



Cochlear[®]
Hear now. And always



Evidence summary for replacement sound processors

Purpose and approach

When Evidence-Based Medicine (EBM) first emerged, its primary focus was to help clinicians use peer-reviewed literature to optimize clinical care.¹

However, reliance on peer-reviewed publications alone has inherent limitations, as it may overlook the critical role of patient and clinician experience. In response, EBM has evolved to combine rigorous appraisal of the evidence with patient values and preferences to support more informed clinical decision-making.¹

Here, we present a comprehensive body of evidence—including peer-reviewed literature and insights from patient survey research—supporting sound processor replacement across three key areas:



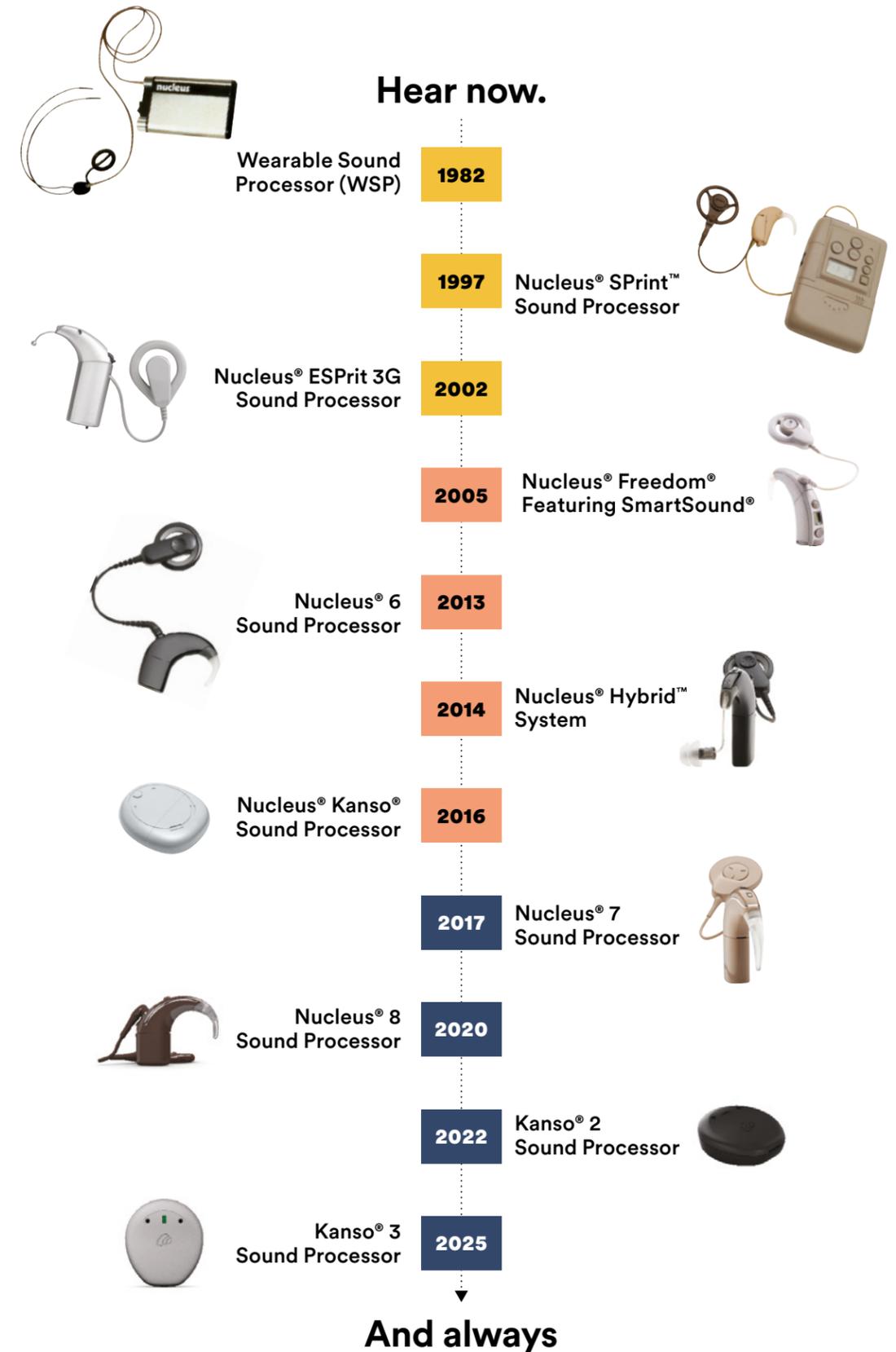
Hearing outcomes



Patient satisfaction



Convenience and connectivity





Hearing outcomes

Real-life is not quiet. Everyday activities like grocery shopping, social gatherings, and eating at restaurants have background noise. Patients want to engage in everyday activities without worrying about their ability to hear. As Cochlear releases next generation sound processors, the technology is designed to make understanding conversations in noisy situations easier.

Nucleus 6 and Kanso Sound Processors

SmartSound® IQ with SCAN*

Nucleus 7 and Kanso 2 Sound Processors

SmartSound IQ with SCAN*, ForwardFocus†

Nucleus 7 and Kanso 2 Sound Processors

SmartSound IQ with SCAN*, ForwardFocus†

Nucleus 8 and Kanso 3 Sound Processors

SmartSound IQ 2, SCAN 2*, ForwardFocus† with improved noise reduction and option to automate

Innovation →

Benefits of ForwardFocus

When using the ForwardFocus (FF) feature, a significant improvement of 7.54 dB in speech understanding in noise was observed compared to sound processors without this feature. This finding was corroborated by patient-reported outcomes, which indicated significant improvements on the Speech, Spatial and Qualities questionnaire.^{2†}

Enabling ForwardFocus on Nucleus 7 and Kanso 2 Sound Processors led to significant improvements (4-8 dB SNR) in speech understanding in noise for participants. Participants' significant others also observed these demonstrated benefits, reporting a significant reduction in communication difficulties after the sound processor replacement.^{3†}

ForwardFocus provides measurable benefits in complex noise environments, especially when noise is spatially separated and dynamic. Outcomes in noise with Kanso 2 and Nucleus 7 Sound Processors were significantly better with ForwardFocus activated (-8.5 dB and -10.8 dB SNR improvement), respectively.^{4†}

In a study measuring event related potentials (ERPs), the ERP data supported behavioral findings reinforcing the clinical value of ForwardFocus in improving speech understanding in noise.^{5†}

With the Kanso 2 Sound Processor, speech in noise understanding was better with ForwardFocus enabled than without the ForwardFocus feature.^{6†}

Innovation ⇨

Benefits of SmartSound iQ 2 with SCAN 2 and ForwardFocus

SCAN 2 with ForwardFocus, compared to the SCAN 2 program, provided a mean in-booth improvement in SRT of 4.3dB for roving rear hemisphere noise and 4.2dB for noise to the sides and behind the listener.^{7††}

SCAN 2 with ForwardFocus delivers superior speech-in-noise performance by combining ForwardFocus technology with SCAN 2's adaptive directionality to reduce multiple competing noise sources from behind.^{7†§}

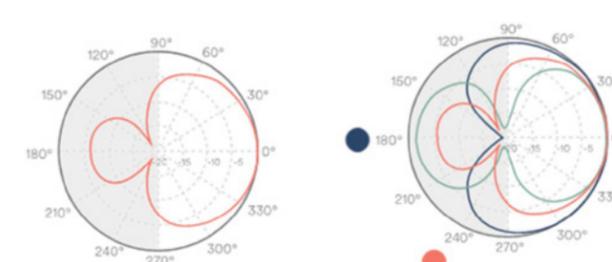
2 out of 3 recipients who upgraded from a Nucleus 7 Sound Processor to Nucleus 8 Sound Processor say they now hear better in noisy environments when SmartSound iQ 2 with SCAN 2 technology and ForwardFocus are activated.^{8††}

Benefits of ForwardFocus

The Nucleus 8 Sound Processor with ForwardFocus enabled shows a significant improvement in the speech recognition thresholds of -5.2 dB SNR_{50%} when compared to using ForwardFocus in the Nucleus 7 Sound Processor.^{9††}

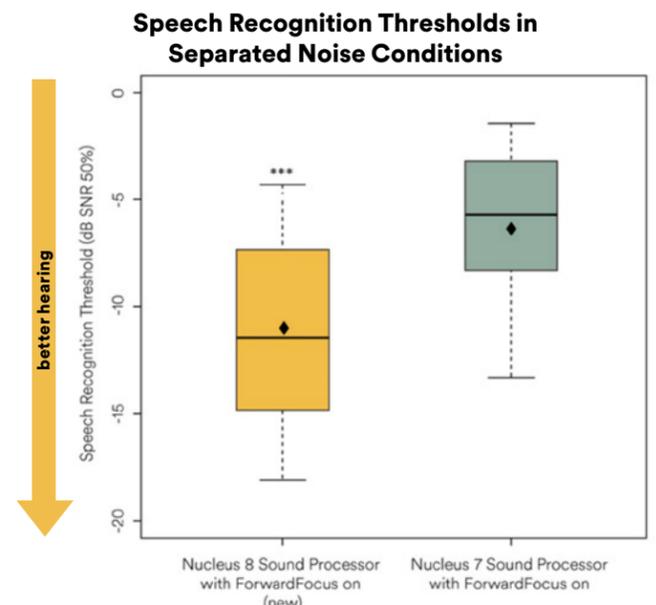
Study results confirm the Nucleus 8 Sound Processor with ForwardFocus enabled, can provide significant hearing benefit for experienced CI recipients when listening to speech in background noise.^{10†}

Fixed vs. Adaptive Directionality



Nucleus 7 Sound Processor ForwardFocus† with zoom fixed directionality

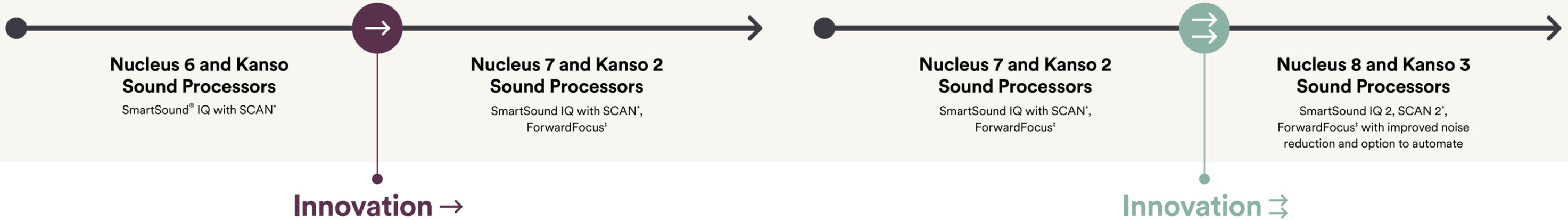
Nucleus 8 Sound Processor ForwardFocus† with Beam® adaptive directionality





Patient satisfaction

Where better hearing begins. Patient satisfaction measures, such as improvements in quality of life or reductions in listening effort and fatigue, are also observed with new sound processor technology.



Nucleus 6 and Kanso Sound Processors

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SmartSound IQ 2, SCAN 2*, ForwardFocus† with improved noise reduction and option to automate

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Reduced Listening Effort

Patient Satisfaction

Reduced Listening Fatigue & Patient Satisfaction

A replacement sound processor of Nucleus 7 or Kanso 2 resulted in a significant decrease in listening effort and fatigue, as measured at one- and six-months post-upgrade. Furthermore, improvements were noted in the ability to hear in challenging listening situations.³

The Nucleus 7 Sound Processor delivered high user satisfaction for overall hearing (72.3%) and one-on-one conversations in quiet (93.1%), satisfaction levels were lower when used in complex noisy environments (34.5%).²

The Nucleus 8 Sound Processor’s automated FF feature enhances speech performance in noise compared to SCAN 2 alone and is well accepted in real world listening environments.^{7†}

Reported listening effort was lowest in noisy environments when ForwardFocus was activated.⁶

Sound processors with an automatic scene classifier received higher average ratings on the SSQ than those without, suggesting the classifier is beneficial for patients in various listening conditions.¹¹

When SmartSound® IQ 2 with SCAN 2 technology and ForwardFocus are activated, half of recipients surveyed reported less listening fatigue with the Nucleus 8 Sound Processor than the Nucleus 7 Sound Processor.^{8†}

Most participants rated their Kanso 2 Sound Processor as equal to or better than their previous sound processor. Additionally, 40% reported increased self-confidence, and 30% found group conversations easier.⁴

9 in 10 recipients who upgraded to a Nucleus 8 Sound Processor from a Nucleus 7 Sound Processor say they would recommend it.⁸



Convenience & connectivity

Living life with ease. In our connected world, the ability to hear in person, over the phone, or anywhere in between, is important for social interactions. Streaming, all-day listening, and automated ForwardFocus are examples of how Cochlear technology can provide convenience and connectivity for patients to fully engage in activities of daily life.



New features in the next generation sound processors, including Bluetooth connectivity and ForwardFocus, led to several post sound processor replacement improvements. These included enhanced social connections, better access to multimedia (phone calls, video calls, music, and podcasts), and a clearer understanding of speech in noisy environments.^{3†#~}

The integration of Bluetooth connectivity and app control enhances usability, a benefit particularly noted among younger users in educational and social settings. User engagement with these features is high, as 79% of users utilized the phone and 72% expressed satisfaction with audio streaming. Top rated features reported included sound clarity and quality, ease of use and comfort and improved hearing in noise.^{2~}

A program that automatically adjusts between settings appears to be a more effective solution for optimizing speech recognition in everyday listening environments.^{12§}

Automated programs and features eliminate the need for manual adjustments, delivering a listening experience many CI patients prefer.^{7§}

Key features

	Nucleus® 6 and Kanso® Sound Processors	Nucleus® 7 and Kanso® 2 Sound Processors	Nucleus® 8 and Kanso® 3 Sound Processors
Direct streaming capability	Via Cochlear Wireless Phone Clip	Compatible Apple® or Android™ devices ^{#1&†} Cochlear Wireless Phone Clip	Bluetooth® LE Audio [^] locations and devices [°] Compatible Apple or Android devices Cochlear Wireless Phone Clip
Control	Remote Control (CR210) and Remote Assistant (CR230)	Nucleus Smart App® and Remote Control (CR310)	Nucleus Smart App® and Remote Control (CR310)
User Controlled ForwardFocus		✓	✓
Automated ForwardFocus[†]			✓
Waterproofed** IP68-rated		✓ (Kanso 2 Sound Processor)	✓



Key takeaways



Peer-reviewed evidence has consistently demonstrated improvements in hearing performance and quality of life among patients who transition to the latest sound processor technology, with findings spanning more than a decade.¹³⁻²²



Across all age groups and regardless of initial implantation timing, patients report meaningful improvements in everyday quality of life following a sound processor replacement. These benefits are reflected in established self-report measures that assess overall well-being across multiple health domains, including daily hearing function and its impact on everyday activities.¹⁹⁻²²

Notably, even patients who received their implant more than 20 years ago may experience significant performance gains when transitioning to the latest-generation sound processor technology.¹³⁻¹⁸

Each generation of sound processor delivers advances in noise reduction, automation, streaming, and wireless technologies designed to improve patients' hearing outcomes.¹³⁻¹⁸

Hear now. And always

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* In the U.S., SNR-NR, WNR and SCAN are approved for use with any recipient ages 6 years and older who is able to 1) complete objective speech perception testing in quiet and in noise in order to determine and document performance 2) report a preference for different program settings.

‡ ForwardFocus can only be enabled by a hearing implant specialist. It should only be activated for users 12 years and older who are able to reliably provide feedback on sound quality and understand how to use the feature when moving to different or changing environments. It may be possible to have decreased speech understanding when using ForwardFocus in a quiet environment.

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& The Cochlear Nucleus 7 Sound Processor is compatible with Apple and Android devices. For compatibility information visit www.cochlear.com/compatibility.

@ The Cochlear Nucleus Smart App is available on App Store and Google Play. For compatibility information visit www.cochlear.com/compatibility.

§ Compared to previous generation SCAN.

+ Compared to Nucleus 7 Sound Processor with ForwardFocus on.

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^ As Bluetooth LE Audio compatible devices become available, a sound processor firmware update will be required to use certain features. Auracast™ broadcast audio capability is subject to third party adoption of the Auracast protocol. The Bluetooth® and Auracast™ word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by Cochlear is under license.

** The Cochlear Nucleus 8 Nexa and Nucleus 8 Sound Processors with the rechargeable battery module and the Kanso 3 Nexa, Kanso 3, and Kanso 2 Sound Processors meet the IP68 rating of the International Standard IEC60529 of freshwater waterproof. These processor configurations were tested by continuous submersion in freshwater for 60 minutes at a depth of 1 meter and functioned as intended. Cochlear offers the Aqua+ accessory for additional protection during extended water use, in salty or rushing water environments. For additional information, please refer to the appropriate user guide.^{23,24}

The Nucleus 7 Sound Processor is protected against water to level IP57 of the International Standard IEC60529. This protection only applies when you use a Cochlear Standard Rechargeable Battery Module or Cochlear Compact Rechargeable Battery Module.

The Cochlear Kanso 2 Sound Processor is compatible with Apple and Android devices, for compatibility information visit www.cochlear.com/compatibility.

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