease-of-use**



**Connected
Care**



**Expanding the
portfolio**



Hearing outcomes have improved significantly over time, leading to expanded indications and funding for cochlear implants... but there is still scope to improve

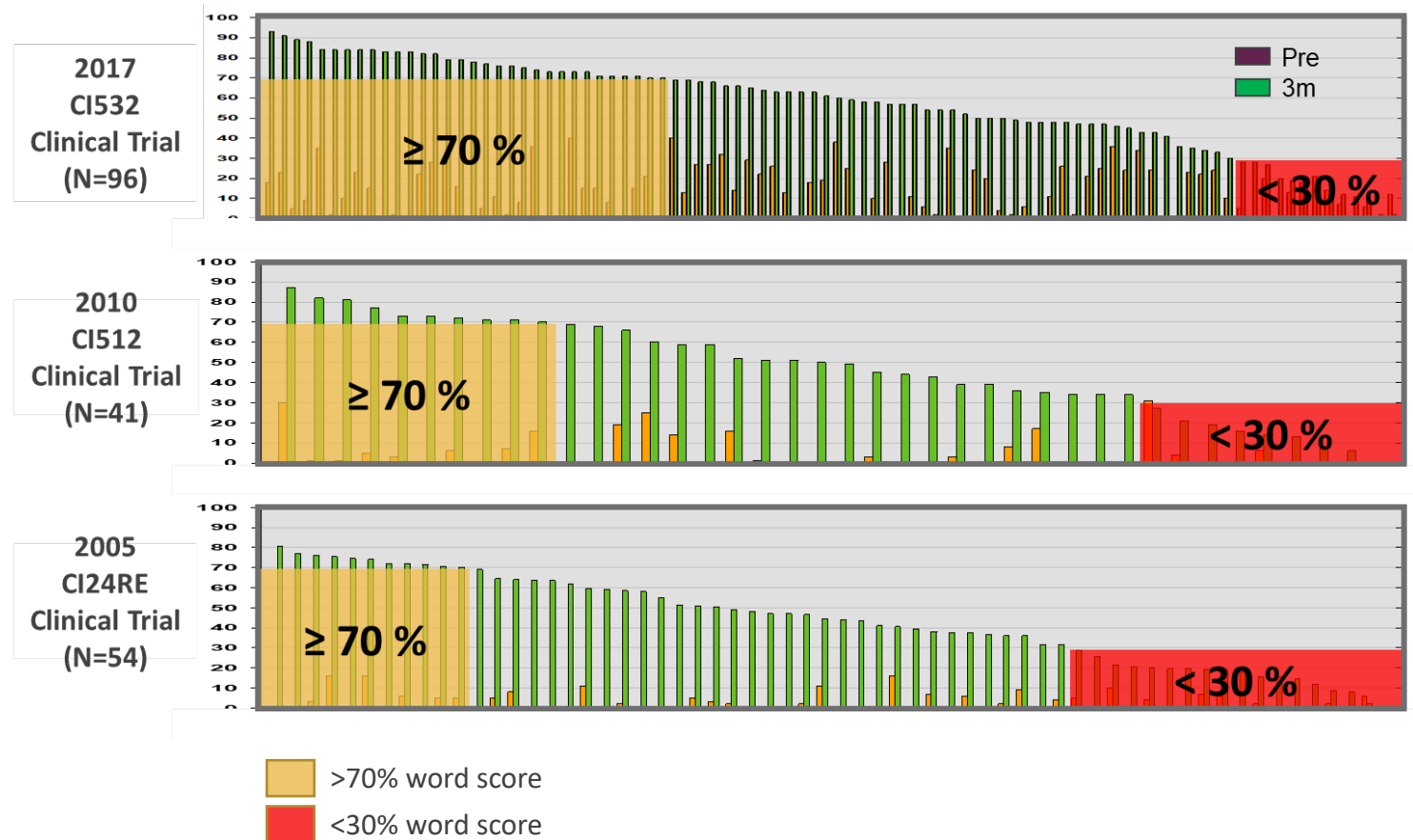
Drivers of improved hearing outcomes...

- **Improved technology**, including dual microphone technology, advanced pre-processing algorithms and wireless connectivity
- **Earlier intervention**, with the majority of children in developed markets bilaterally implanted by 18 months²

Leading to growing total addressable market from expanding indications...

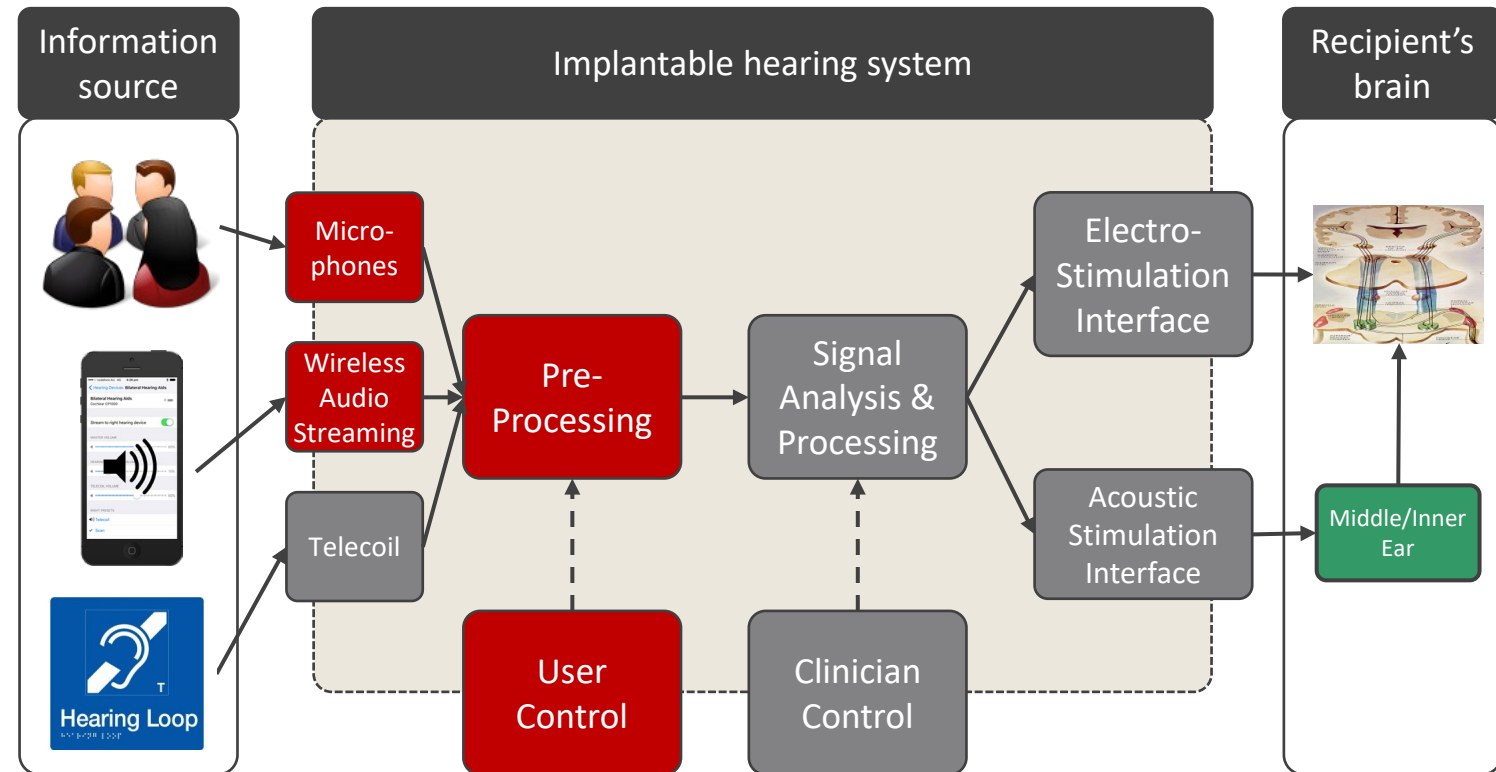
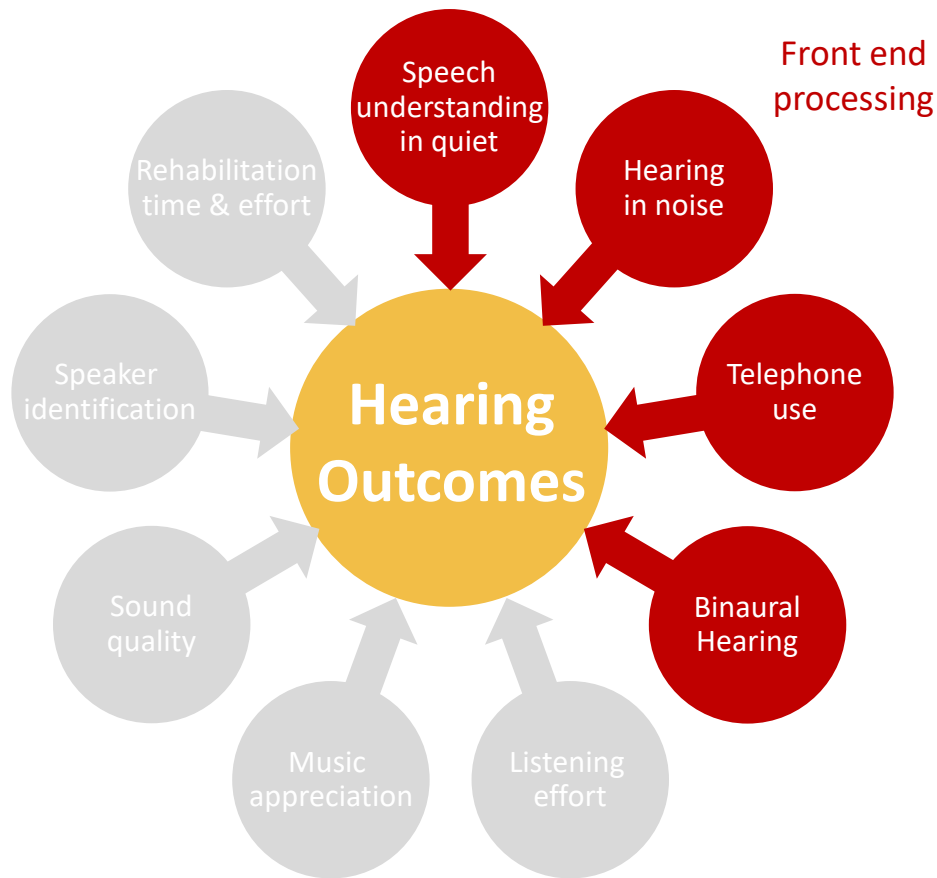
- Indications have shifted from profound hearing loss to severe to profound hearing loss across most markets
- Lowering age of implantation (eg: from 9 months in the US)
- Single-sided deafness in many markets

Clinical data demonstrating that over time more people are hearing better with cochlear implants¹



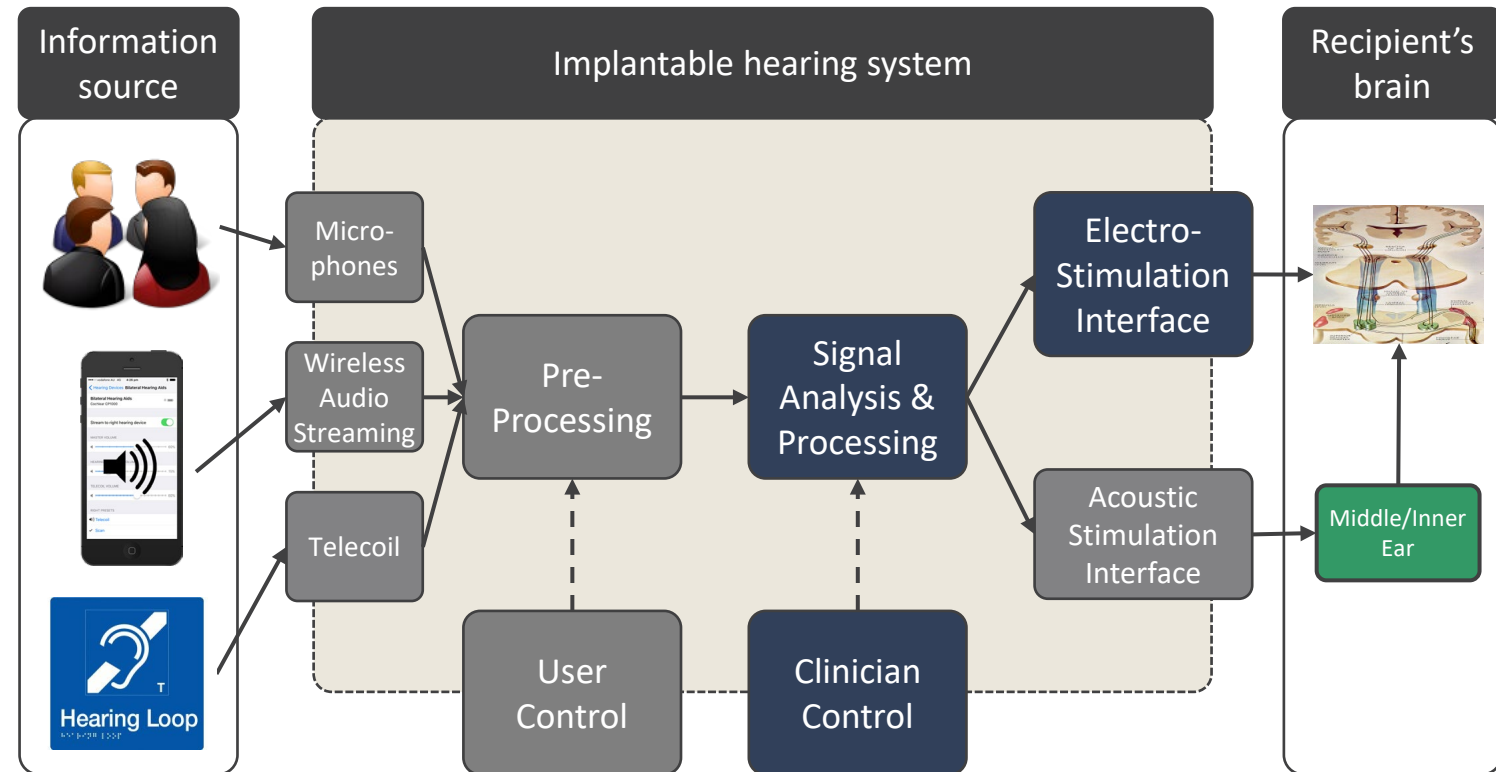
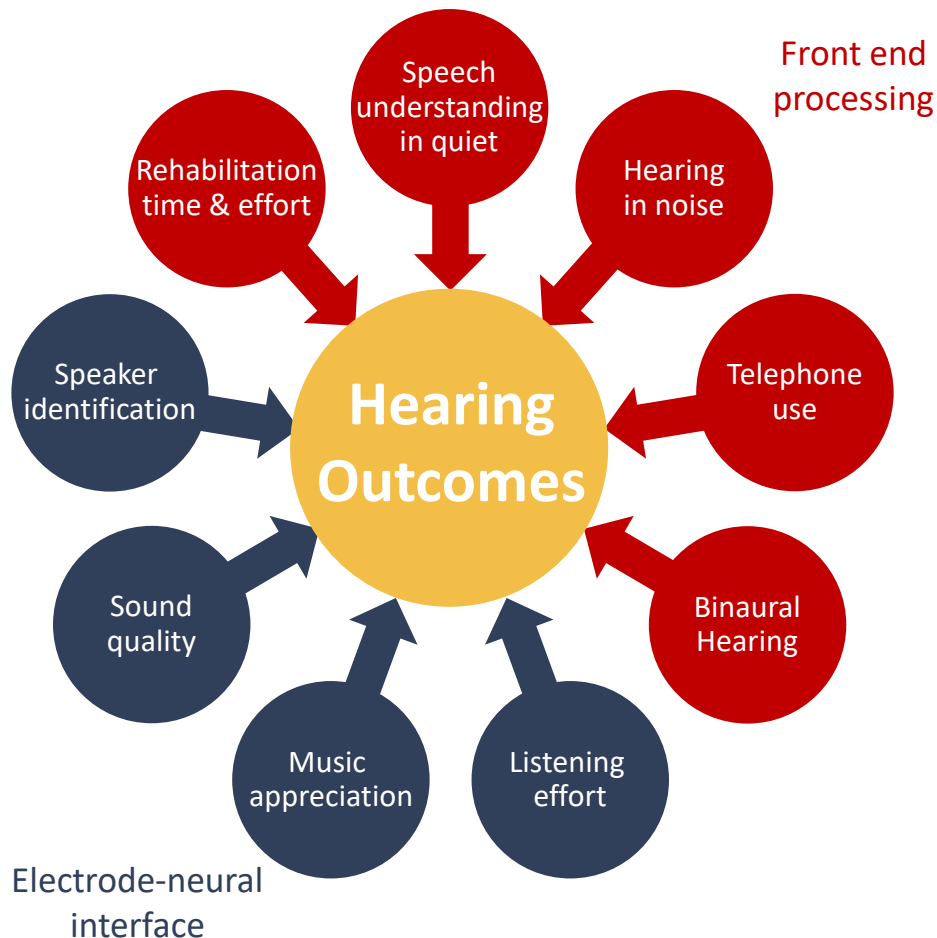
Improved hearing outcomes over the past decade largely driven by advancements in sound processing technology

Key sources of improved hearing outcomes



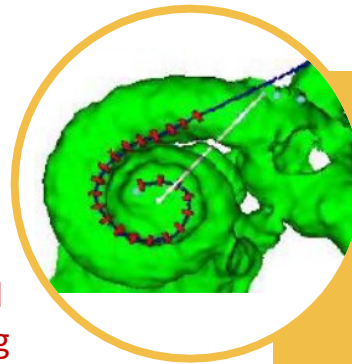
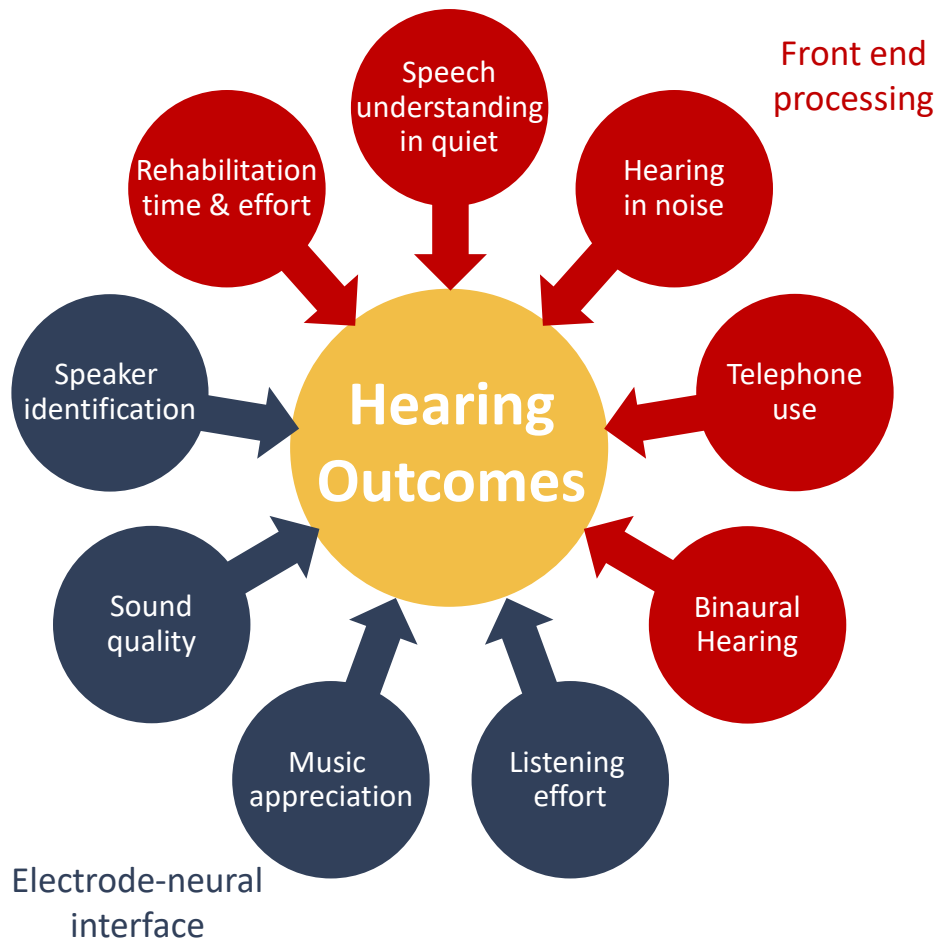
Future technology aims to improve hearing outcomes from next generation implant innovation

Expected sources of improved hearing outcomes



Key focus areas

Sources of improved hearing outcomes



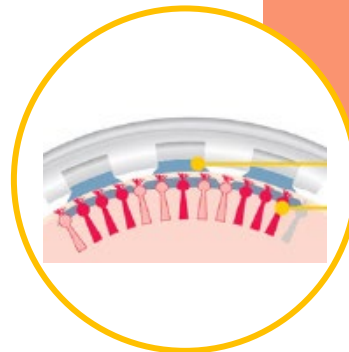
Get close to the auditory nerve

Minimise cochlear trauma during surgery



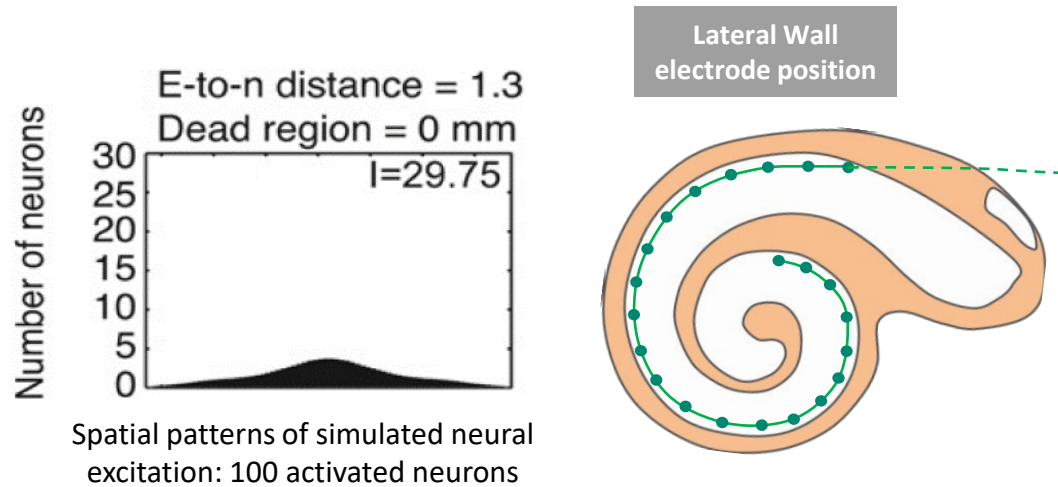
Improve the quality of stimulation of the auditory nerve

Drug / device combinations

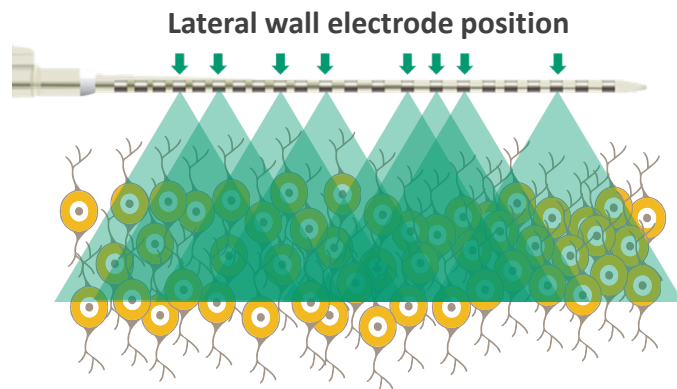
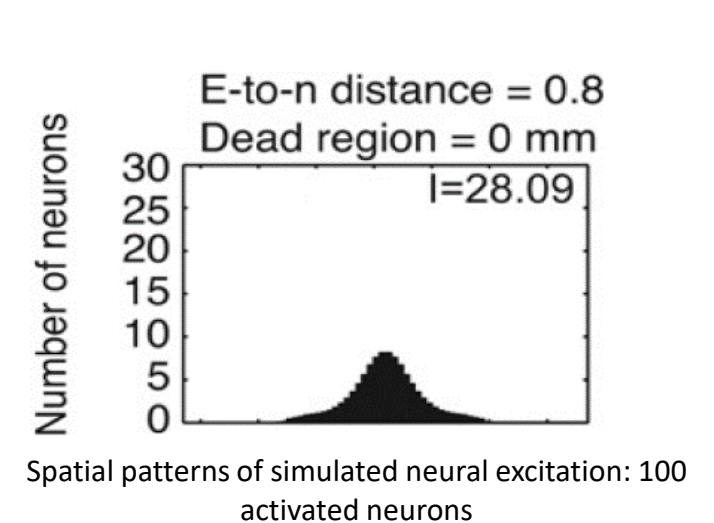


Peri-modiolar electrodes deliver electrical stimulation closer to the hearing nerve

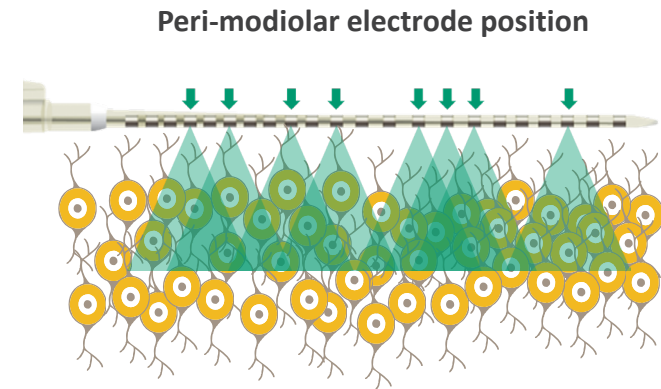
Lateral wall electrodes



Peri-Modiolar electrodes



*"At close electrode-neuron distances, excitation patterns become more spatially localized....."**



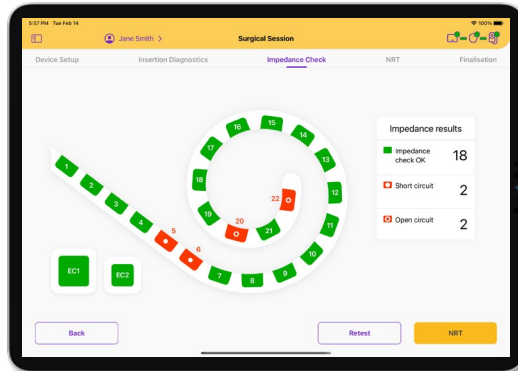
Surgical tools to minimise cochlear trauma during surgery

The Nucleus® SmartNav System

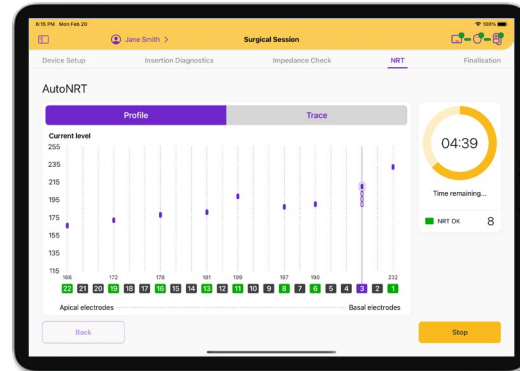
- Includes an iPad app and a surgical processor for use in the operating room
- Delivers wireless, real-time, actionable insights to support surgical navigation
- Gives added assurance that surgery is successful and the electrode array is properly placed
- Provides diagnostic measurements to confirm device integrity, auditory system response and inform post-operative programming
- Supports automated implant registration and cloud data transfer



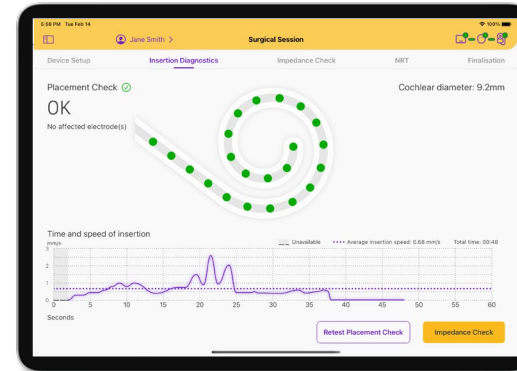
Nucleus® SmartNav System features



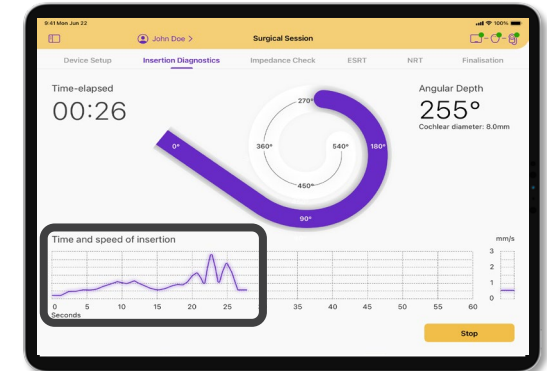
Impedance Check



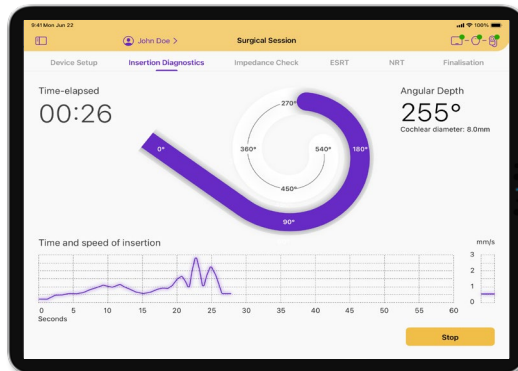
AutoNRT®



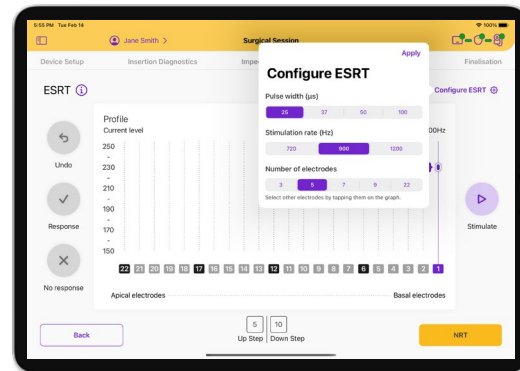
Placement Check



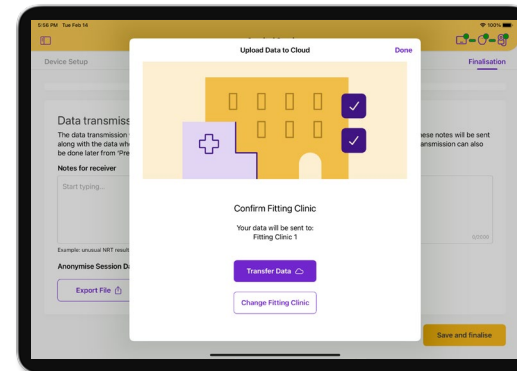
Speed of Insertion



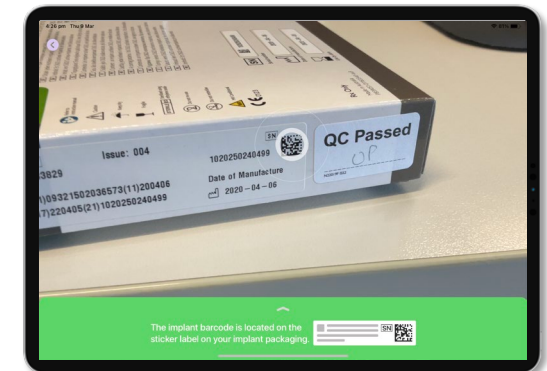
Angular Insertion Depth



Electrical Stapedius Reflex Threshold

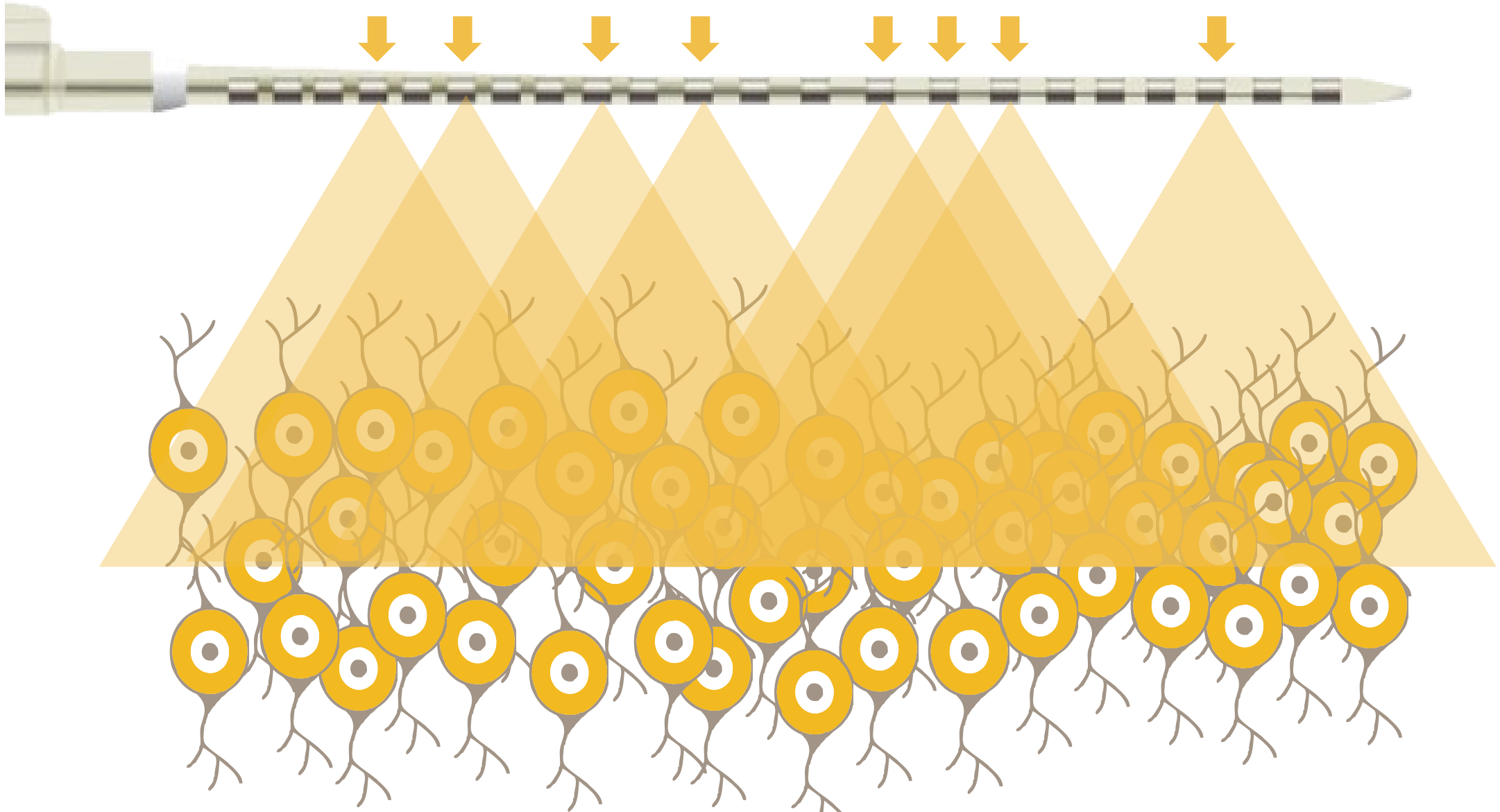


Seamless Data Export (Cloud)

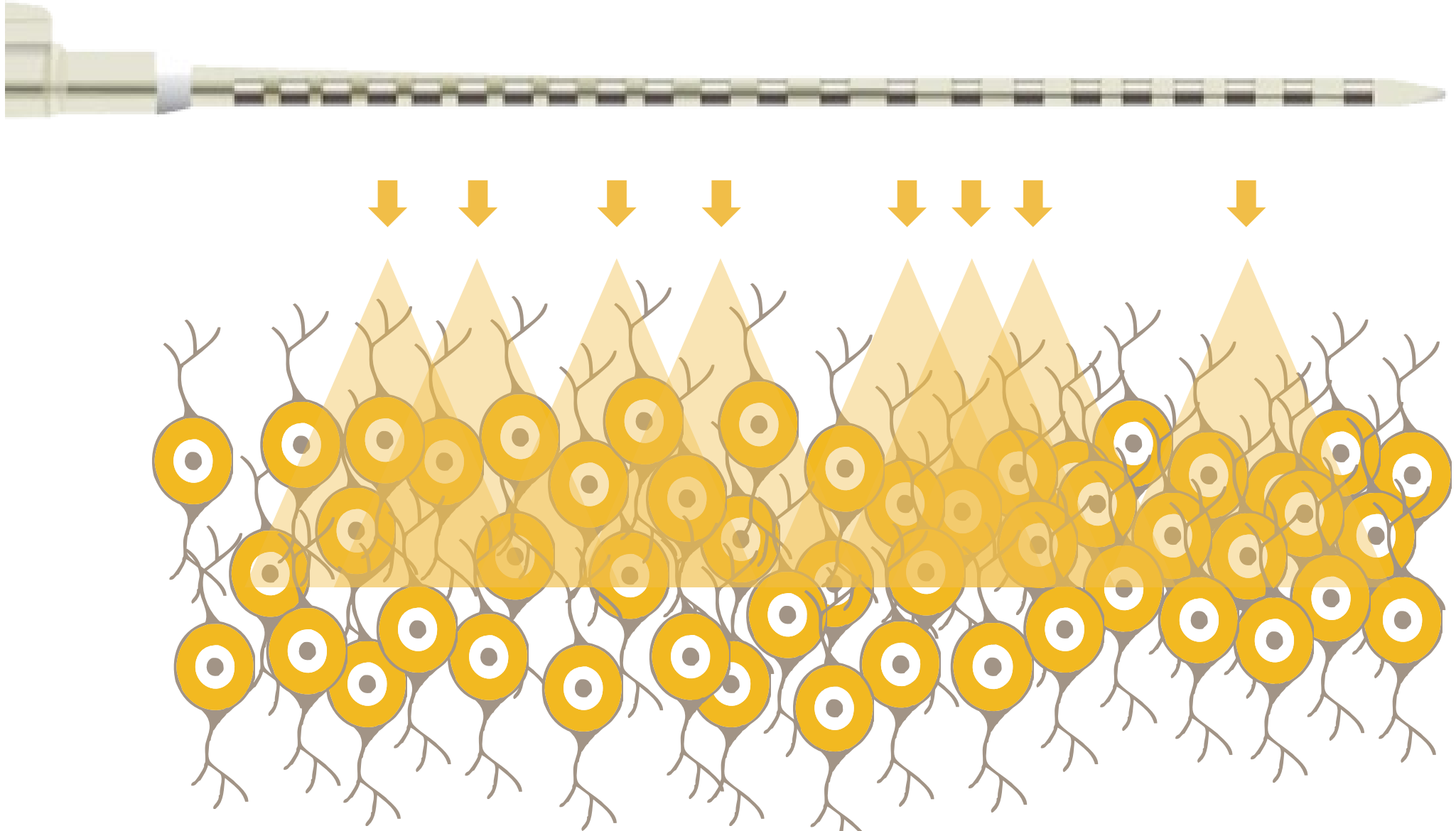


Automated implant registration

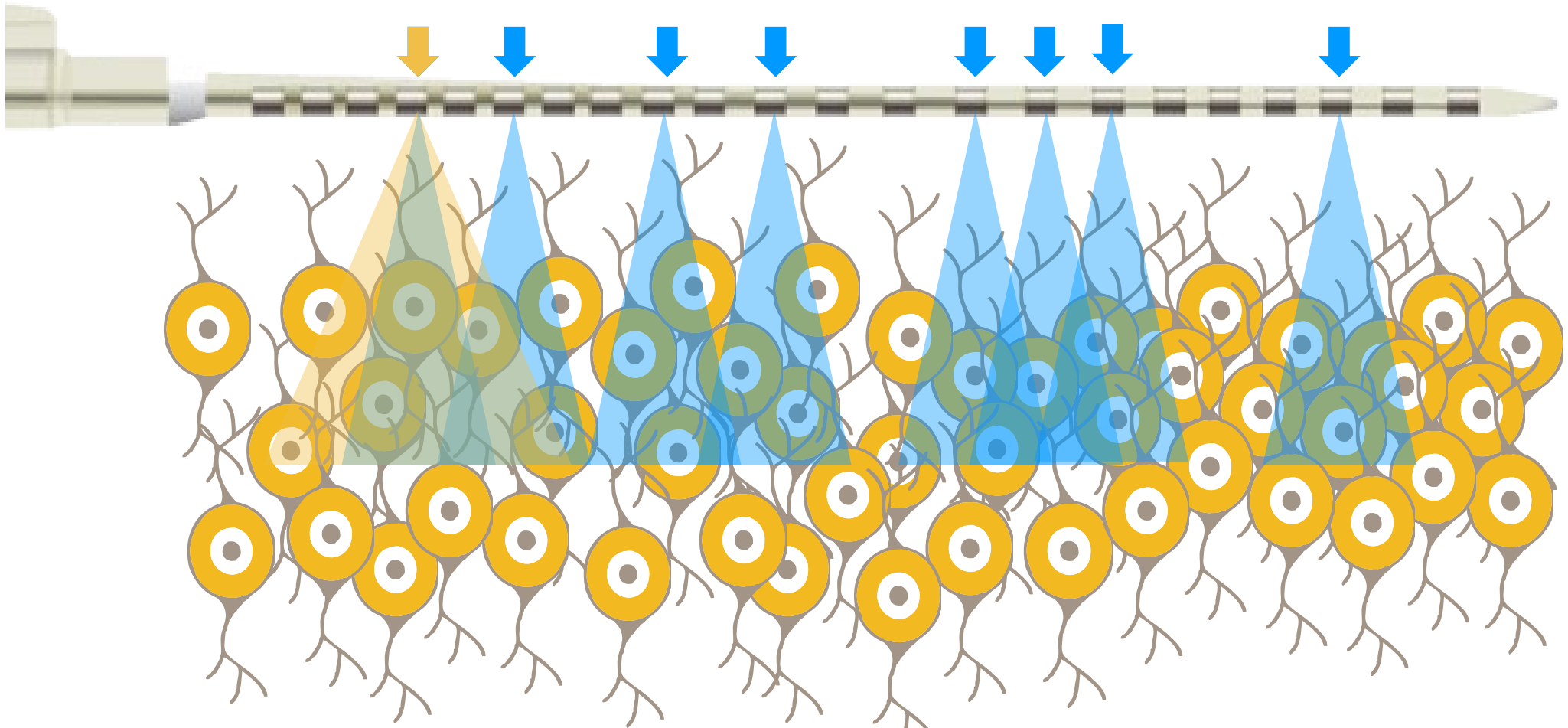
Lateral wall electrodes = high channel interaction / overlap



Peri-modiolar electrodes = reduce channel interaction / overlap



The combination of a peri-modiolar electrode and more precise auditory nerve stimulation has the potential to further improve hearing outcomes

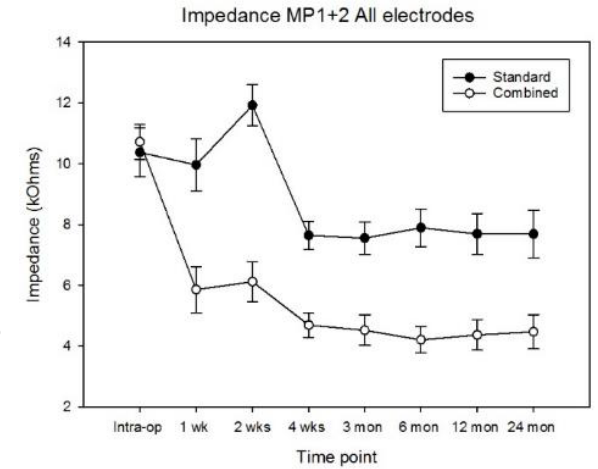


A range of drug / device combination studies underway



- Drug/device combinations have the potential to improve hearing outcomes by minimising the foreign body reaction from surgery
- We are progressing our dexamethasone eluting electrode clinical studies following a feasibility study that indicated the potential for improved hearing outcomes
- Commercialisation still a number of years away with a pivotal study and regulatory submission still to come
- Further research collaborations include:
 - Oral drug delivery with Sensorion SENS-401 feasibility study focused on preservation of residual hearing after cochlear implantation
 - Gene therapy with a cochlear implant. BaDGE[®] neurotrophin gene therapy clinical trial investigating regeneration of the auditory nerve to improve hearing outcomes for cochlear implant recipients

Dexamethasone eluting electrode clinical studies demonstrating lower impedances



Sensorion
SENS-401
feasibility study



BaDGE[®]
neurotrophin
gene therapy
clinical trial



UNSW
SYDNEY

Innovation focus areas



**Hearing
Outcomes**



**Lifestyle and
ease-of-use**



**Connected
Care**



**Expanding the
portfolio**



Living your life – cochlear implant sound processor wearing options



Behind-The-Ear (BTE) Sound Processors



Nucleus® 8 Sound
Processor

Off-The-Ear (OTE) Sound Processors



Kanso® 2
Sound Processor

Continue to shrink the Sound Processor



No external processor (TICI)



Dual
microphones



SSiQ
with SCAN



ForwardFocus®



Advanced
Data Logs



True Wireless
Accessories



Bi-modal
compatibility



Proven hearing performance technologies and industry-leading connectivity



Nucleus® 8 Sound Processor



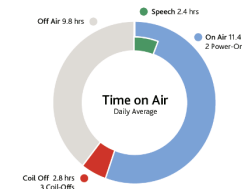
Dual microphones



SSiQ 2 with SCAN 2



ForwardFocus



Usage data



Hearing aid compatibility

Connectivity



Kanso® 2 Sound Processor



Direct streaming for Apple and Android™



Nucleus® Smart App



True Wireless™



IP68



Wearing options

Performance

Bimodal

Lifestyle

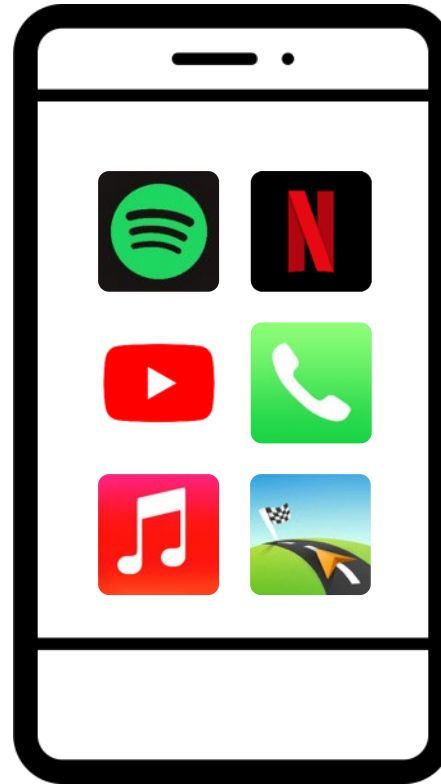
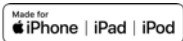
Nucleus 7, Nucleus 8 & Kanso 2: smart bi-modal hearing solution



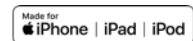
Kanso[®] 2
Sound Processor



Nucleus[®] 8
Sound Processor



ReSound /
GN Hearing
Hearing Aids



Smart Hearing Alliance



Share your audio

Auracast™ broadcast audio will let you invite others to share in your audio experience, bringing us closer together.



Unmute your world

Auracast™ broadcast audio will enable you to fully enjoy televisions in public spaces, unmuting what was once silent and creating a more complete watching experience.



Hear your best

Auracast™ broadcast audio will allow you to hear your best in the places you go and is expected to become the next generation assistive listening technology, improving audio accessibility and promoting better living through better hearing.

Information taken from Bluetooth® website: <https://www.bluetooth.com/auracast/>

1st Generation totally implantable cochlear implant research device (2005-2006)

- Hearing performance in quiet and in noise significantly degraded when using invisible hearing
- Usability strongly affected by the presence of body noise (breathing, swallowing, eating, ...)
- Due to these issues the Melbourne recipients do not use the invisible hearing as the 'standard' hearing mode
- However ... today, all 3 recipients use the invisible hearing mode for part of the day in particular situations and activities
- The recipients were not prepared to give up the invisible hearing function:

"I'm never deaf anymore"

"Freedom from deafness"



3 patients implanted with first generation investigational TICI device in 2005

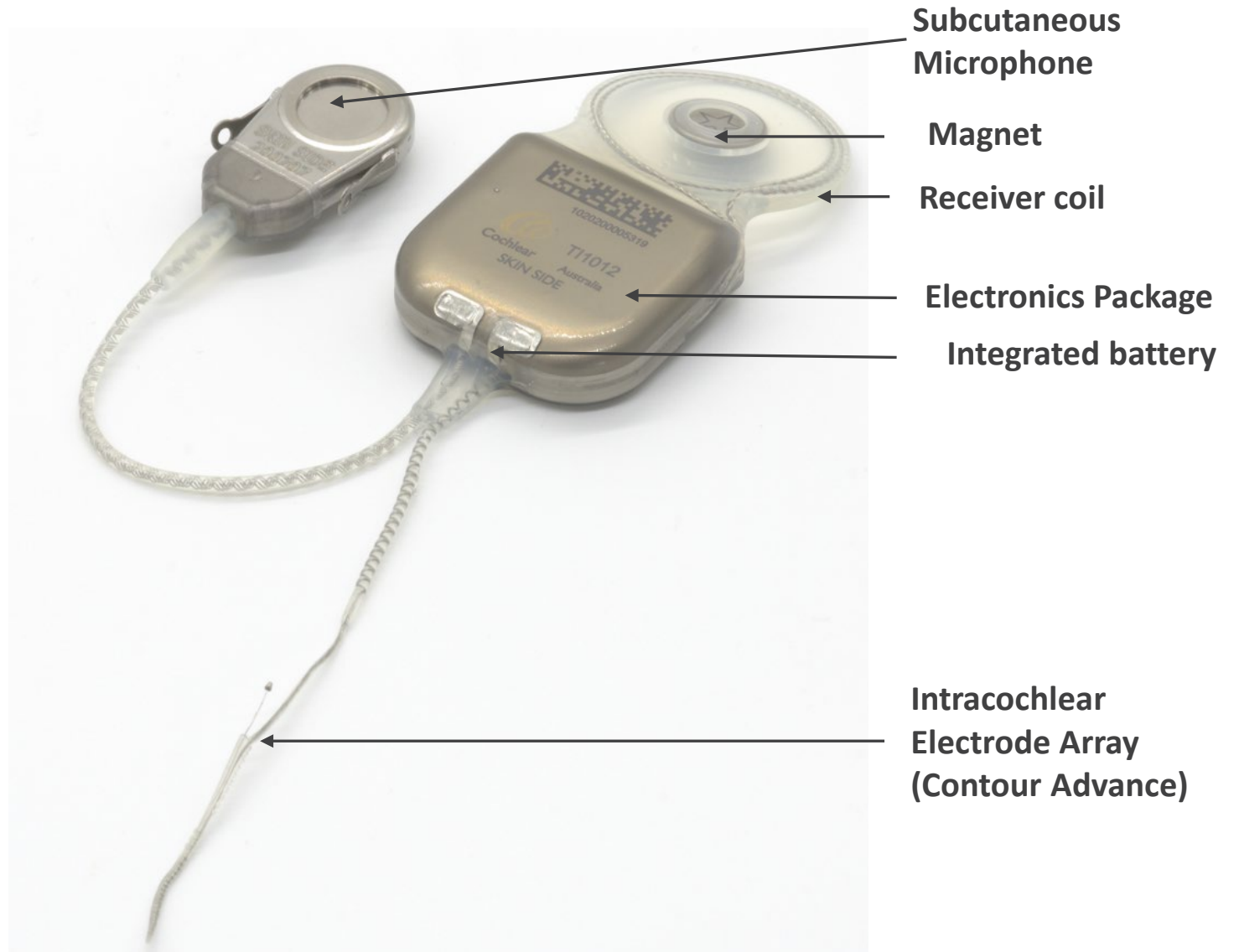
2nd Generation totally implantable cochlear implant research device (2018)



Custom body-worn charger



Cochlear Nucleus® 6 Sound Processor



2nd Generation TICI research device hearing modes

External hearing mode



Invisible hearing mode



2nd Generation TICI research device – significant improvements in hearing outcomes

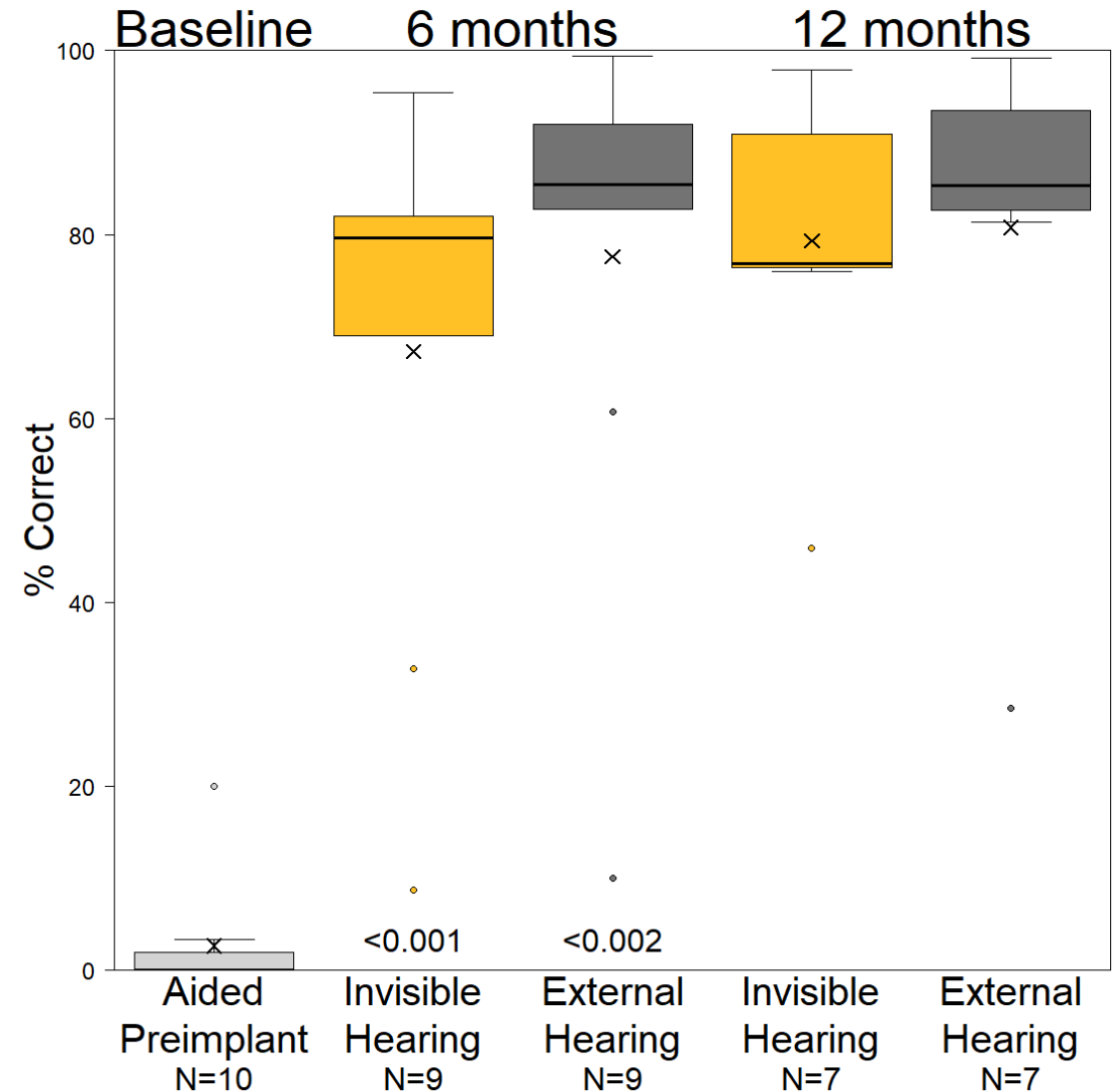


Clinical study results (Briggs)

- 10 patients
- Baseline hearing (aided pre implant) of ~3% sentence understanding in quiet
- At 6 months after TICI switch on they can hear up to 80% in invisible hearing mode, improving even further after 12 months
- Great outcomes in invisible hearing mode compared to hearing with the external sound processor
- Body noise is still audible but is not as intrusive the 1st gen device

Pathway to commercialisation – still many years away

- Finalisation of product development
- Pivotal clinical study
- Regulatory approval
- Reimbursement considerations



Innovation focus areas



**Hearing
Outcomes**



**Lifestyle and
ease-of-use**



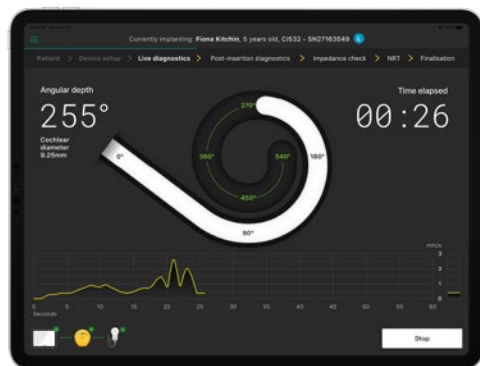
**Connected
Care**



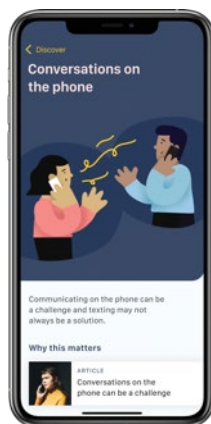
**Expanding the
portfolio**



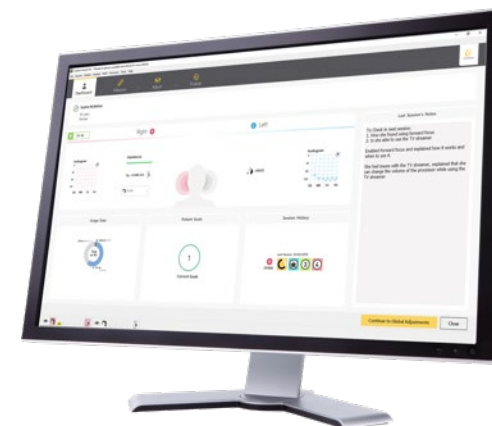
Connected Care supports patients at every stage of their journey



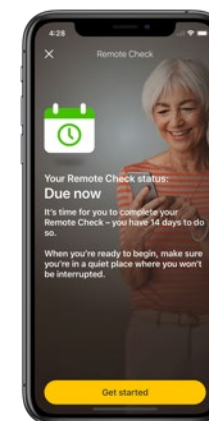
Surgical Care



Self-managed Care



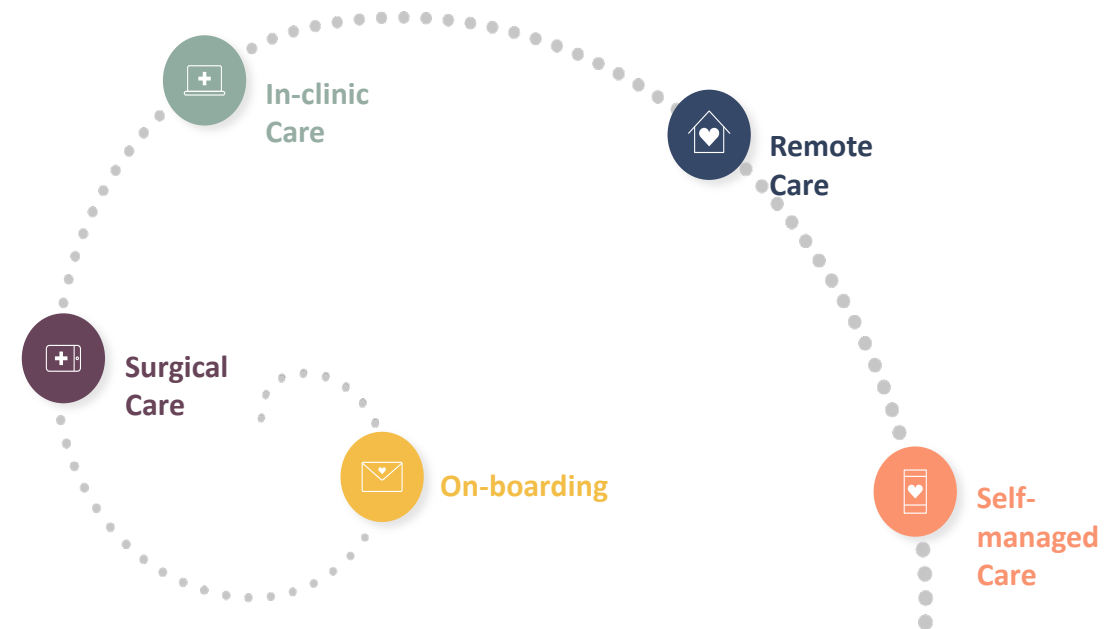
In-clinic Care



Remote Care

Connected Care provides convenience and confidence to customers and has the potential to drive clinic efficiency and enable data-driven care

- **Convenience and confidence:** delivering digital products that enhance the patient and professional experience
 - Real-time surgical guidance
 - More convenient care delivery options
 - Insights and intuitive device controls to drive patient engagement
- **Clinic efficiency:** connected care products enable more efficient care delivery, reducing waiting lists and increasing access to new candidates
- **Data-driven care:** by capturing demographics, device info/usage patterns and longitudinal performance measures, we can create data-driven clinical decision support to enhance patient outcomes.
 - Establishes an evidence-based standard of care that delivers personalised care recommendations
 - Opportunity for AI-assisted fitting and rehab



Connected Care impacts the entire patient journey

Innovation focus areas



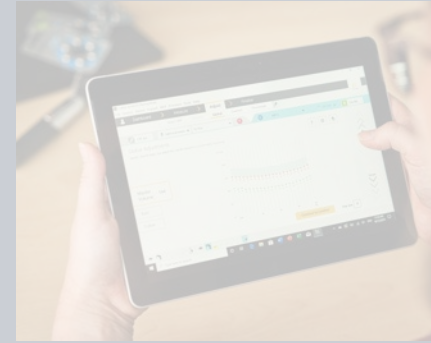
**Hearing
Outcomes**



**Lifestyle and
ease-of-use**



**Connected
Care**



**Expanding the
portfolio**

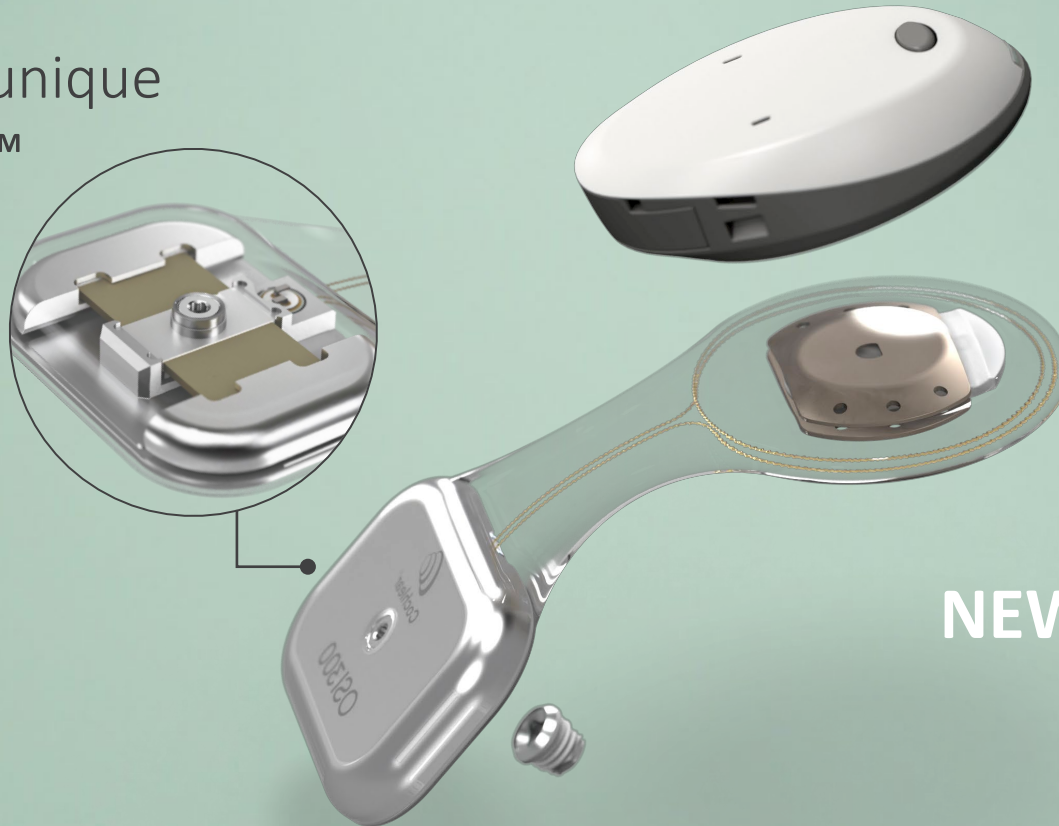


The Osia™ System®

Removing boundaries to bone conduction



Powered by unique
Piezo Power™
technology



NEW!

**High-frequency power
& performance¹**

Discreet & easy to use

**Only active system
enabling MRI at 3 T²**

High-resolution MRI, without compromise

NEW!

**Next-generation
3 T magnet**

**Piezo Power™
transducer**



The Osia System is the
only active BC system
enabling MRI at 3 T^{1,2*}

*The OSI300 implant is MRI conditional at 1.5 T and 3 T with magnet in place. Refer to Osia MRI guidelines for further information.

1. MRI Checklist for MED-EL Bone Conduction Implant BCI 602 MED-EL Elektromedizinische Geräte GmbH, Austria; AW52878_1.0 (English US)

2. Ellsperman SE, Nairn EM, Stucken EZ. Review of Bone Conduction Hearing Devices. Audiol Res. 2021;11(2):207-219.

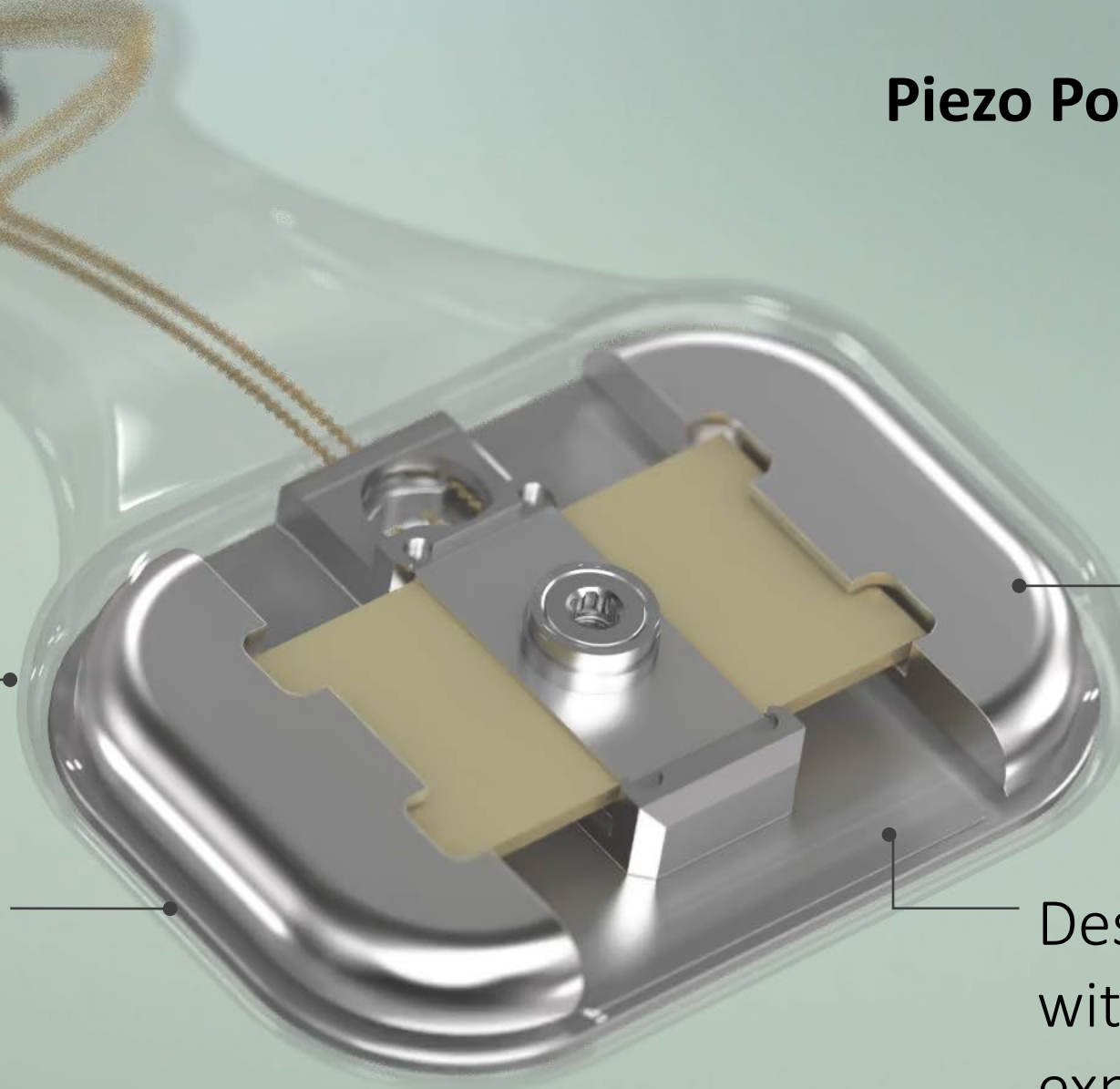
Piezo Power™ transducer

No unnecessary
surgeries

No performance
degradation

Minimal image
artefact

Designed to
withstand 3T MRI
exposure



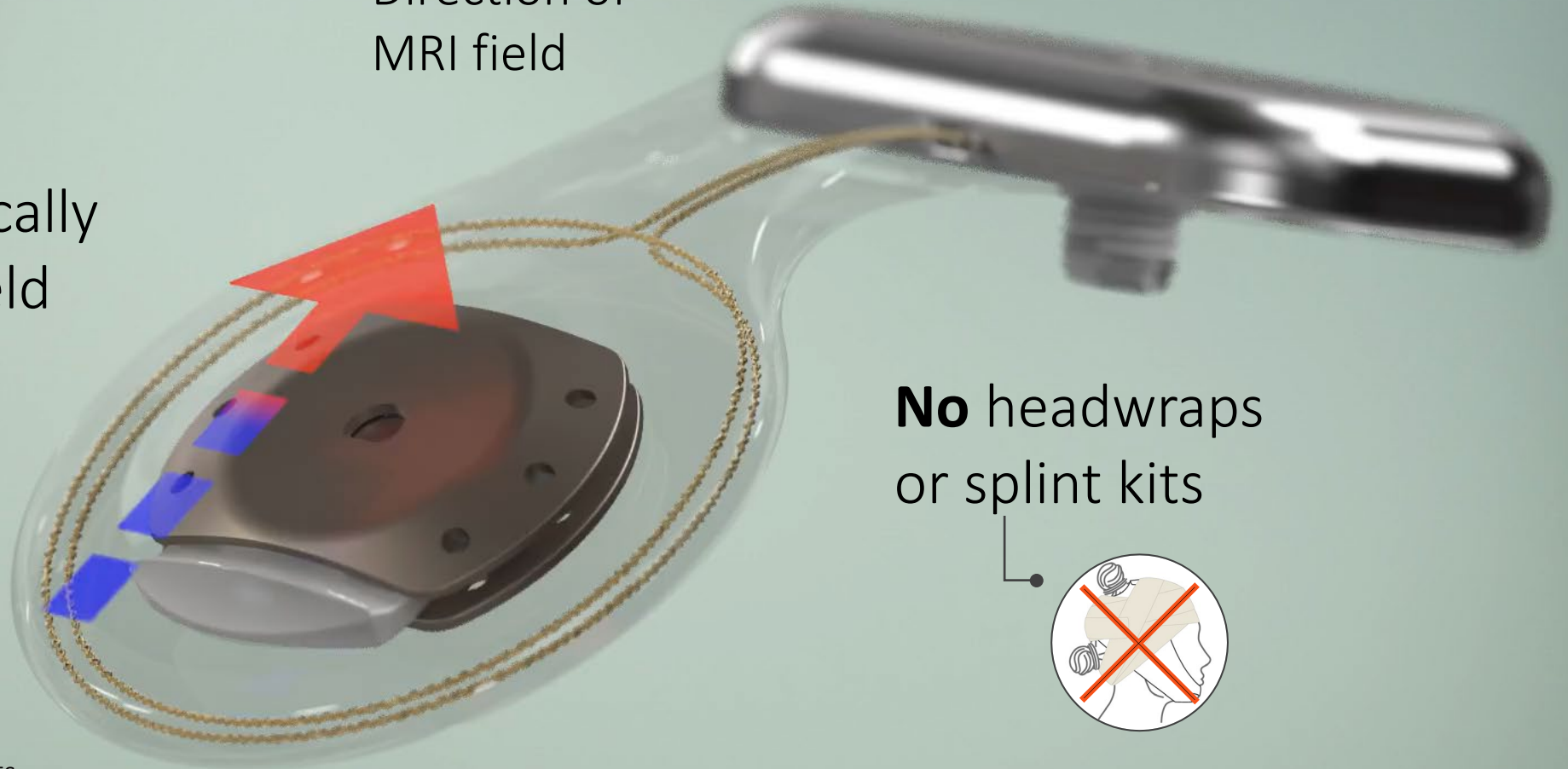
Next-generation 3 T magnet

Magnet automatically
realigns to MRI field

Direction of
MRI field

Simple magnet
removal *if
needed*

For further reduced image artefacts



No headwraps
or splint kits



We continue to invest ~12% of sales revenue each year in R&D, with a strong pipeline of products and services in development

- Opportunities to improve **hearing outcomes** from implant-focused investment – peri-modiolar electrodes + more precise auditory nerve stimulation, drug / device combinations
- **Lifestyle** focus on smaller, lighter, better connected sound processors and totally implantable cochlear implant solutions
- **Connected care** continues to focus on improving convenience and confidence to customers
- **Expanding the portfolio** with acoustic implant innovation as well as exploring potential opportunities to broaden the use of our technology outside of hearing loss



Hear now. And always



Developing a treatment pathway for adults

Cochlear Capital Markets Day | 27 October 2023

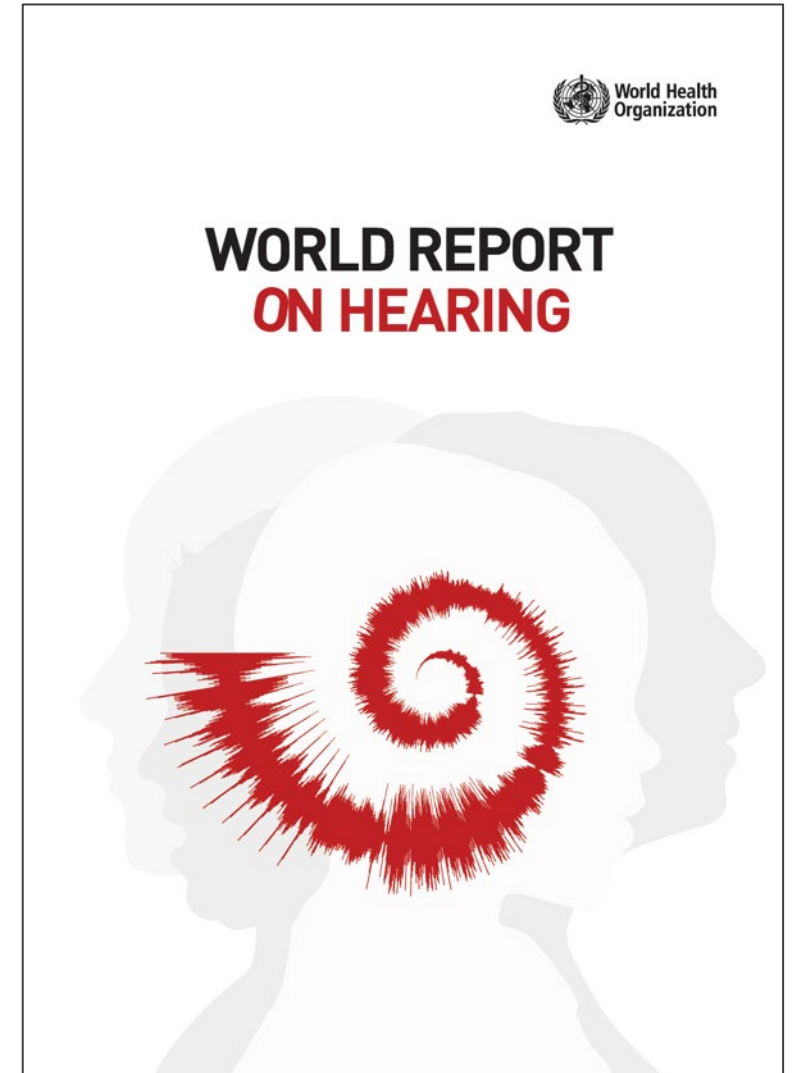
Dean Phizacklea
SVP Global Strategic Marketing

The global burden of hearing loss is significant

- Hearing loss affects more than **1.5 billion people** or **20%** of global population¹
- Most people with severe or worse hearing loss are **over 60**¹
- **1 in 3 people over 65** are affected by hearing loss¹
- Global cost of unaddressed hearing loss < **\$980 billion annually**¹
- Hearing loss is the **single largest modifiable risk factor** for dementia²

1. World Health Organization. World report on hearing ,2021

2. Dementia prevention, intervention, and care: 2020 report of the Lancet Commission, Prof Gill Livingston, MD



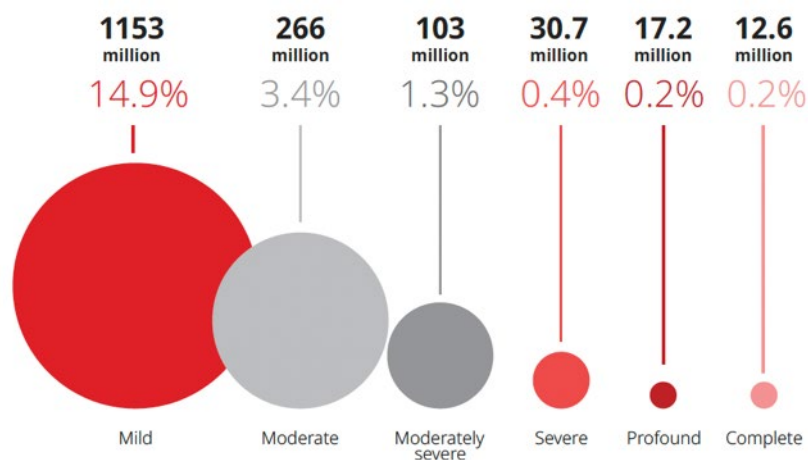
An ageing population and a growing segment of patients who would be eligible for cochlear implants provides opportunity for sustained growth

**Total Population and Those Aged 60 and Older by World Region:
2020 and Projected 2050**

(Numbers in millions)

Region	Total population		Population aged 60 and older			
	2020	2050	2020		2050	
			Number	Percent	Number	Percent
World	7,684.3	9,665.3	1,045.4	13.6	2,092.2	21.6
Africa	1,339.5	2,533.6	74.4	5.6	235.1	9.3
Asia	4,539.6	5,188.0	603.2	13.3	1,292.2	24.9
Europe	749.3	716.4	191.1	25.5	246.7	34.4
Latin America and the Caribbean	644.3	742.6	82.6	12.8	183.4	24.7
Northern America	370.5	432.1	86.8	23.4	122.2	28.3
Oceania	41.1	52.6	7.3	17.9	12.6	24.0

Source: U.S. Census Bureau, International Database, 2019.



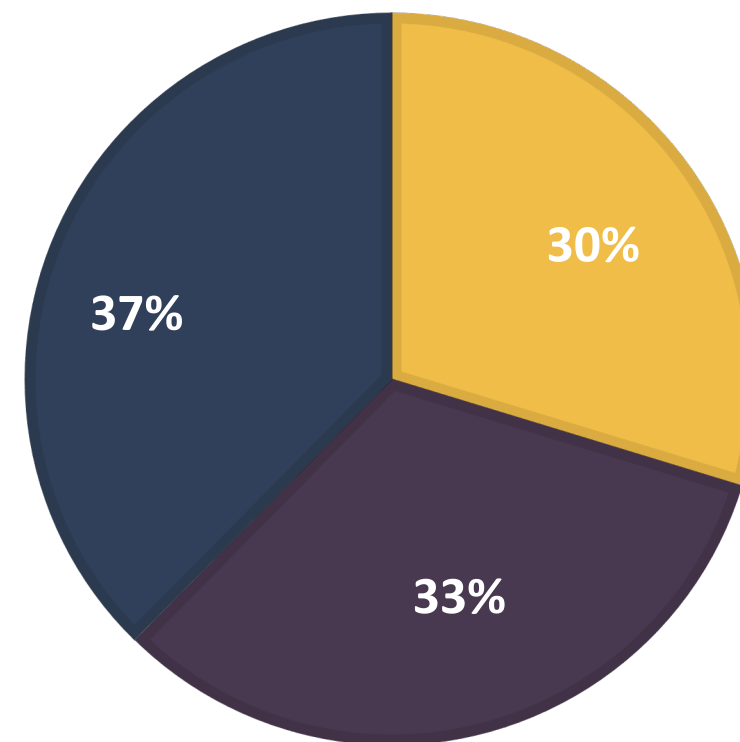
Globally 1.5 billion people live with hearing loss

Source: World Health Organization; 2021

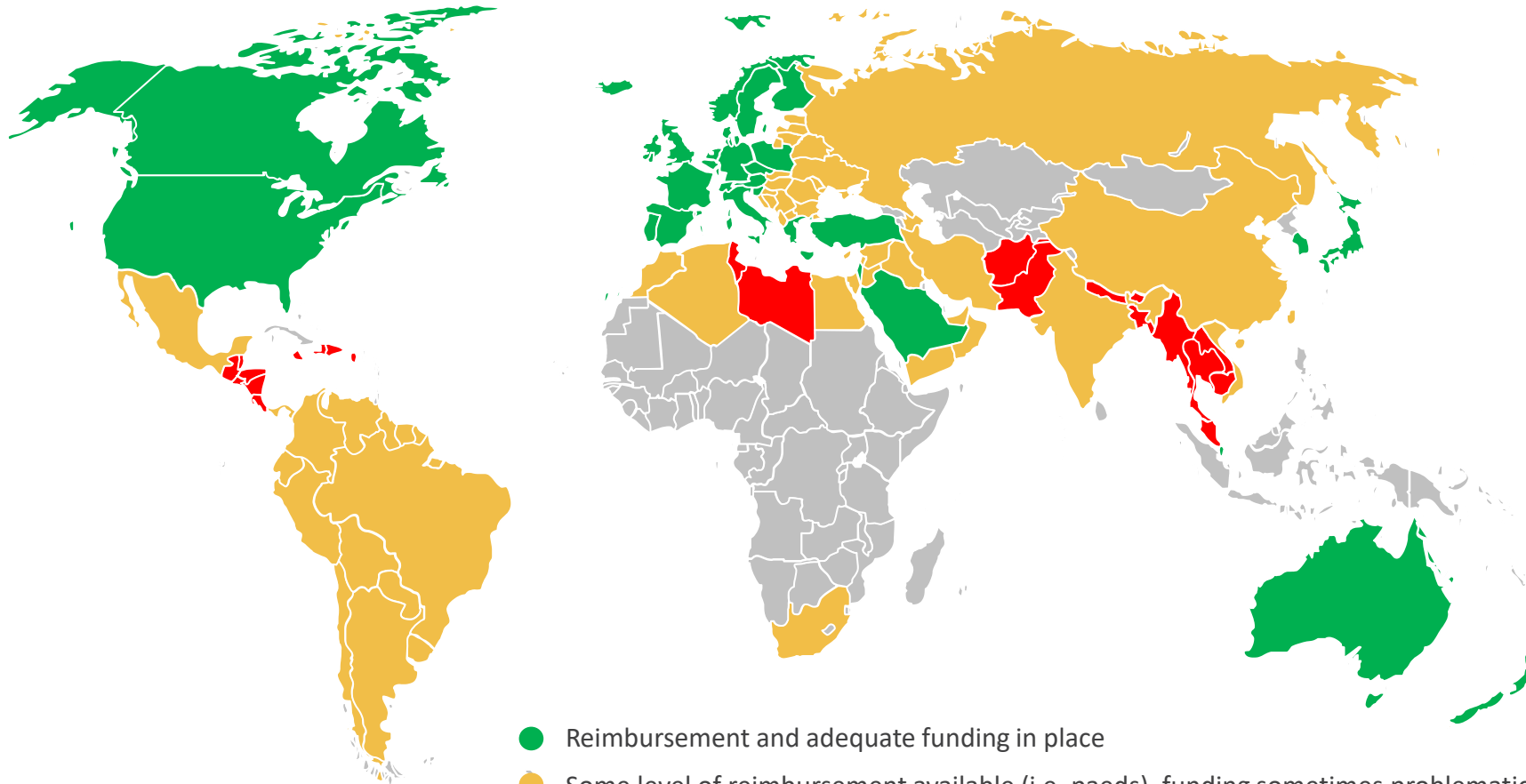
FY23 Cochlear surgery mix

DEVELOPED MARKETS

■ Paediatrics ■ Adults ■ Seniors



Reimbursement and funding for CI is well established in developed markets and improving in emerging markets



- Reimbursement and adequate funding in place
- Some level of reimbursement available (i.e. paediatric), funding sometimes problematic
- Little or no reimbursement – mostly cash pay
- No reimbursement / limited cash pay

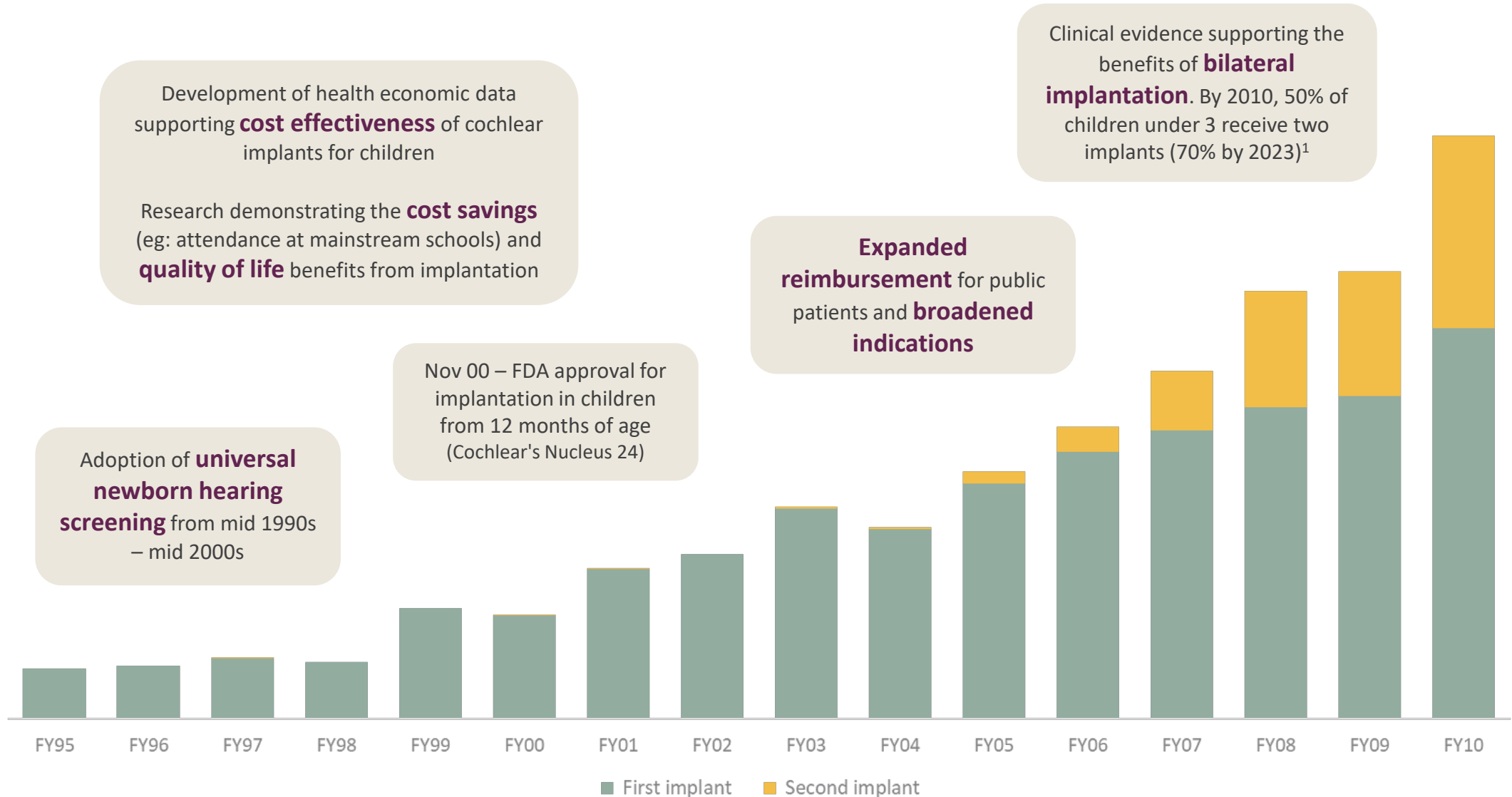
Reimbursement criteria usually focuses on age, PTA threshold level and word / speech recognition

Country	Age criteria	PTA criteria	Audiometric criteria (adults)
USA	9m+	70dB+	<60% best aided
Germany	No age limit	60dB+	<60% Freiburger test
UK	No age limit	80dB+	<50% on AB word test
Australia	No age limit	70dB+	-

Cochlear implants became the standard of care for children by 2010

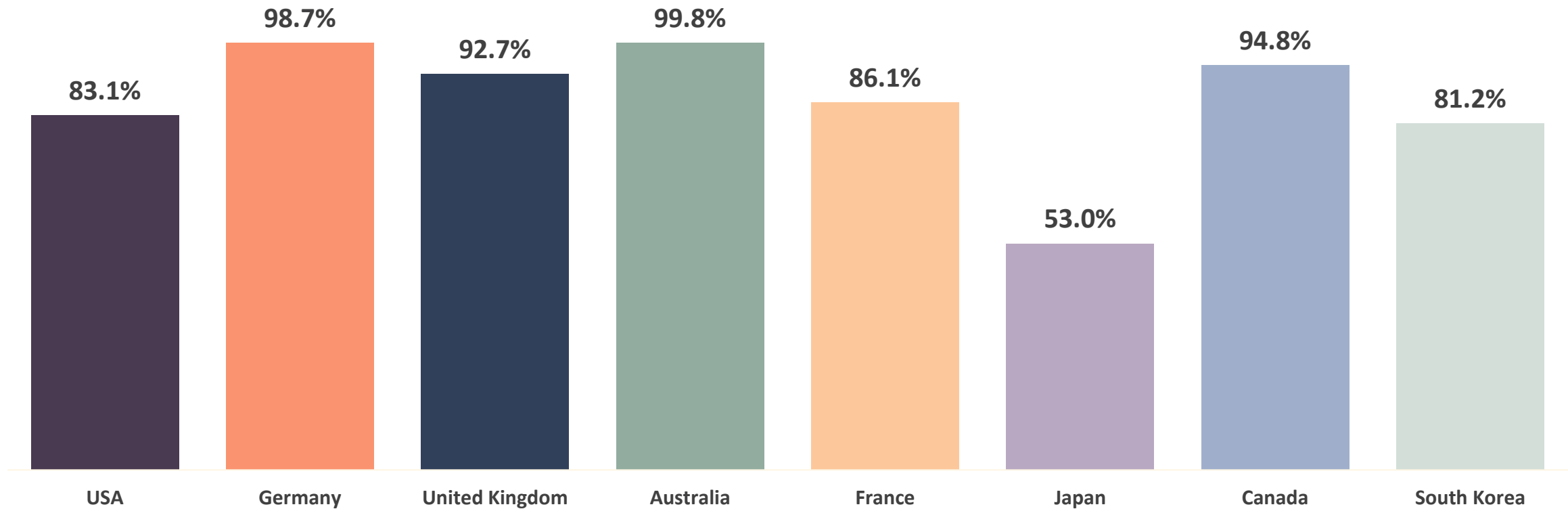


Cochlear US paediatric surgeries



1. Based on Cochlear's surgery data for developed markets

Estimated penetration of cochlear implants in Children (developed markets)

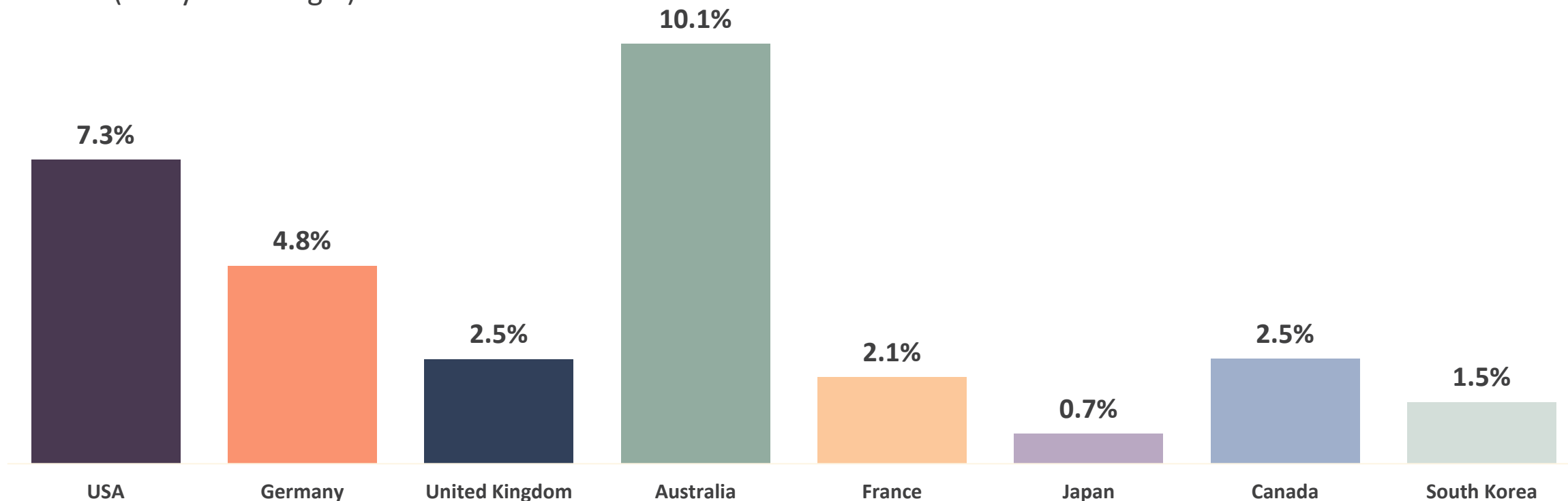


- Eligible patient population aged 0-18 with hearing loss > 90db
- Prevalence % derived from Haile et al , Hearing loss prevalence and years lived with disability, 1990–2019: findings from the Global Burden of Disease Study 2019 , Lancet 2021; 397: 996–100)
- No adjustments made for funding availability and access
- Total market recipients derived using Cochlear recipient and Cochlear market share data (FY2023)

Estimated penetration of cochlear implants in Seniors (developed markets)



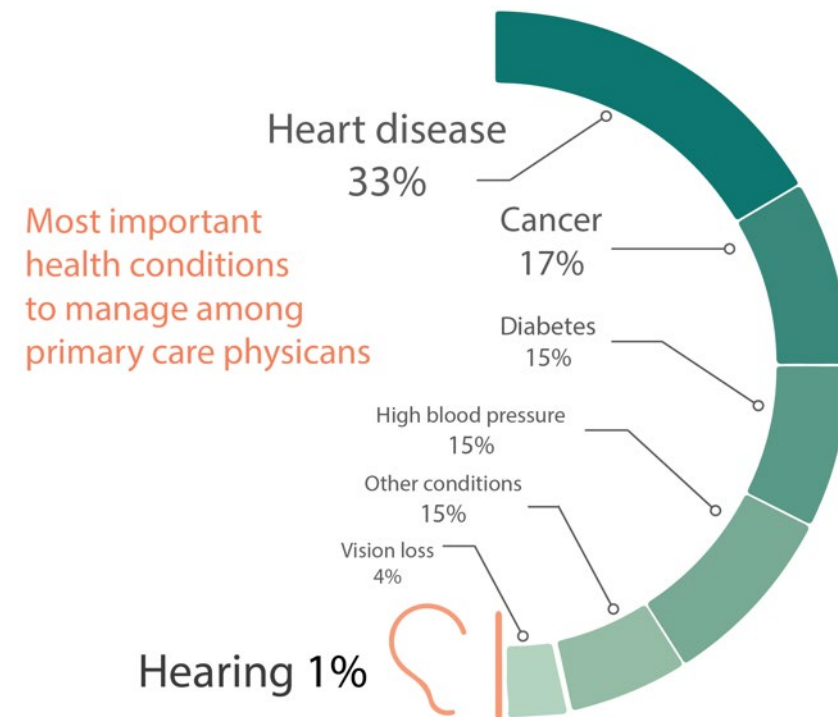
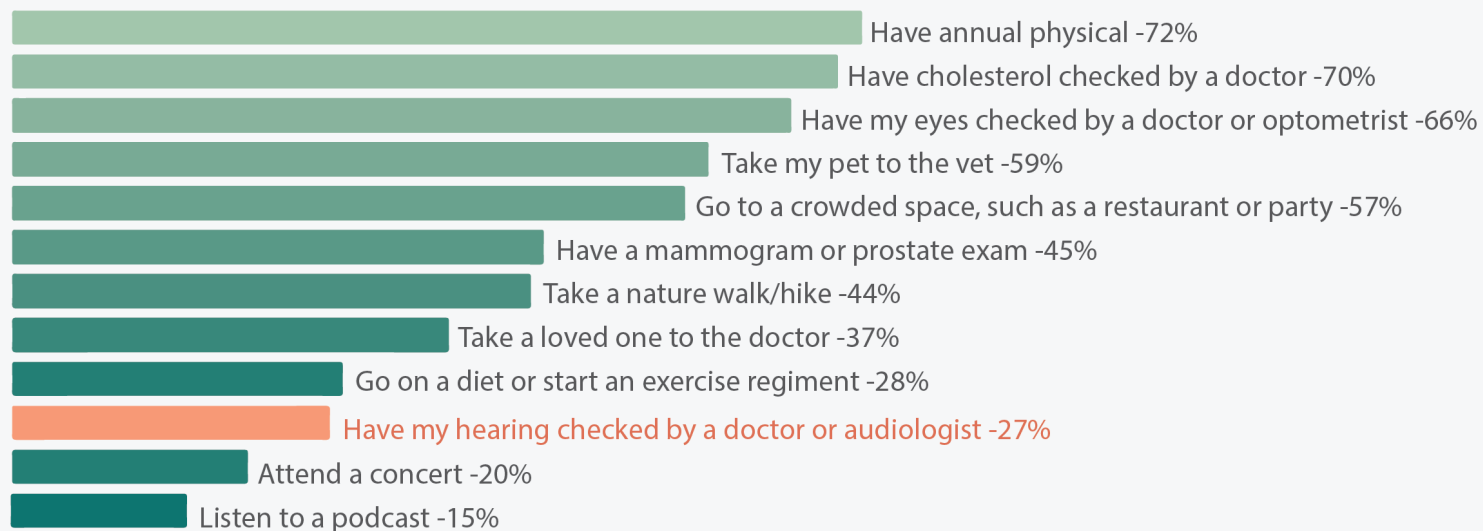
Seniors (65+ years of age)



- Eligible patient population aged 65+ with hearing loss > 70db
- Prevalence % derived from Haile et al , Hearing loss prevalence and years lived with disability, 1990–2019: findings from the Global Burden of Disease Study 2019 , Lancet 2021; 397: 996–100)
- No adjustments made for funding availability and access
- Total market recipients derived using Cochlear recipient and Cochlear market share data (FY2023)

Hearing loss is not seen as a serious medical condition

Likelihood of prioritizing health conditions and life activities in the next 12 months - responses of very likely

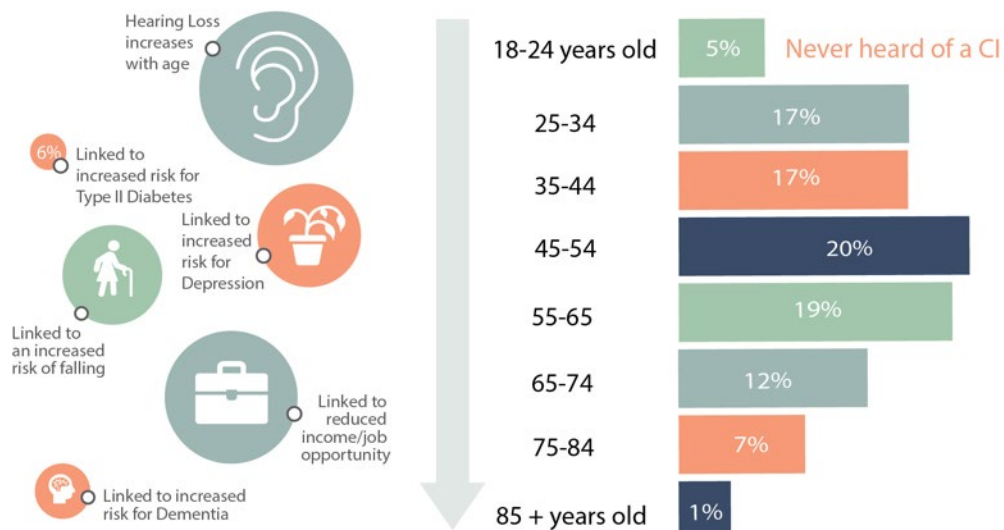


US Survey of 400 PCPs

Patients have a very low level of awareness of a cochlear implant as a potential treatment option

From a national survey of 15,138 adults in 2021

80% of adults with hearing difficulty reported never talking with a hearing care professional about cochlear implants (CIs)



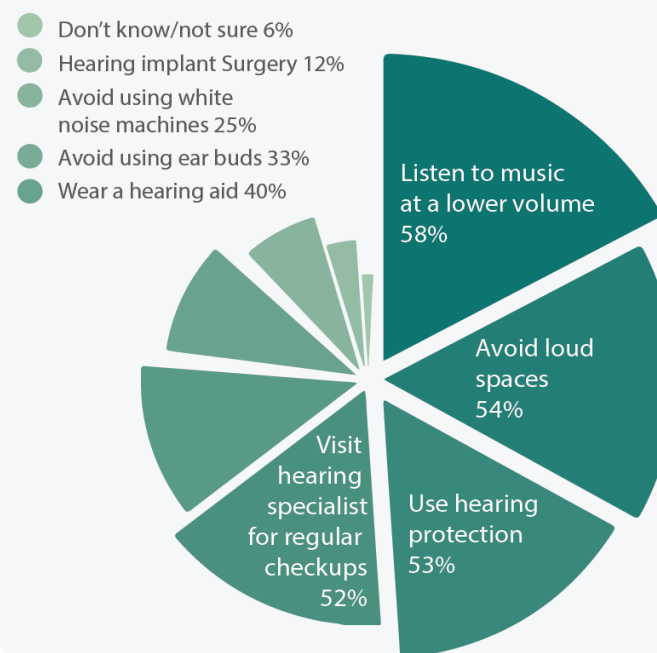
Awareness contributes directly to underutilization of cochlear implants

CI Awareness in the US

John P. Marinelli, Sarah A. Sydlowski, Matthew L. Carlson

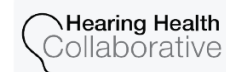


Perceived steps to resolve hearing loss

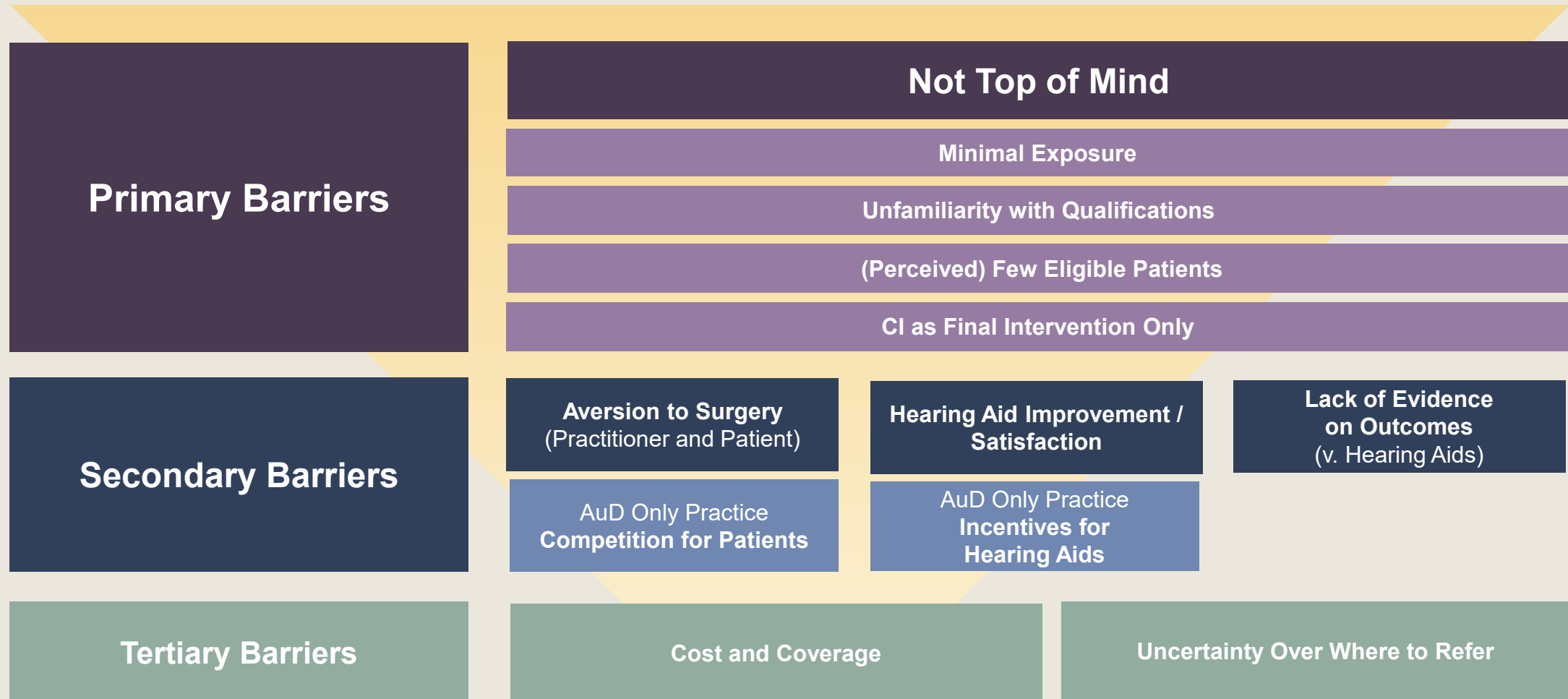


National cross-sectional survey study of adults between ages of 50 and 80

Hearing Loss Awareness and Literacy



Professionals most commonly cite knowledge and patient-related concerns as barriers to referral; commercial concerns are important for audiology-only clinics



Why we need a Standard of Care for cochlear implants

*“One of the challenges we have is that if the various **different professionals**, are not all giving, similar or the same and **consistent, messaging** around hearing healthcare then all we're doing is making it more difficult for individuals to seek treatment.”*

CI User from the Living Guidelines Taskforce

*“There is a lack of **person-centred** and **consistent referral pathways**, which results in **inconsistent diagnosis** and **delays in referral** to CI specialists for candidates who may benefit.”*

CI Audiologist from the Living Guidelines Taskforce

The key elements of Standard of Care

Creation of evidence

The continuous generation of robust clinical evidence that demonstrates improved clinical outcomes and patient quality of life.



Living Guidelines

An evidenced based set of treatment guidelines for adults who would benefit from a cochlear implant.



Policy and Advocacy

Engage key stakeholders to raise the awareness and the importance of hearing health in adults and, in particular, the role of cochlear implants.



Behaviour change

Move hearing professionals into willing and active referrers.

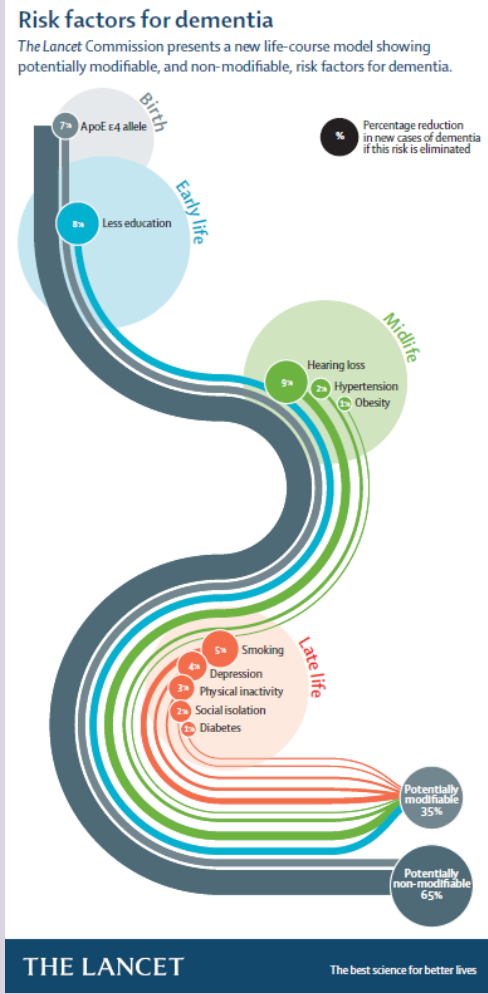


Creation of evidence

The continuous generation of robust clinical evidence that demonstrates improved clinical outcomes and patient quality of life.



The evidence to support the role of hearing treatment in healthy ageing and its effectiveness is continuing to strengthen



ACHIEVE
HEALTHY AGING

COACH

	Hearing aids only**	Cochlear implant***
Overall hearing performance Satisfied or Very Satisfied	9%	95%
Ability to understand what is said on TV	13%	76%
Ability to understand conversations in a small group	8%	79%
Hearing performance in background noise	2%	58%
Ability to listen to and appreciate music	13%	68%
Ability to understand people on the phone	6%	71%

Analysis of Cochlear Implants: A Societal Perspective

Boerman,¹ Wilbert B. van den Hout,² Jeroen J. Briare,¹ van den Boven,¹ and Johan H.M. Frijns^{1,4}

loss and have become the standard of care for this patient population (Bond et al. 2009). Increasing numbers of patients are eligible for CI since patients with increasing residual hearing benefit from CI (Carlson et al. 2018; Snel-Bongers et al. 2018; Huinck et al. 2019). For example, the recent relaxation of selection criteria in the United Kingdom and Belgium will lead to an approximate 30% increase of patients eligible for CI (Van der Asten et al. 2020a). Due to the substantial lifelong cost of implantation and maintenance, the total cost of CI will increase the coming years. Given that the healthcare sector is budget constrained, the risk exists that not all patients eligible for CI receive CI, or that the rising cost of CI will displace other healthcare treatments.

Despite the rising total cost, unilateral CI is considered cost-effective, as was shown in numerous cost-utility analyses of CI (O'Neill et al. 2001; Schulz-Gattermann et al. 2002; Immerfeld et al. 2002; UK Cochlear Implant Study Group 2006; Barton et al. 2009b; Lee et al. 2006; Nelson 2006; Chen et al. 2014; Smulders et al. 2016). In addition, two critical reviews (Immerfeld et al. 2002; Barton et al. 2009b) and a meta-analysis (Barton et al. 2009b) have concluded that the effectiveness and cost-effectiveness of unilateral CI in children and adults (Bond et al. 2009; Ontario Health 2019). Most of these studies took the healthcare perspective into account, and some also included educational cost of children with and without CI (O'Neill et al. 2001; Schulz-Gattermann et al. 2002; Barton et al. 2009b; Colletti et al. 2011). No study taken other costs and benefits outside the healthcare sector into account, such as future productivity losses and gains. All these costs combined are called lifetime societal costs. To put this cost in perspective, the time societal costs of severe to profound hearing loss in the United States in 1998 (Mohr et al. 2009).

The healthcare perspective only provides insight into cost to the healthcare sector and does not take all benefits of CI into account. Besides improvements in educational level (De Raeye et al. 2015; van Wierdenburg et al. 2019) and reduction of educational cost (O'Neill et al. 2001; Barton et al. 2009b; Colletti et al. 2011), productivity also improves after CI (Kos et al. 1977; Monteiro et al. 2012). A cost-benefit analysis (CBA) with societal perspective includes all these benefits and provides comprehensive understanding of CI consequences. A health perspective yields risks for suboptimal budgetary decision-making at the patient's expense, where a CBA taking a societal perspective can support decision-makers in maximizing societal welfare (Krol & Brouwer 2014). This study aimed to include relevant societal costs and benefits of CI in the Netherlands. Economic modeling generally entails assumptions about future costs and benefits. The wider the perspective that is adopted, the greater the number of such assumptions. For that reason, we

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The European Journal of Health Economics
<https://doi.org/10.1007/s10198-021-01393-y>

ORIGINAL PAPER

The cost-effectiveness of unilateral cochlear implants in UK adults

Henry Cutler¹ · Mutsha Gumbie¹ · Emma Olin¹ · Bonny Parkinson¹ · Ross Bowman² · Hafsa Quadri³ · Timothy Mann²

Received: 8 April 2020 / Accepted: 21 October 2021
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Abstract Objective The National Institute for Health and Care Excellence (NICE) updated its eligibility criteria for unilateral cochlear implants (UCIs) in 2019. NICE claimed this would not impact the cost-effectiveness results used within its 2009 technology appraisal guidance. This claim is uncertain given changed clinical practice and increased healthcare unit costs. Our objective was to estimate the cost-effectiveness estimates of UCIs in UK adults with severe to profound hearing loss within the contemporary NHS environment.

Methods A cost-utility analysis employing a Markov model was undertaken to compare UCIs with hearing aids or no hearing aids for people with severe to profound hearing loss. A clinical pathway was developed to estimate resource use. Health-related quality of life, potential adverse events, device upgrades and device failure were captured. Unit costs were derived mostly from the NHS data. Probabilistic sensitivity analysis further assessed the effect of uncertain model inputs.

Results A UCI is likely to be deemed cost-effective when compared to a hearing aid (£11,946/QALY) or no hearing aid (£10,499/QALY). A UCI has an 93.0% and 98.7% likelihood of being cost-effective within the UK adult population when compared to a hearing aid or no hearing aid, respectively. ICERs were mostly sensitive to the proportion of people eligible for cochlear implant, discount rate, surgery and device costs and processor upgrade cost.

Conclusion UCIs remain cost-effective despite changes to clinical practice and increased healthcare unit costs. Updating the NICE criteria to provide better access to UCIs is projected to increase annual implants in adults and children by 70% and expenditure by £28.6 million within three years. This increased access to UCIs will further improve quality of life of recipients and overall social welfare.

Keywords Cost-utility · Cochlear implant · Hearing aid · Hearing loss · Economic evaluation

JEL Classification D61 · I18 · I19

Introduction

Around 11 million people in the UK live with permanent hearing loss, most of which results from age related damage to the cochlear due to environment and genetic factors [1]. A unilateral cochlear implant (UCI) can improve hearing in people with severe to profound sensorineural hearing loss. Speech recognition is better with cochlear implants compared to hearing aids for adults with post-lingual severe to profound bilateral hearing loss, regardless of age [2–8]. While pre-lingual deafened people derive significant benefits from cochlear implants, people with post-lingual severe to profound hearing loss receive the greatest improvements in speech perception [8, 9]. Gains in speech perception scores are greatest in the first few months, but performance continues to improve over time [10, 11].

Improved hearing from using a UCI also improves quality of life. People have reported improvements in the Geriatric Depression Scale [12, 13], improved mental health and social functioning in the Short Form Health Survey (SF-36) [10, 14–16], improved health-related quality of life as measured by the Health Utilities Index Mark 3 (HUI3) [11], and

Published online: 02 November 2021

Springer

Large multicentre, randomised clinical studies will support the Standard of Care in Adults



Multicentre RCT to assess whether a cochlear implant or hearing aids are better at improving speech understanding for adults with severe hearing loss.

Primary outcome: measure of speech perception at 9 months post activation

- UK sites
- 130 patients
- Severe hearing loss
- Randomised to either a Hearing Aid or a Cochlear implant

Estimated completion date : April 2025



Multicentre RCT to determine efficacy of hearing treatment in reducing cognitive decline in older adults.

Primary outcome: 3-year change in global cognitive function

- US sites
- 977 patients
- Mild to moderately severe hearing loss
- Randomised to either hearing aids or health education control

Completed: June 2023
(funding has now been secured for a further 3 year extension)

JAMA Otolaryngology-Head & Neck Surgery | Review

Unilateral Cochlear Implants for Severe, Profound, or Moderate Sloping to Profound Bilateral Sensorineural Hearing Loss

A Systematic Review and Consensus Statements

Craig A. Buchman, MD, René H. Gifford, PhD, David S. Haynes, MD, Thomas Liner, MD, Gerard O'Donoghue, Oliver Adunka, MD, Alison Biever, AuD, Robert J. Briggs, Matthew L. Carlson, MD, Pratik D. Choudhry, MD, Robert W. Firsich, MD, Bruce J. Gantz, MD, Richard K. Garg, MD, Marlan R. Hansen, MD, Meredith Holcomb, AuD, Eva Karlborg, MD, Mindi Kirtane, MD ENT, Janine Laney, AuD, Emmanuel A. M. Mahoney, MD, J. Thomas Roland Jr, MD, Shaleel R. Saeed, MD, Henry Skarzynski, MD, Piotr H. Skarzynski, MD, Mark Symms, MD, Holly Teagle, AuD, Paul H. Van de Heyning, MD, Christophe Vincent, MD, Hao Wu, MD, Tatsuya Yamasoba, MD, Terry Zwolan, PhD

Viewpoint and invited

IMPORTANCE Cochlear implants are a treatment option for individuals with severe, profound, or moderate sloping to profound bilateral sensorineural hearing loss (SNHL) who receive little or no benefit from hearing aids; however, cochlear implantation in adults is still not routine.

OBJECTIVE To develop consensus statements regarding the use of unilateral cochlear implants in adults with severe, profound, or moderate sloping to profound bilateral SNHL.

DESIGN, SETTING, AND PARTICIPANTS This study was a modified Delphi consensus process that was informed by a systematic review of the literature and clinical expertise. Searches were conducted in the following databases: (1) MEDLINE In-Process & Other Non-indexed Citations and Ovid MEDLINE, (2) Embase, and (3) the Cochrane Library. Consensus statements on cochlear implantation were developed using the evidence identified. This consensus process was relevant for the use of unilateral cochlear implantation in adults with severe, profound, or moderate sloping to profound bilateral SNHL. The literature searches were conducted on July 18, 2018, and the 3-step Delphi consensus method took place over the subsequent 9-month period up to March 30, 2019.

MAIN RESULTS AND MEASURES A Delphi consensus panel of 30 international specialists voted on consensus statements about cochlear implantation, informed by an SR of the literature and clinical expertise. A modified 3-step Delphi consensus method was used to vote on and refine the consensus statements. This method consisted of 2 rounds of email questionnaires and a face-to-face meeting of panel members at the final round. All consensus statements were reviewed, discussed, and finalized at the face-to-face meeting.

RESULTS In total, 6492 articles were identified in the searches of the electronic databases. After removal of duplicate articles, 74 articles fulfilled all of the inclusion criteria and were used to create the 20 evidence-based consensus statements. These 20 consensus statements on the use of unilateral cochlear implantation in adults with SNHL were relevant to the following 7 key areas of interest: level of awareness of cochlear implantation (1 consensus statement), best practice clinical pathway from diagnosis to surgery (3 consensus statements), best practice guidelines for surgery (2 consensus statements), clinical effectiveness of cochlear implantation (4 consensus statements), factors associated with postimplantation outcomes (4 consensus statements), association between hearing loss and depression, cognition, and dementia (5 consensus statements), and cost implications of cochlear implantation (1 consensus statement).

CONCLUSIONS AND RELEVANCE These consensus statements represent the first step toward the development of international guidelines on best practices for cochlear implantation in adults with SNHL. Further research to develop consensus statements for unilateral cochlear implantation in children, bilateral cochlear implantation, combined electric-acoustic stimulation, unilateral cochlear implantation for single-sided deafness, and asymmetrical hearing loss in children and adults may be beneficial for optimizing hearing and quality of life for these patients.

JAMA Otolaryngol Head Neck Surg. doi:10.1001/jamaoto.2020.0998
Published online August 27, 2020.

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International Consensus Paper 2020

Living Guidelines 2023



Local adaptation and implementation

Living Guidelines

An evidenced based set of treatment guidelines for adults who would benefit from a cochlear implant.

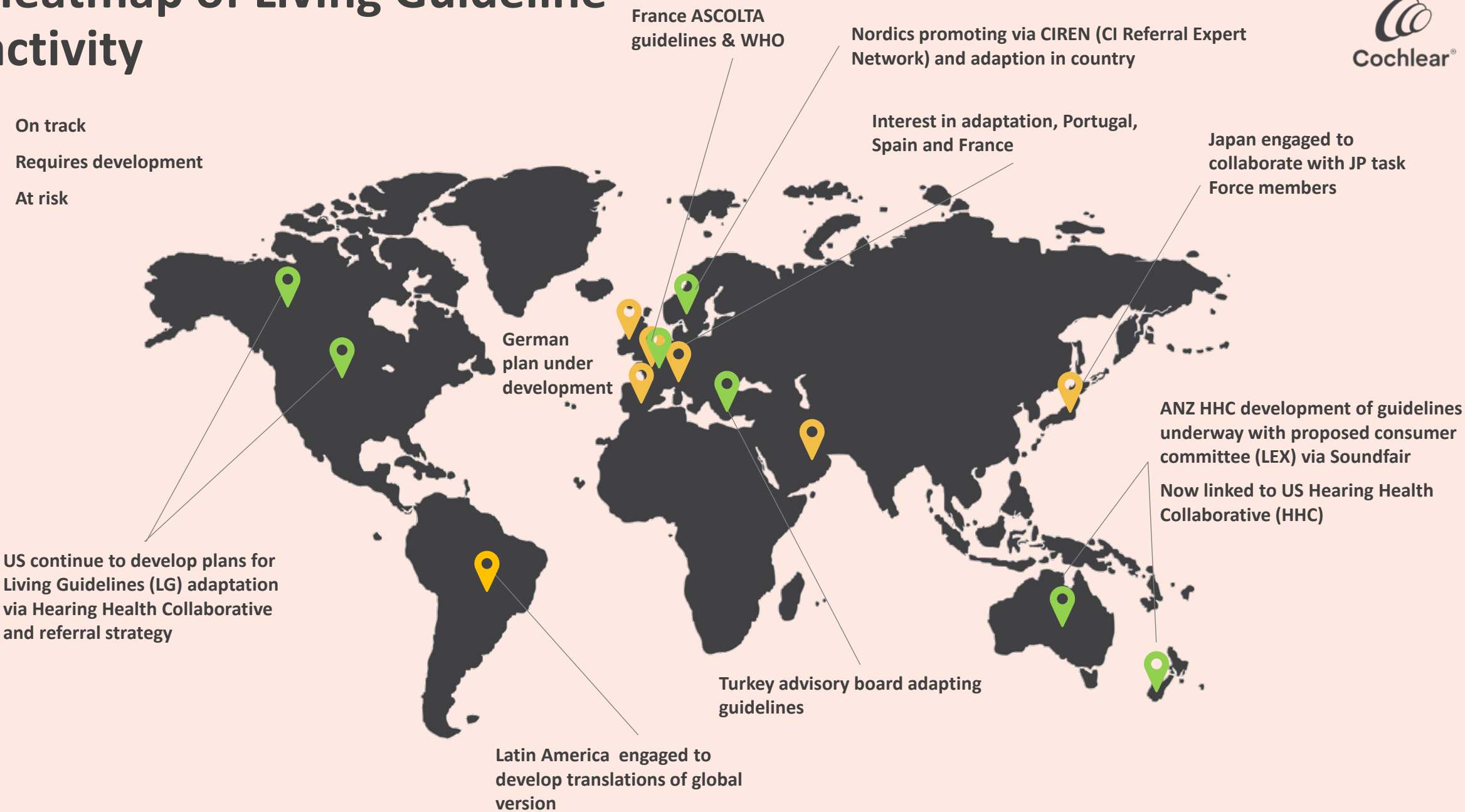


Establishing a clearly defined care pathway for adult cochlear implantation will enable consistent and equitable hearing healthcare

Heatmap of Living Guideline activity



- On track
- Requires development
- At risk



Engaging key stakeholders to raise the awareness and advocate for the importance of hearing and hearing health



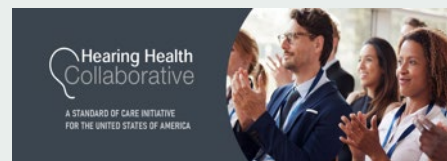
Partner with the World Health Organization to ensure Hearing and Hearing Health remains a public health priority and support the WHO efforts in enacting change in countries.



Helped establish a global community of advocacy groups (+ 60 countries) to amplify the patient voice in support of closing the gap in CI provision and support.



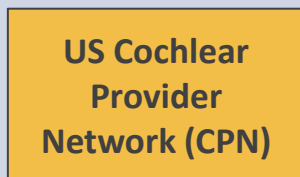
Continue our partnership with Academic institutions to further the understanding of Hearing and Healthy Aging.



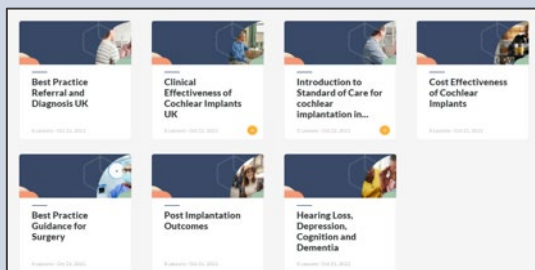
Support collaborations that bring together multiple professional, provider and consumer organizations, that help advance good healthcare practices and public policy on hearing care in connection with healthy aging.

Policy and Advocacy

Engage key stakeholders to raise the awareness and the importance of hearing health in adults and, in particular, the role of cochlear implants.



Collaborate with hearing health providers to establish sustainable referral pathways for suitable candidates.



Developing and deploying cochlear implant training modules for Audiology practices to improve understanding and confidence in referring potential candidates.



Professional education platform that aims to increase awareness via the latest clinical, economic and public health evidence to reach an agreed standard of care for adults with hearing loss.

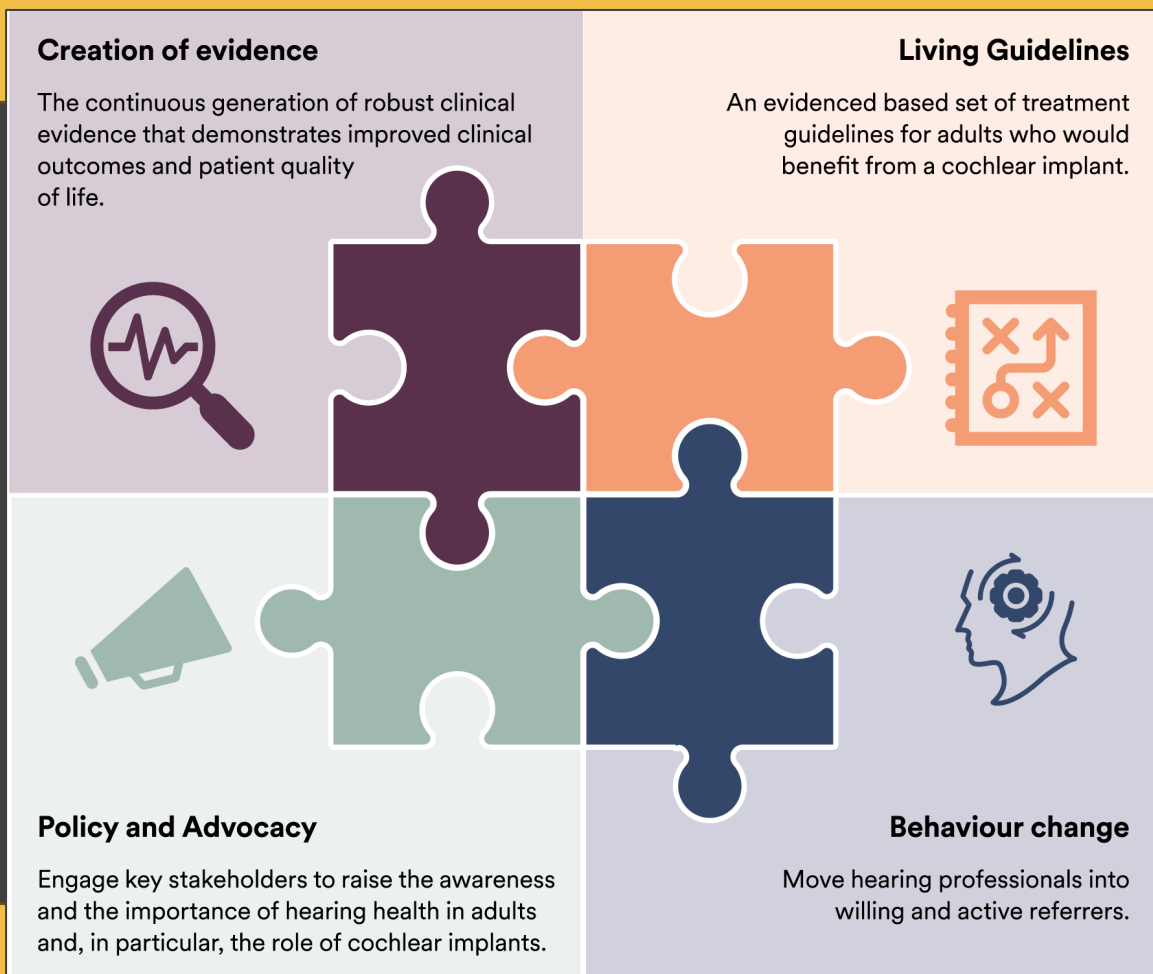
Enabling hearing professionals to identify and refer potential candidates



Behaviour change

Move hearing professionals into willing and active referrers.

The journey to a Standard of Care requires an integrated approach and a sustained effort



Standard of Care

Establish cochlear implants as the **Standard of Care** for adults with severe to profound sensorineural hearing loss.

This includes the **proper diagnosis**, **timely referral** to an appropriate centre, **access** to cochlear implantation and **aftercare**.

Treat in a manner that best improves the individual's **quality of life** and health through optimising **hearing function** and social **participation** and **engagement**.

Hear now. And always

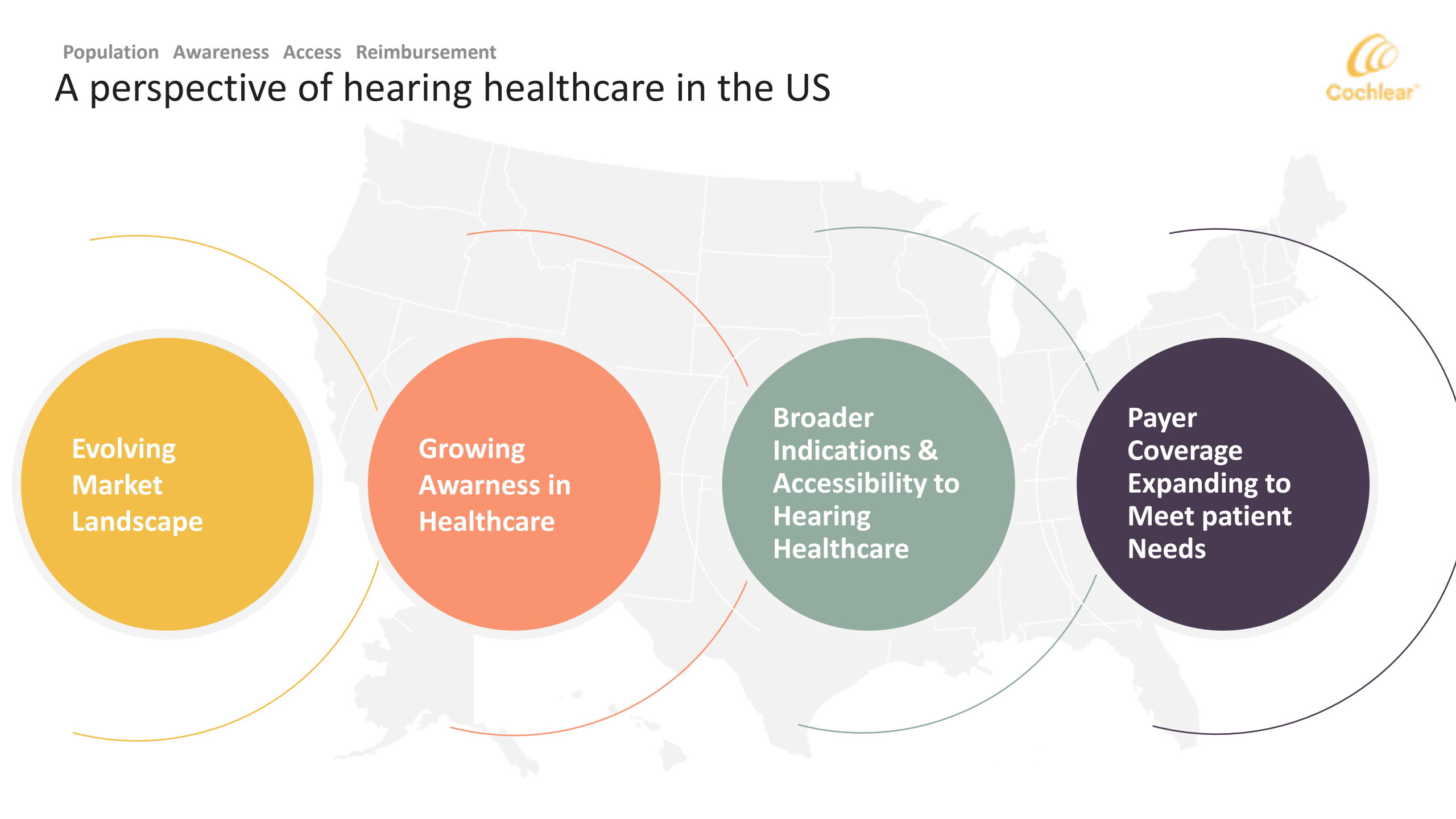


Cochlear's US business

Cochlear Capital Markets Day | 27 October 2023

Lisa Aubert
President, North America

A perspective of hearing healthcare in the US



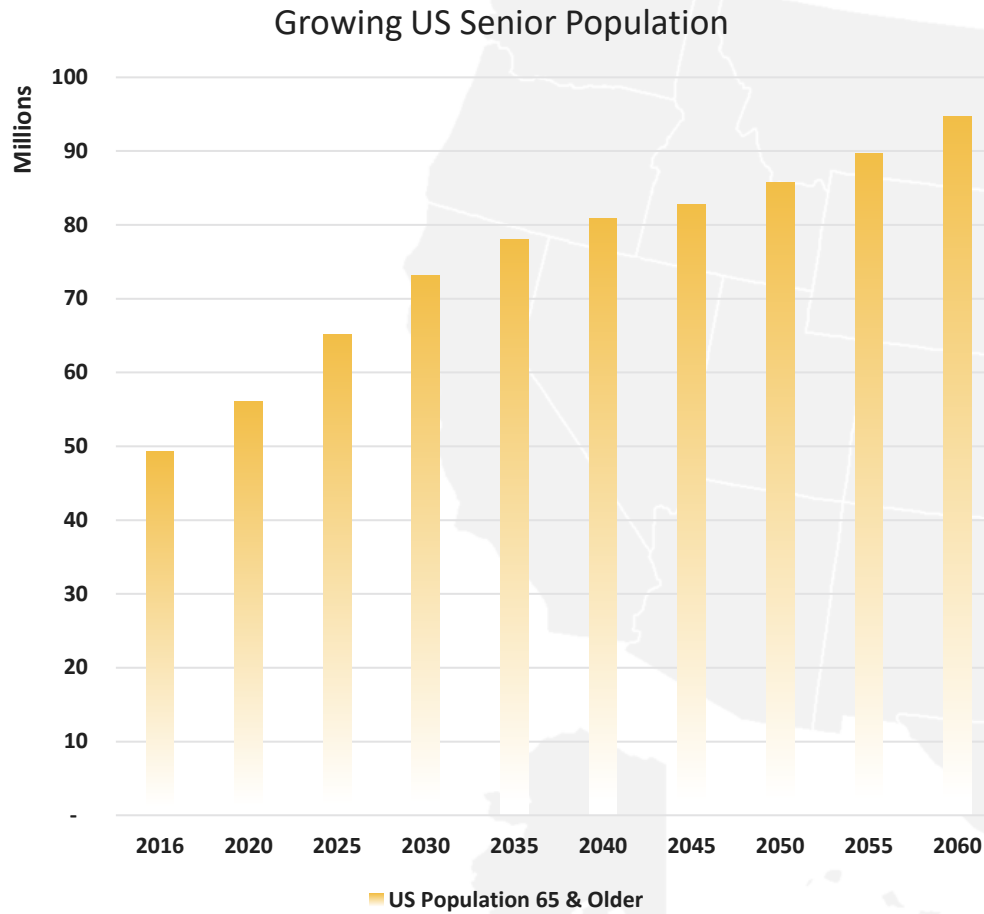
**Evolving
Market
Landscape**

**Growing
Awareness in
Healthcare**

**Broader
Indications &
Accessibility to
Hearing
Healthcare**

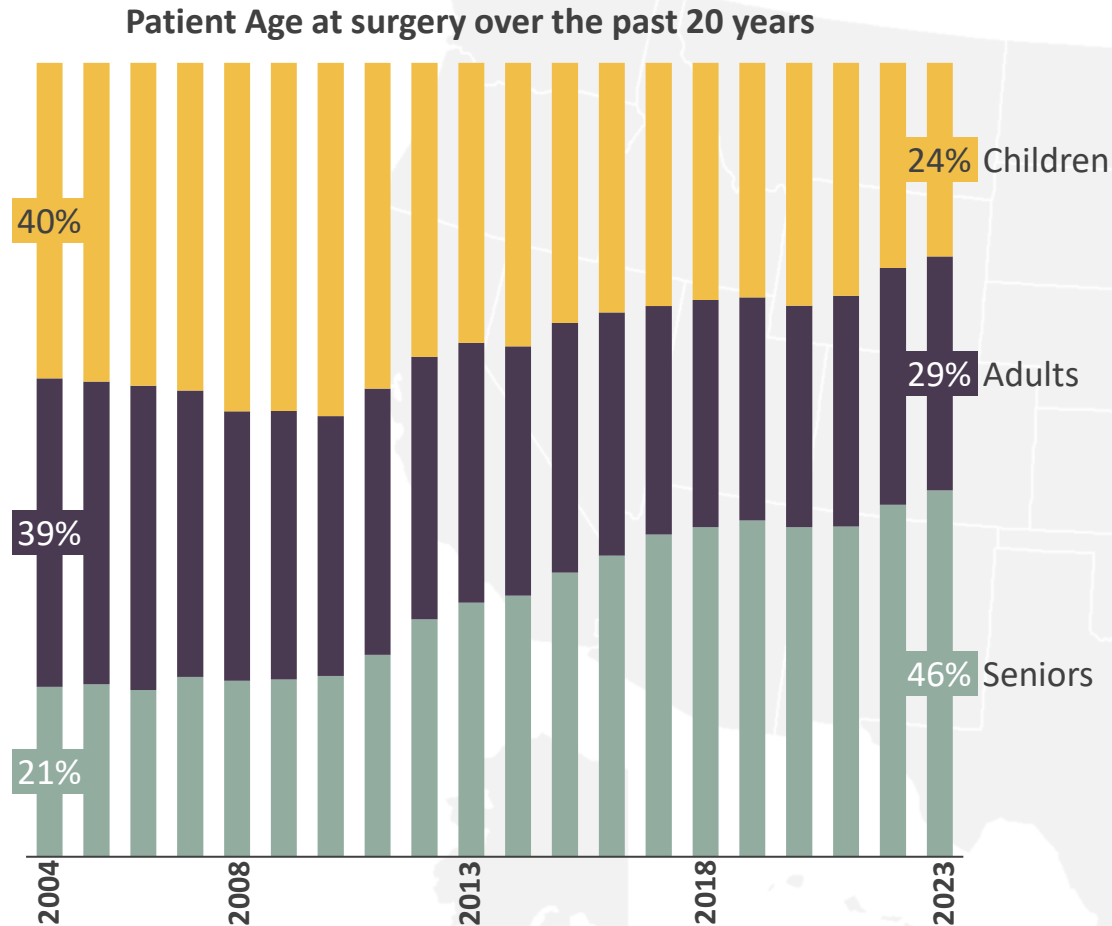
**Payer
Coverage
Expanding to
Meet patient
Needs**

A changing patient population and market landscape continues to support growth with senior population



- Everyday in the US **10,000 'new' 65 year olds** join the senior segment of our population
- From 2020 to 2035 we will see accelerated growth of the senior population leading to a CAGR of **3.5x the general population growth**
- By 2060 it is forecast that seniors will account almost **¼ of the total US population**

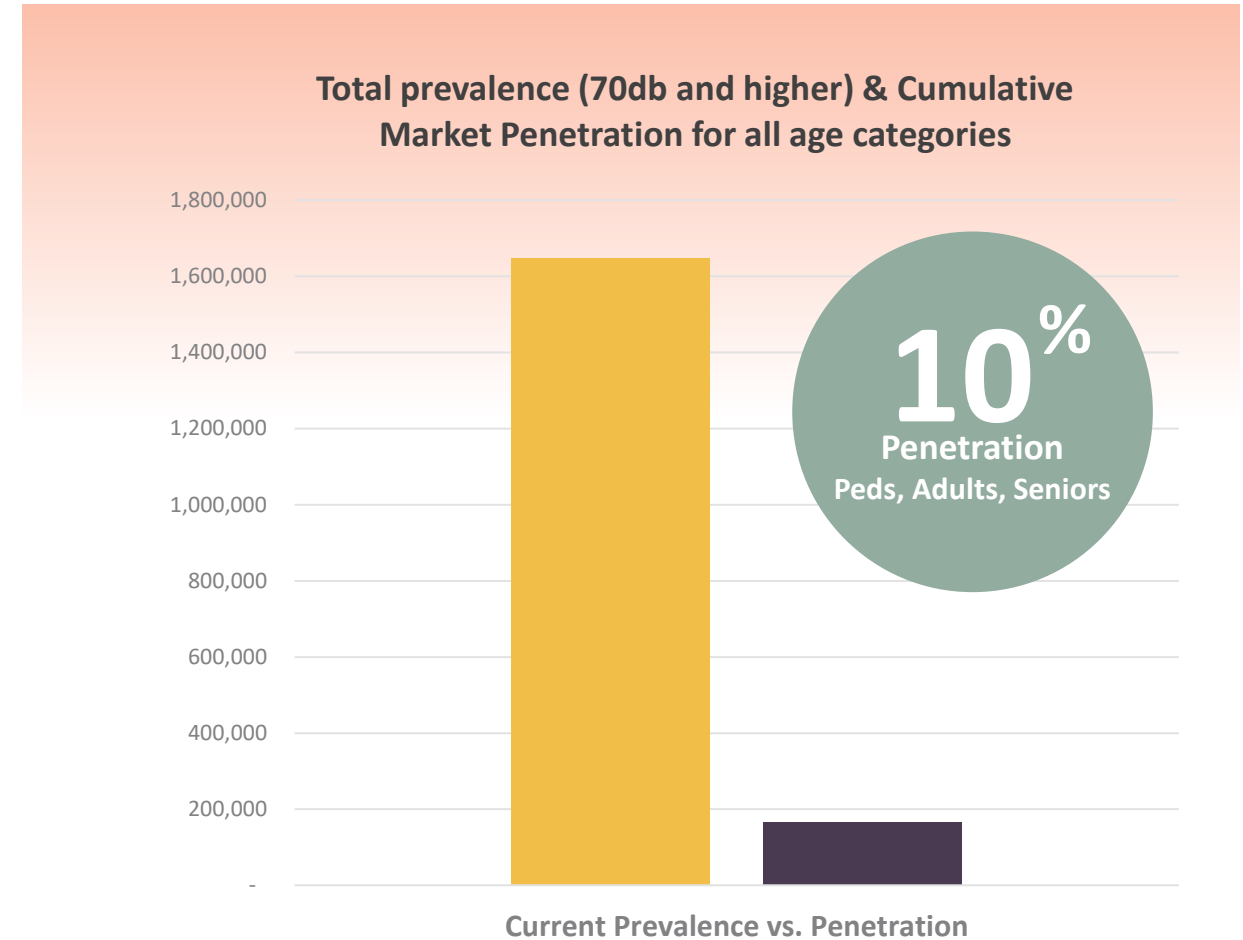
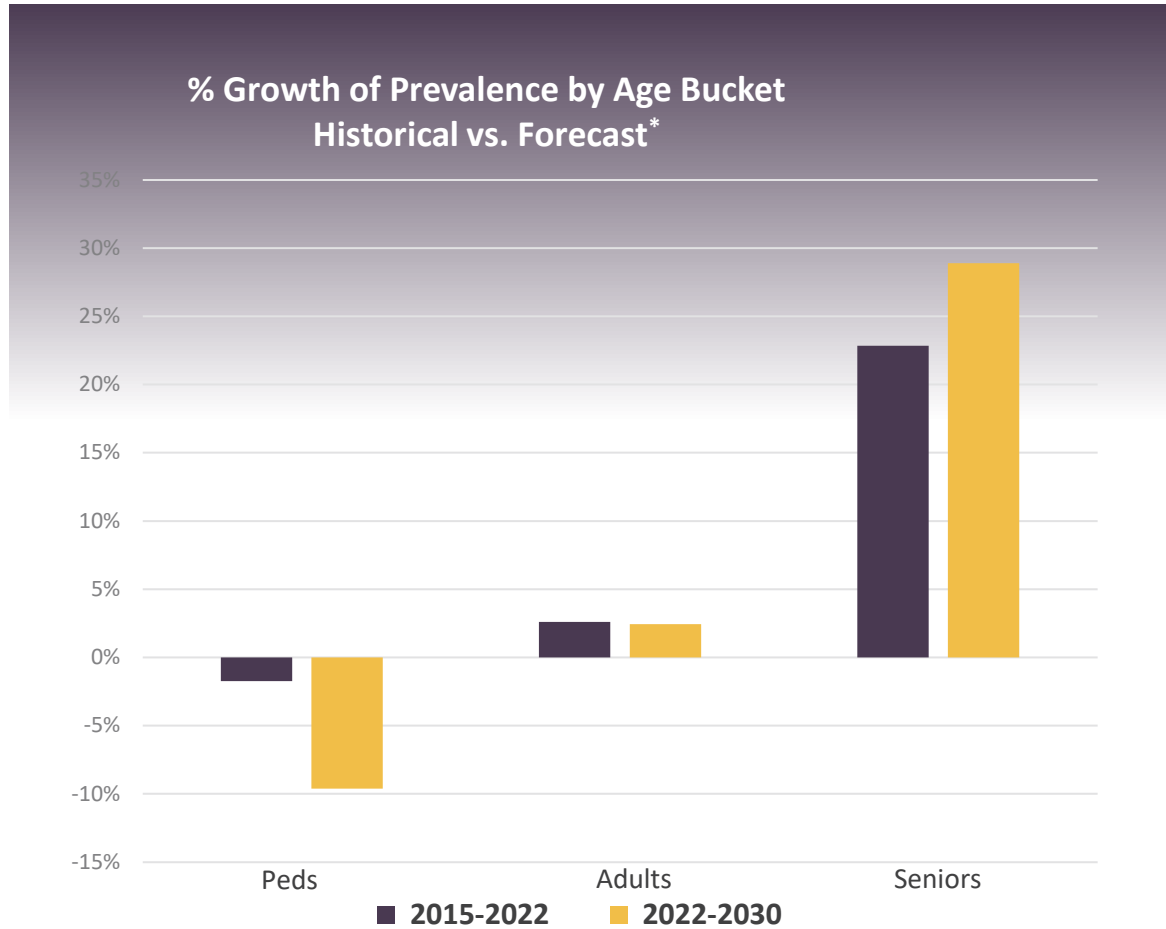
Our patient mix over the past 20 years has continued to evolve with >75% of our recipients now being adults or seniors



- >75% of US candidates are adults or seniors
- Over this time **pediatric incidence has remained steady** at around 1:1000 reflecting the impact of the population changes such as the aging baby boomers and decreased birth rates
- **Healthy aging** as a trend that is driving consumers to remain active and engaged

*The 2023 APP Pickleball Participation Report released details that **36.5 million** people have played pickleball at least once in the last year. **1/3rd of those who play eight or more times a year are the age of 65+*.***

Growth in prevalence of severe to profound hearing loss is greatest in seniors, with relative growth in pediatric prevalence declining



*Eligible patient pop with hearing loss >70db (Sensio neural only)

*Penetration calculated using total unique Cochlear recipients (unilateral and bilateral) as of 2022 and applying estimates for market share and registrations to get total CI recipients in market

*Prevalence data - GBD 2019 Hearing Loss Collaborators. Hearing loss prevalence and years lived with disability, 1990-2019: findings from the Global Burden of Disease Study 2019. Lancet. 2021 Mar 13;397(10278):996-1009. doi: 10.1016/S0140-6736(21)00516-X. PMID: 33714390; PMCID: PMC7960691.





Despite increasing awareness of cochlear implants in North America, the urgency of treating hearing loss is often deprioritized



In partnership with AARP, the leading senior's publication in the US, we surveyed more than 600 members between the ages of 50 & 70+ in relation to hearing health.

We asked them to state whether the following statements were true or false?

	True %	False %
Cochlear implants are a viable option when hearing aids are not providing enough benefit	96	4
Cochlear implants are a proven medical treatment for hearing loss	94	6
Cochlear implants are covered by most insurance	83	17
You have to be profoundly deaf to benefit from a cochlear implant	15	85
You have to be a certain age to get a cochlear implant	9	91

1 in 3

AARP members (>12million) have had their hearing tested in the past 5yrs

1 in 5

Are actively working to address a hearing loss or their partner/ loved one is doing so

The results speak to the progress Cochlear, and the industry have made in increasing awareness around hearing health and the available treatment options.

The ongoing emergence of the digital savvy senior has opened new communication pathways leading to increased awareness

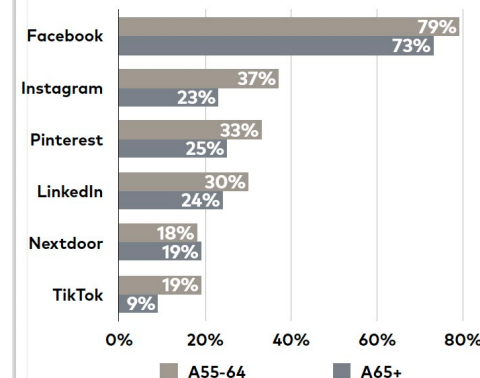
- Our Direct to Consumer (DTC) programs continue to support our growing business
- In FY23 DTC contributed to **>25%** of surgeries
- **>70%** of our lead generation comes from digital engagement with Seniors
- Time from awareness to surgery is reducing as candidates are more informed before having discussions with their hearing care professional

Older adults rapidly shifted to digital channels during the pandemic, and many of these behaviors have stuck around.

+431%

INCREASE IN ONLINE GROCERY USAGE BY BOOMERS FROM 2019 - 2021

While **Facebook is the largest platform** for A55+ (76%), their use of other platforms like **Instagram and TikTok is growing**, particularly with A55-64.



Source: Resonate, 2023

Their healthcare behaviors have become increasingly digital-centric.

2020: 10%

2022: 48%

% OF BOOMERS USING TELEHEALTH

Driving a collaborative approach to establish standards for hearing health care



A STANDARD OF CARE INITIATIVE
FOR THE UNITED STATES OF AMERICA



AMERICAN ACADEMY OF
OTOLARYNGOLOGY-
HEAD AND NECK SURGERY®



Focus on 3 priorities

1

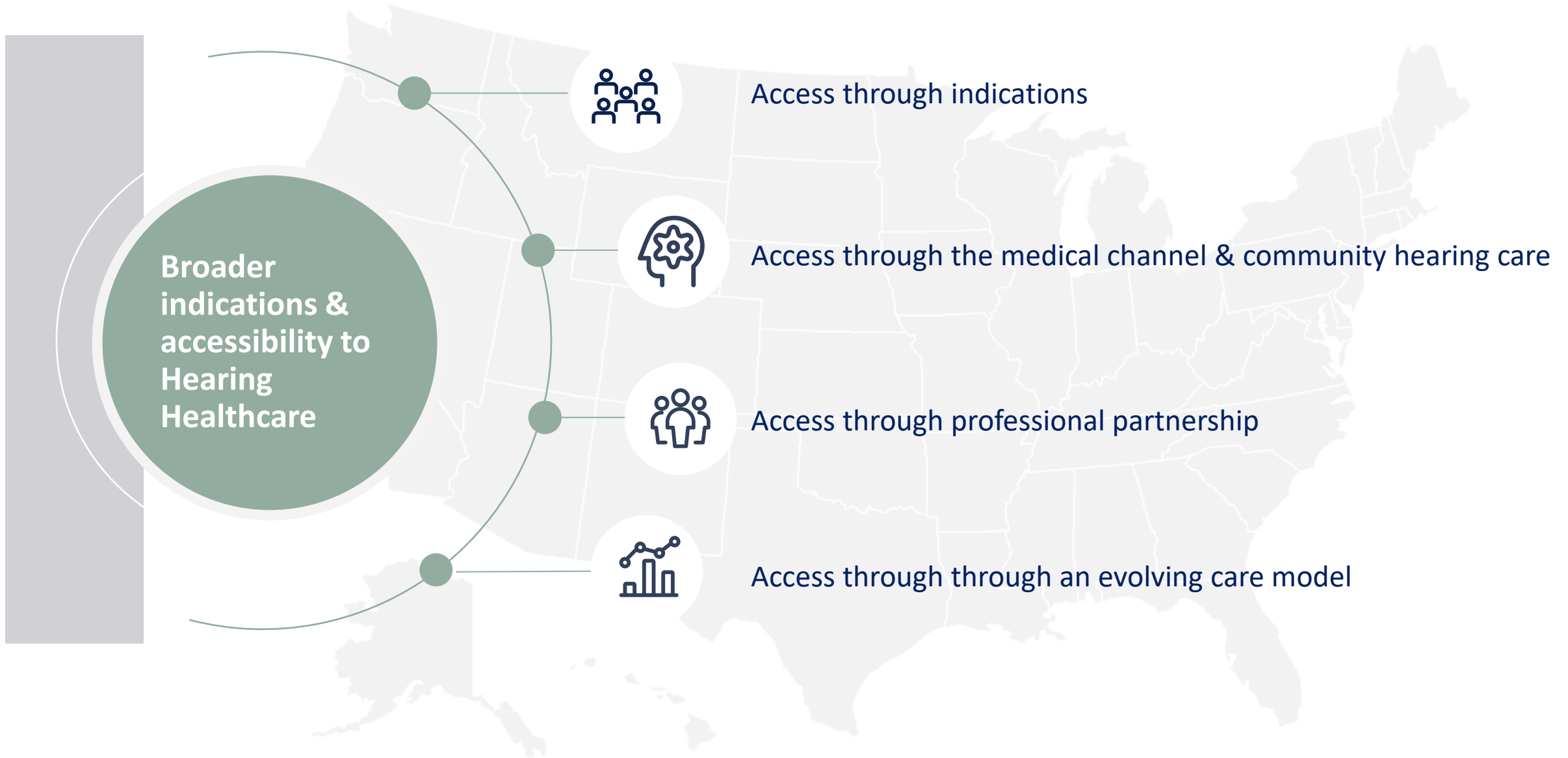
A simple metric as a **vital sign**
for hearing health

2

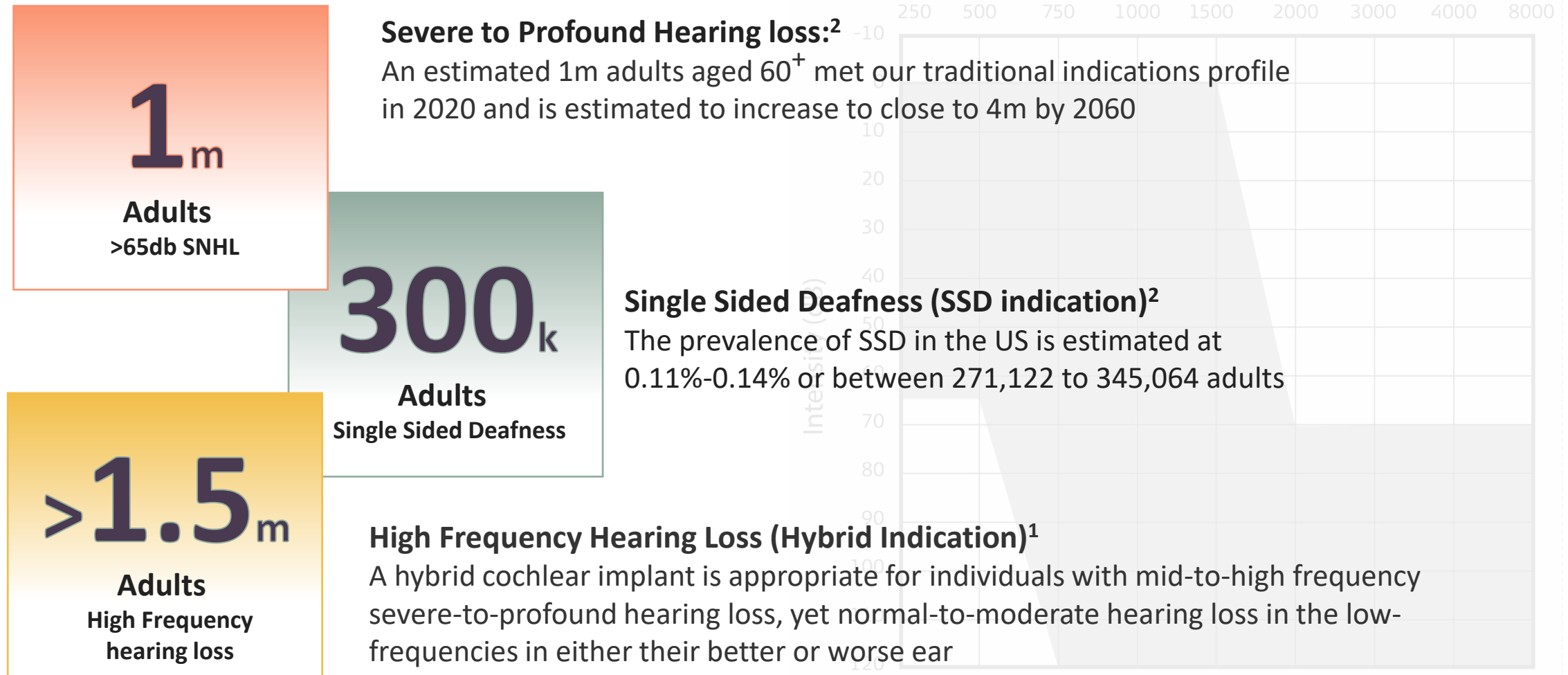
Simple and consistent reporting for hearing loss that
defines standards of care

3

Secure evidence-based procedural
changes for timely referral for
clinical evaluation and treatment of
hearing loss as **standard of care**



Expansion of indications increases the addressable adult & seniors population



1. Goman, Adele M. Ph.D.; Dunn, Camille C. Ph.D.; Gantz, Bruce J. M.D.; Lin, Frank R.. PREVALENCE OF POTENTIAL HYBRID AND CONVENTIONAL COCHLEAR IMPLANT CANDIDATES BASED ON AUDIOMETRIC PROFILE. Otology & Neurotology 39(4):p 515-517, April 2018. | DOI: 10.1097/MAO.0000000000001728

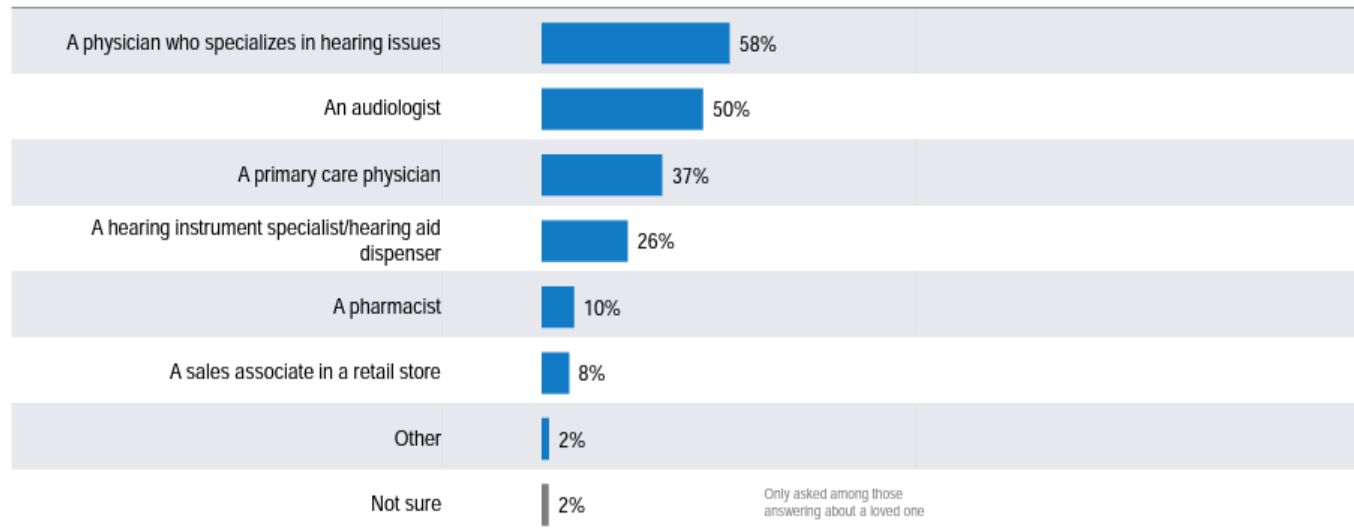
2. Kay-Rivest E, Irace AL, Golub JS, Svirsky MA. Prevalence of Single-Sided Deafness in the United States. Laryngoscope. 2022 Aug;132(8):1652-1656. doi: 10.1002/lary.29941. Epub 2021 Nov 10. PMID: 34757636; PMCID: PMC9085960.

Patients desiring hearing care guidance are most likely to enter the medical channel¹

Physicians who specialize in hearing issues are the top choice, followed by audiologists and then PCPs

Comfortable seeking guidance from
(Among those who think it is somewhat importance to receive guidance)

Important to receive guidance
N=272



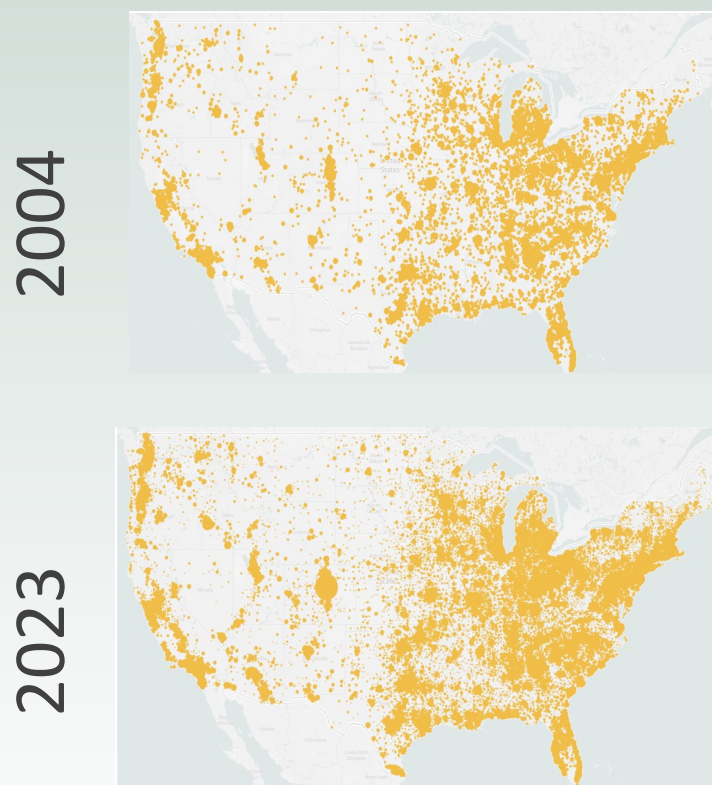
New question for this year hence no sig test



- **Referral** for audiological assessment comes from multiple channels spanning retail, primary care and ENT (medical)
- Cochlear works with **partners** across all areas of the professional referral pathway to support greater access to hearing
- Patients view the **trusted source** of specialized care coming from the **medical channel**

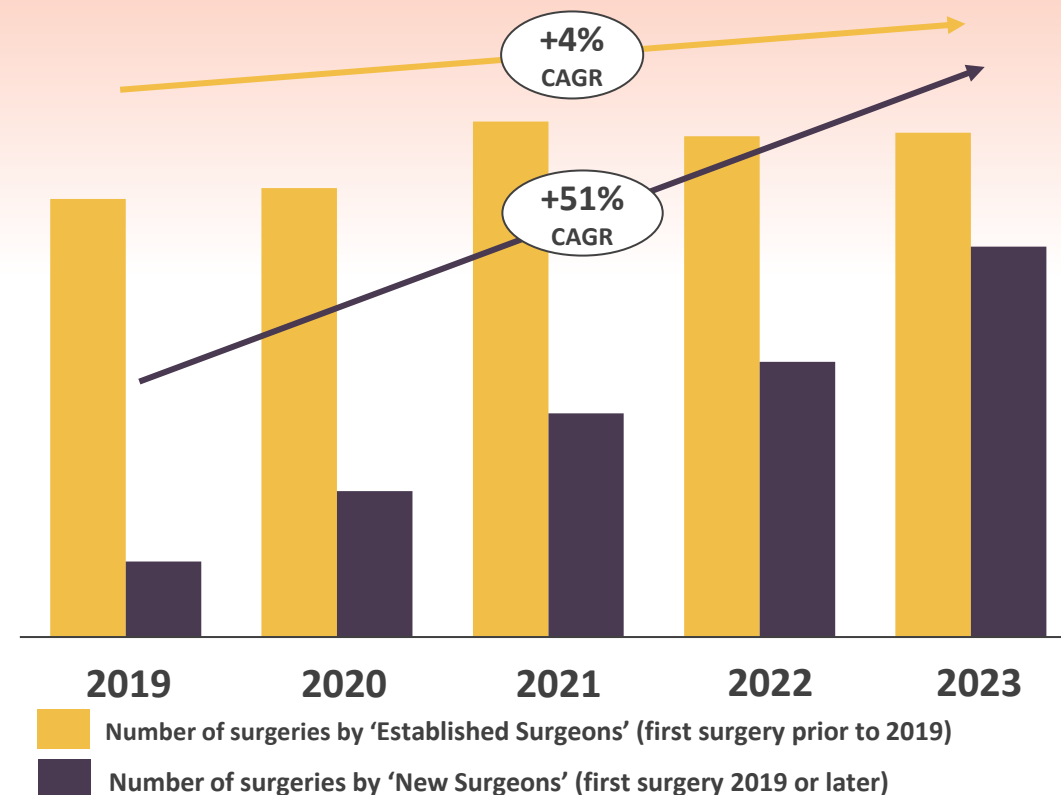
Greater access to more implanting centers and the emergence of 'newer in practice' surgeons continues to support growth in the US

Comparison of Cochlear recipient numbers in North America between 2004 v 2023



Recipient numbers continue to grow across the US as access to hearing care grows

Comparing the average number of CI surgeries on an annual basis between established surgeons and new surgeons

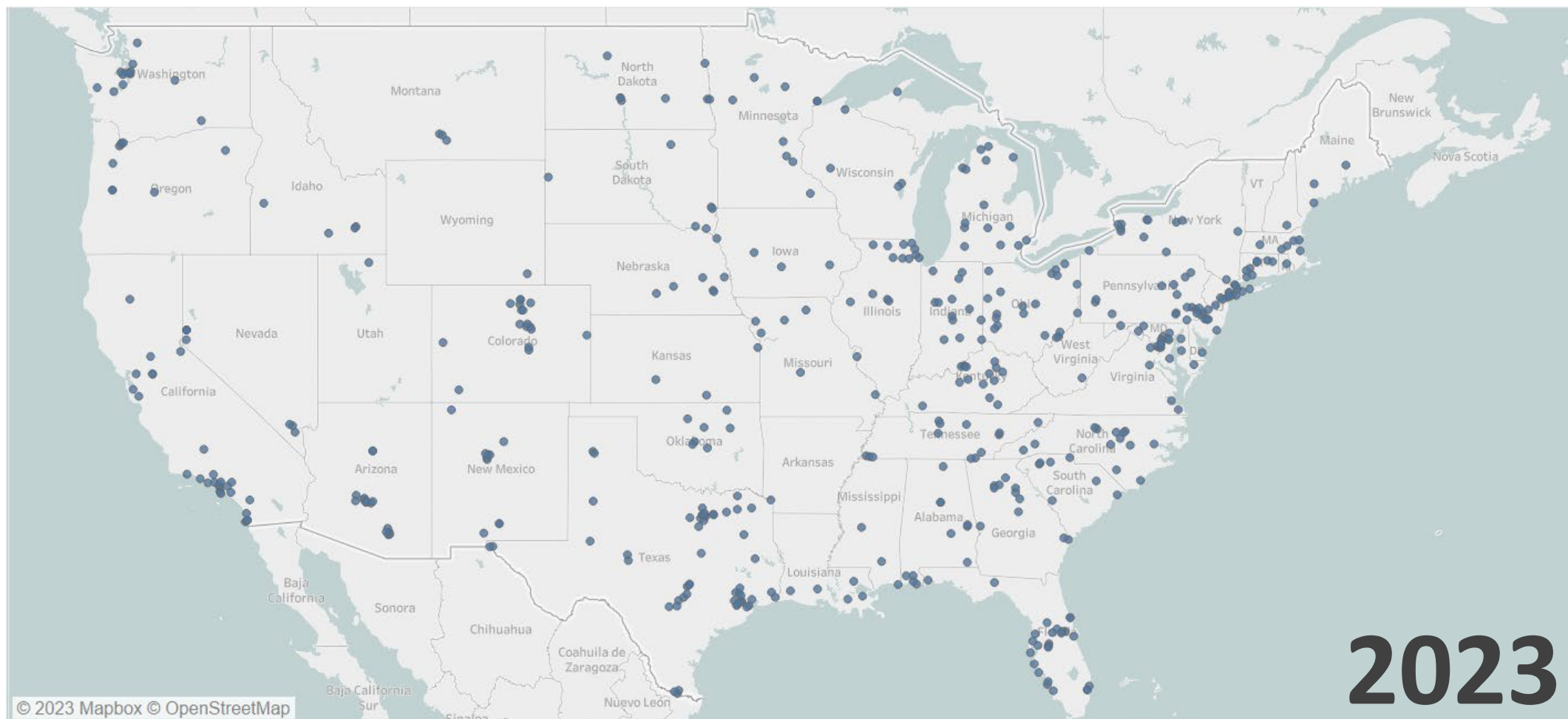


Newer surgeons are growing surgeries on average at rates faster than established surgeons

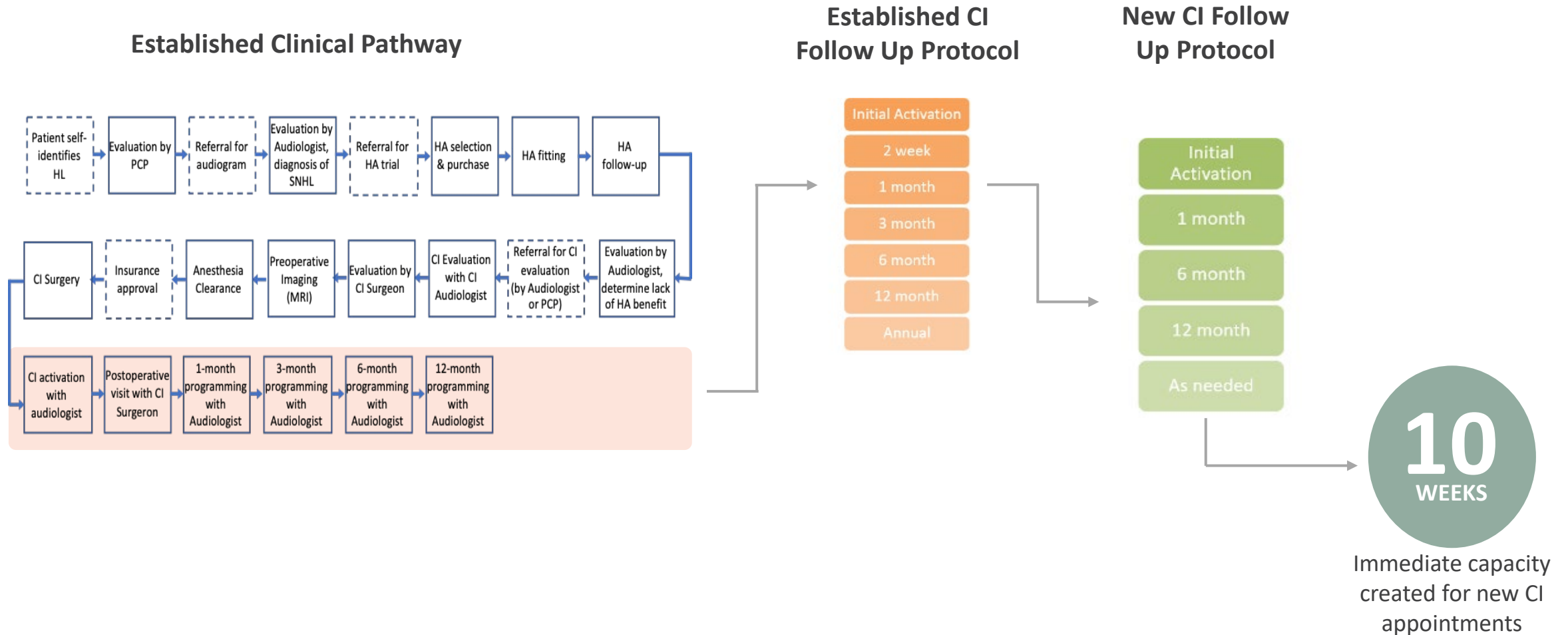
The Cochlear Provider Network (CPN)



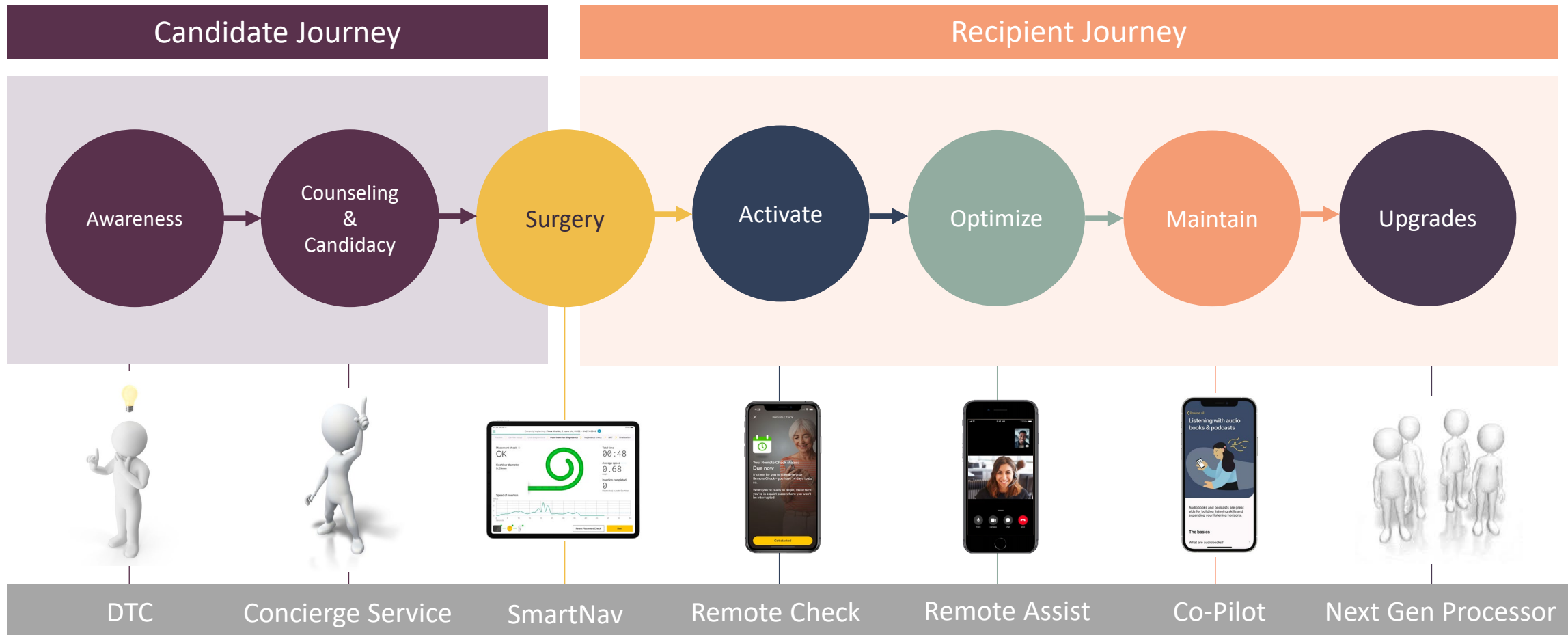
The CPN program over the past 10 years has played a significant role in enabling patients to **receive care** where and when they need it. It has also provided candidates with **greater accessibility to audiometric assessments and counselling** on implantable hearing solutions. Today **increasing numbers of patients are referred** through the CPN program for evaluation.

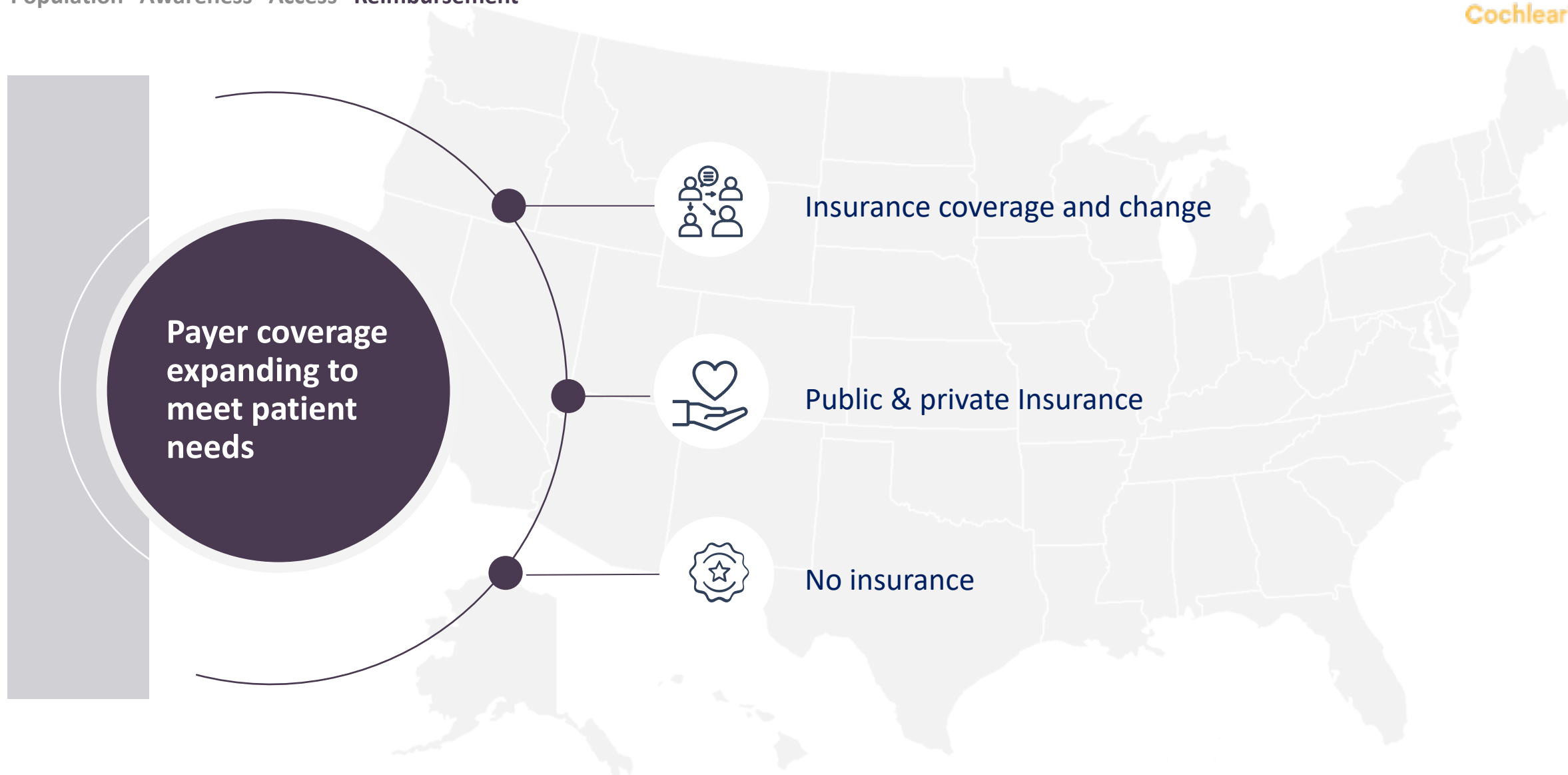


To meet a growing patient base, the clinical protocol and patient pathway needs to continuously evolve



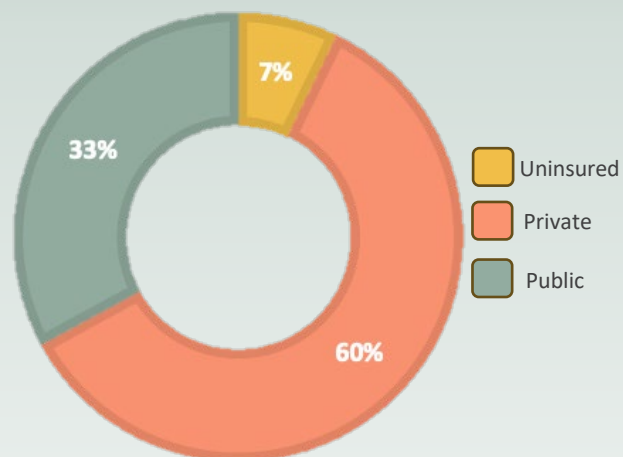
A patient centric journey, supported by effective tools, enables continued high standards of patient care for a growing patient base





Favorable insurance coverage for the majority of Americans

Insurance coverage for Americans with SNHL hearing loss



- Bilateral hearing loss has insurance coverage across all providers both private and public for adults and peds**
- Single-sided deafness (SSD) has growing coverage, with >50% of private insurance plans covering adults and children. Limited coverage for Medicaid and no coverage with Medicare**

99%*

of private employer health insurance plans and managed care organizations provide coverage benefits for the cost of cochlear implant (CI) surgery and related services for bilateral indicated hearing loss

100%*

of state Medicaid programs provide CI coverage for children 21 years of age and younger with bilateral indicated hearing loss

Medicaid coverage of adults is an optional service and varies by state and indication

Plans offered by Affordable Care Act Marketplace Plans generally cover CI

100%*

of Medicare, TRICARE, the Veteran's Administration and other federal health plans provide coverage for CI



In 2022, the Centers for Medicare & Medicaid Services (CMS) expanded coverage for cochlear implants, broadening the patient criteria to individuals with hearing test scores of **>40% and ≤60%**

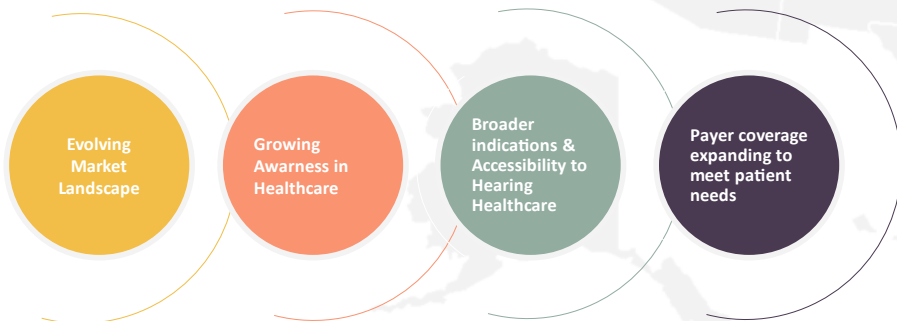
**Nurn The on to mayo on coralary promotion, exis to an he or lamoro than aya f health insurance. at <<https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar23.pdf>>.

Source: U.S. Census Bureau, Current Population Survey, 2022 and 2023 Annual Social and Economic Supplements (CPS ASEC).

*About 60.0 million people are enrolled in Medicare Parts A and B in 2023. SOURCE: KFF analysis of CMS Medicare Advantage Enrollment Files, 2010-2023; Medicare Chronic Conditions (CCW) Data Warehouse from 5 K FF percent of beneficiaries, 2010-2016; CCW data from 20 percent of beneficiaries, 2017-2020; and Medicare Enrollment Dashboard 2021-2023. •

Hearing healthcare in the US

- The next 15-20 years continues to see a **growing senior population** who have a higher predisposition to hearing loss, however we have work to do in serving them
- Seniors' **understanding & awareness** around hearing loss, and its contribution to healthy aging, continues to grow with the rise of the digital savvy senior
- The **referral pathway** continues to be a key focus for Cochlear as indications expand, and we have a growing patient base that need to navigate the care pathway
- As patients move from the hearing aid channel to the **medical channel for treatment**, we are working with Healthcare professionals to **expand access to points of care** in both the surgical and audiological settings
- Payer coverage continues to expand to meet patients needs



Hear now. And always



Global supply chain overview

Cochlear Capital Markets Day | 27 October 2023

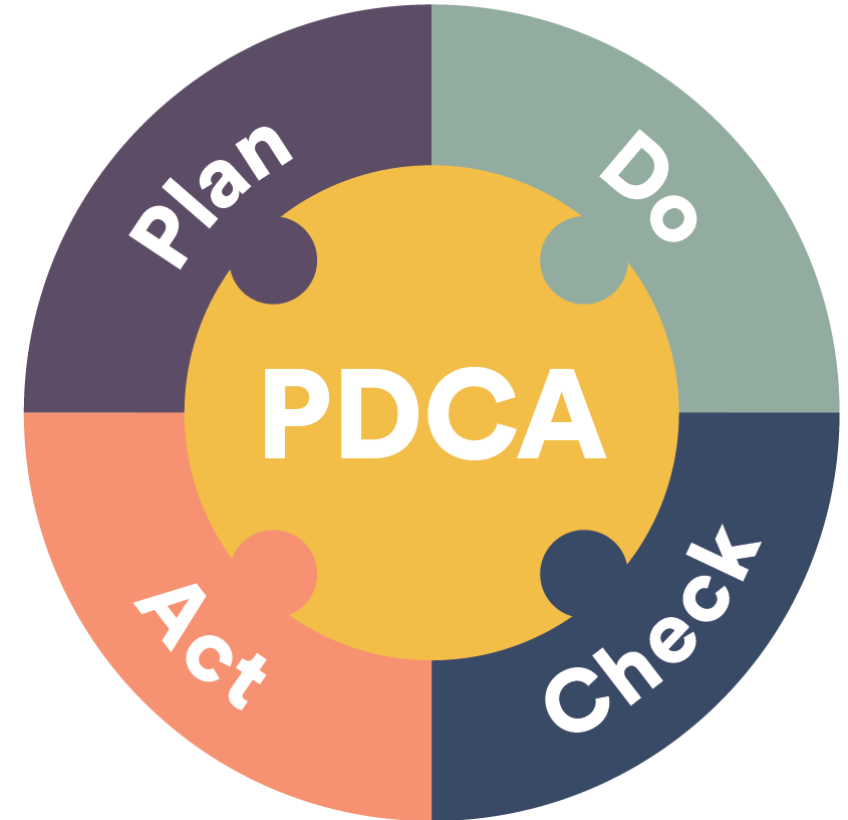
Greg Bodkin
SVP Global Supply Chain

Cochlear's key internal supply chain locations



The philosophy that underpins our supply chain

- Tight integration and co-location with R&D:
 - Improves quality
 - Speed to market
- We own and vertically integrate key manufacturing process steps that are critical to quality or managing supply risk
- Lean methodology to drive efficiency and continuous improvement
- Progressively introduce automation as scale and technology allow
- Deep 3rd party supplier relationships
- Strategic use inventory to buffer supply chain risks



Rigorous supply chain management is a core driver of implant reliability



People / Quality

- Team member selection, on boarding, training and assessment is a critical part of manufacturing management
- 3 months to have a production team member at basic proficiency
- Process / Quality controls and a compliant Quality Management System are foundational to ensuring we produce safe and effective products



Process

- Implant manufacture is complex: over 181 process steps, 12 tests and 41 inspections to make a cochlear implant. There are also 16 destructive tests as part of our Manufacturing Quality Plan
- We have deep and extensive process knowledge from performing these steps in higher volume and over a longer period than any other company
- Manufacturing Process IP is a key competitive advantage in the manufacture of implants and sound processors



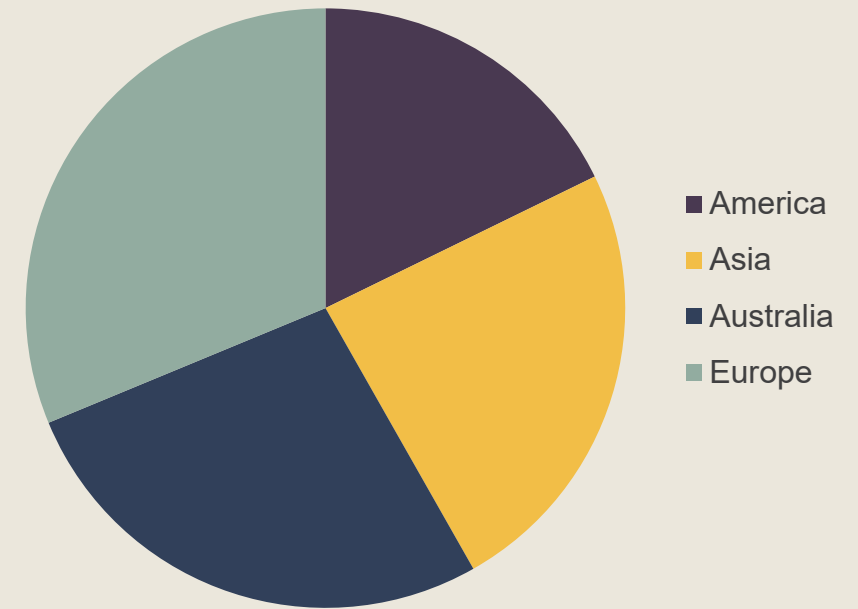
Capacity

- We continue to invest capex to align with our growth ambitions
- Our Global Manufacturing Network also allows us to scale our capacity to meet demand and manage risk

Deep 3rd party supplier relationships

- 565 suppliers from across the world
- Segment suppliers based on customisation requirements and impact on product quality
- Long standing relationships with key suppliers – many over 20 years – scale and experience are important
- Focus is on quality and reliability of supply and the sustainability of the supplier:
 - Financial – ensuring price covers appropriate quality controls
 - Ethical – modern slavery compliance
 - Environmental – increasing focus on environmental footprint and mitigation actions
 - Governance – strong supplier audit program to ensure compliance of 3rd party suppliers

Geographical split of suppliers



Key categories

Batteries
Contract Mfg (Finished Goods)
Electronics: EA (Assemblies)
Parts: Plastic Moulded
Electronics
Electronics: ICs
Precious Metals
Acoustic
Electronics: PCBs
Manufacturing Consumables

Inventory is used to reduce supply risks

- Supply risk results from long product life – product life cycle can be longer than component lifecycle requiring lifetime buys of components to support recipients
- Inventory is used to buffer supply risk for single source suppliers – often lower cost to hold stock than develop a second supplier to the appropriate quality standard
- The cost of a lost sale is far greater than the cost of holding strategic inventory





Notes and references



Forward looking statements

Cochlear advises that this document contains forward-looking statements which may be subject to significant uncertainties outside of Cochlear's control. No representation is made as to the accuracy or reliability of forward-looking statements or the assumptions on which they are based. Actual future events may vary from these forward-looking statements and it is cautioned that undue reliance is not placed on any forward-looking statements.

Growth opportunity

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b. Tomaka J, Thompson S, Palacios R. The Relation of Social Isolation, Loneliness, and Social Support to Disease Outcomes Among the Elderly. Journal Of Aging And Health [serial on the Internet]. (2006), [cited July 3, 2018]; (3): 359.

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Key market segments

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