team

TYMPAHEALTH

Tympa - the world's first all in one ear and hearing health solution

Client: TympaHealth

DBA Design Effectiveness Awards entry - July 2025

For publication

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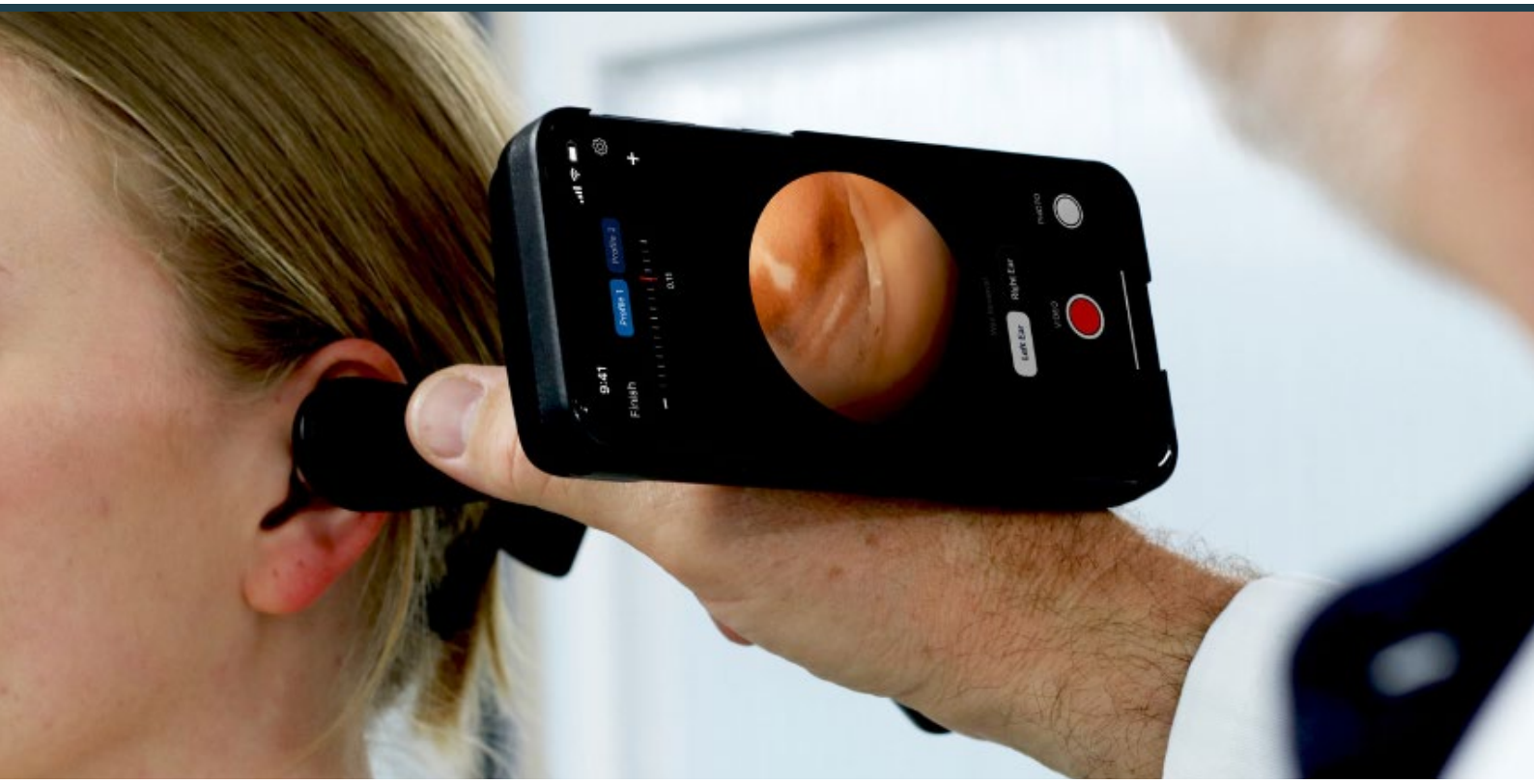


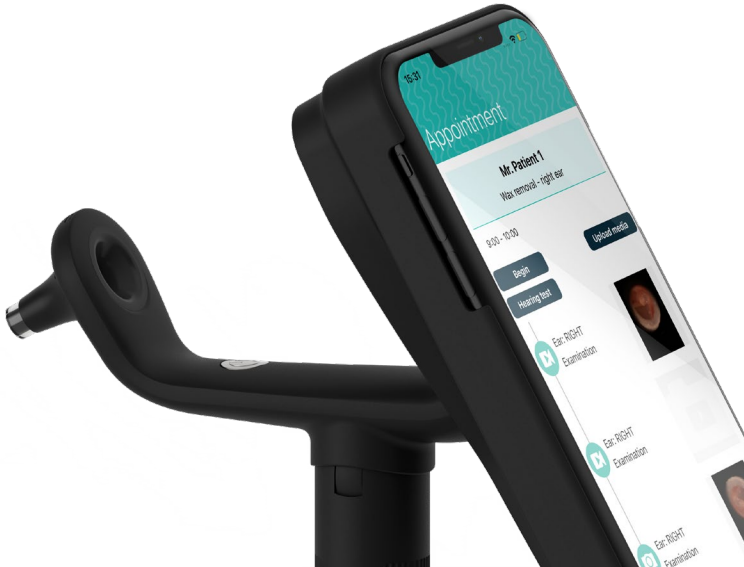
Executive summary

TympaHealth's Tympa Platform is the world's first all-in-one ear and hearing health solution, designed to make ear and hearing health more accessible to communities and speed up access to care. The device, a portable smartphone-enabled otoscope used in conjunction with a mobile App, is designed to enable both specialist and non-specialist professionals to conduct a full ear examination, hearing check and ear wax removal (microsuction) in one place.

Tympa started as an idea from an NHS surgeon, who worked with us, a design consultancy, to take this from initial concept to a multinational company in 3 years through three phases of development: prototype, Gen 1 and Gen 2. Tympa, built around a smartphone, allows a full ear and hearing health check anywhere in the world, featuring:

- HD digital otoscope - it captures high-definition images and videos of the outer ear
- Microsuction wax removal
- Secure cloud digital storage for patient's ear and hearing records allowing shared access with other healthcare professionals
- Remote review – the Tympa system sends high-resolution images to a team of ENT specialists and audiologist for support, advice and provide guidance when needed.

> **"35,000 patients a month currently get an ear examination using the Gen 2 Tympa System and since launch over 400,000 patients have had a Tympa ear exam."**



Context and overview

Market context

Democratising ear and hearing health – taking care out of the hospital and delivering it in the community – is one of the critical challenges facing healthcare systems worldwide. There is a need for new approaches and technologies to empower healthcare professionals (pharmacists, opticians and audiologists) to deliver specialist care outside the clinic.

- According to the WHO, half a billion people worldwide suffer from hearing loss.
- On average it takes 10 years from when a patient first suspects hearing loss to when a hearing aid is fitted.
- 35% of UK adults have experienced hearing loss.
- 56% say it has negatively impacted their mental health.
- 1 in 3 people have never had a hearing check[1].
- Hearing loss has been linked to the development of dementia, increased risk of falls and social isolation.

Dr Krish Ramdoo, founder of TympaHealth, was working as an Ear, Nose and Throat (ENT) surgeon for the NHS when he was asked to assess a patient with possible dementia. To complete the full examination the patient would have needed to travel between the clinic, specialists and back to the clinic in multiple appointments, creating a delay in care and unnecessary stress for the patient. Dr Ramdoo had an idea – could we turn his smartphone into a medical device capable of providing a full hearing health assessment and treatment outside the clinic? His idea was to leverage the power of a smartphone to deliver a full hearing health check in one device.

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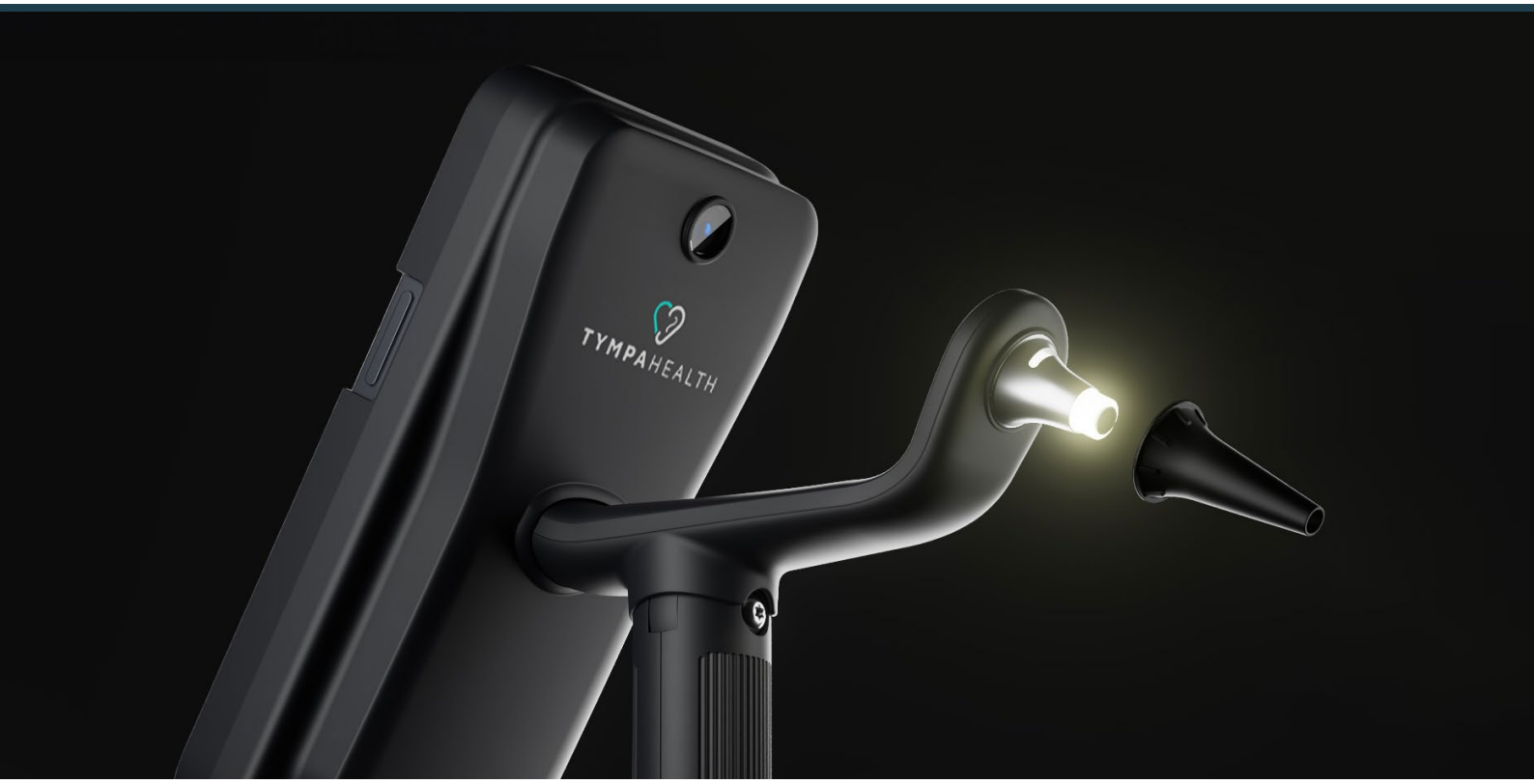

Project brief

There has been a strong partnership with Dr Krish Ramdoo and us from the start. In November 2017 Dr Ramdoo came to us with a very early prototype of a cradle that held an iPhone. Phase one of the project began. Working in an iterative process we provided a powerhouse team of 20 specialists including industrial designers, human factors engineers, mechanical engineers, optical engineers, project manager, marketing, regulatory and quality specialists. We regularly met with Dr Ramdoo to test the feasibility of each design iteration.

This initial phase of the project delivered 4 prototypes that could be used by trained employees of a high street pharmacy, Boots, to assess the feasibility of the Tympa Platform.

As the success of the product grew so did the teams working on the device. Initially, it was just us with Dr Ramdoo, but as the months passed TympaHealth became a multi-national business with a strong partnership with Boots/Walgreens and further clients in the USA and UK.

Phase one -

Project fees REDACTED CONFIDENTIAL DATA– completion date December 2018. In addition to testing the feasibility these prototypes were used to attract more funding.

Phase two - Gen 1

Started in 2018 with three additional stages and milestones

- January 2018 - REDACTED CONFIDENTIAL DATA- updates to the design and a video capture App
- April 2018 - REDACTED CONFIDENTIAL DATA– handling models and prototype of the device
- November 2018 - REDACTED CONFIDENTIAL DATA– finished detailed design of the Gen 1 product. This product was CE marked on the 5th of February 2019 and put into production. At this stage the Tympa Platform relied on the imaging quality provided by the smartphone camera. The plans developed to create a device that was safe and effective and met the medical device regulations.

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Phase three - Gen 2

Started in February 2019 –
total design fees REDACTED CONFIDENTIAL DATA

Tympa Gen 1 was being used in the market and as such plans were developed from users' feedback.

- Improved ergonomics provided by altering the handle to increase comfort for prolonged periods. The balanced weight and articulated handle allow for relaxed "universal" grip to reduce fatigue during use. The pivoting handle makes the device comfortable and practical for both left and right-handed users.
- Perception of quality and performance – the aesthetic design and construction of the device has been optimised to portray a high quality, precision and reliable piece of medical equipment. Using subtle cues such as colour, materials and finishes evident on other otoscopy devices, such as high precision otoscopes, the user is provided confidence and reassurance.
- Positional control – the "pinkie" finger is left free to aid in positioning against the patients' head, reducing the risk of injury during the procedure
- Clear instrument access – the hollow speculum port allows the user clear line of sight into the patient's ear canal, and also unobstructed access for a suction probe for earwax removal. Providing clear and open access to the patient's ear increases the confidence of non-specialist providers
- Bio-contamination protection - the Tympa device is designed to utilise a standard OEM disposable hygiene shield (speculum) to protect against bio-contamination across multiple patients.
- Enhanced image quality – a custom-designed light guide focuses light from the array of light emitting diodes (LEDs) to the speculum tip efficiently to allow clear illuminated sight inside the ear. The LED on/off button is easily activated by the thumb without needing to adjust the hand position.
- Optical magnification – enhanced optics within the Gen 2 device provide optical magnification that allows the capture of more detailed imagery (High-definition) while retaining the form-factor, ergonomics and weight distribution of the device.
- Sustainability - a mains-powered charging base recharges the on-board battery (which powers the LED array) and simultaneously charging the smartphone via a retractable charging cable, eliminating the need for disposable battery waste
- High-definition video capture – HD video is captured in anticipation of the introduction of artificial intelligence-driven (AI) diagnostics for future App software updates
- Phone compatibility – a simple user interface allows easy and confidential data entry, image capture and data sharing for both iPhone and Android based systems

Phase three –

The Tympa Platform continues to evolve and provide hearing health for the world. Future developments include response to market feedback and AI diagnostic compatibility. The next phase of development is scheduled for 2025+

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Design solution

At every stage of development, a successful design solution was provided. The intuitive design of the device has supported non-specialist healthcare practitioners by offering a simple user interface via the smartphone App, along with an ergonomic and intuitive industrial design. This has resulted in more access to hearing health for patients, with the Tympa Platform now being employed by high street pharmacy providers including Boots, Day Lewis Pharmacy, Weldricks, Dears and many more. In addition, the Tympa Academy, a learning platform provided by TympaHealth, offers effective training on ear and hearing health including wax removal, hearing assessment and video/image screening to ENT specialists. The portable, rechargeable Tympa device has taken healthcare out of the hospital, offering the full “ear clinic” in a single portable device, whether it’s used at high-street pharmacies or the jungles of Cambodia.

Medical device approvals

The Tympa System was UK & EU - CE Marked in October 2020. This transitioned to the UKCA Mark in June 2023.

The Tympa System is also FDA registered for the USA, as of December 2020.

How did the design decision lead to these results?

The intuitive, comfortable design supported non-specialist professionals in expanding their health offering and becoming hearing healthcare providers. Confidence was built-in to the design because of the integration with a known consumer product – the smartphone. This provided a familiar user interface to support easier adoption.

The high usability of the device design and ease of accessibility to non-specialist users also provided confidence in the corporate decisions for high street pharmacies to invest in this new service offering for their retail establishments.

Original challenge

How did the design solution meet the original objective?

The original objective of Dr Ramdoo was to improve access to hearing healthcare and simplify the patient pathway. The robust design delivered an easy-to-use, high-definition medical device based on a consumer phone – a complete hearing health platform which now provides ear and hearing health care to over 400,000 people. As an easy-to-use, portable system, the device is meeting this objective by bringing ear and hearing healthcare into the community, from local pharmacies to remote locations.

Objectives and goals

Designing in confidence for the non-specialist - simplicity of use was designed in.

Designed for ease of use for busy users, the device leverages smartphone technology to provide real-time image capture, data entry and diagnosis to be carried out in the designated smartphone App. The captured data can then be shared via the Cloud with ENT specialists across the globe, allowing users in remote locations to have access to a wide network of specialists to help with diagnosis.

With balanced weight distribution, the device has an adjustable ergonomic handle designed for practicality and prolonged use. The LED on/off button is easily accessible by the thumb without needing to adjust hand position. The 'pinkie' finger is also left free to aid in positioning against the patient's head, reducing risk of injury. An angled display allows legibility both when in use and when on the charging stand.

The device is designed for daily use, with robust materials selected to withstand impact and frequent cleaning, including a standard OEM disposable hygiene shield to protect against bio-contamination, reduce waste and remove the burden on cleaning. Servicing and component replacement is also incorporated into the design, helping to extend the product's life.

Multiple phone platforms - To keep production costs to a minimum the design was tightly constrained for the variation in mobile phones. Minimising differences in weight, balance, look, feel and finish of the device were imperative to provide a seamless offering. Every permutation was considered to ensure the same experience was provided for the users and patient. For example, the weight distribution of the different phones would impact the handling of the device and had to be mitigated.

Better patient hearing health through high-definition imaging - Capturing High-definition imaging was another challenge the team faced. In the first generation of the device, the integrated flash of the smartphone was used for lighting inside the ear, however, image quality proved to be a key challenge. To resolve this, integrated optics were added to greatly enhance the image, while outer ear illumination was improved by incorporating battery-powered LED lights into the base of the speculum. To ensure a stable optical performance, the device was also engineered with a robust construction, comprising a low-cost glass-reinforced injection moulded chassis and cast aluminium speculum arm.

Sustainability and simplified use - A recharging docking station integrated into the handle provided in the Gen 2 design eliminated the need for single use disposable batteries.

Improved design for extended use - The product needed to be held comfortably for extended periods of time by different users. In the first-generation design, the handle was initially positioned straight, parallel with the smartphone screen. Following user testing and feedback from clinical studies, however, it was recognised that off-setting the handle angle to the smartphone screen would help to improve usability and ergonomics. This allows the device to be held more comfortably for longer periods of time by both left and right-handed users, without compromising grip or control.

How does Tympa compare to the competition?

The Tympa System is the first product on the market that offers high-resolution otoscope imaging while facilitating microsuction and hearing check in a single device. Other products existed before it to facilitate parts of this service, but none combined all these functions into a single, portable, cost-effective, easy-to-use product that can also offer remote consultation with ENT specialists. With integrated machine learning, the device and accompanying App also enables the creation of a digital health record. It was created by a team of doctors and technology experts who recognised the need for an all-in-one, accessible device to improve hearing healthcare.

Results and other influencing factors

The initial goal was to make hearing health accessible to everyone and with the intuitive design of the Tympa Platform this has been achieved with over 2000 healthcare professionals using the system internationally.

Awards and external association and endorsements

Tympa has won several major industry awards including: The Royal Society of Medicine, The iF Design Award, Good Design Award and a Gold UX Design Award.

In addition, TympaHealth has secured strong partnerships with leading companies in the healthcare industry including Bupa, NHS England, several high-street pharmacies and more.

Credits

Team Consulting

Steven McLellan
Peter Money
Grant Smetham
Lucy Eaton
Carl Warren
Liam McGuinness
Kester Page
Steven Fowler

TympaHealth

Dr. Krishan Ramdoo
Nick Pattas
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