



PHILIPS

Fetal monitoring

**Freedom in labor.
Passion for innovation.**

Philips **50** years
fetal monitoring



Leading the way for 50 years

2018 marks 50 years since the launch of the world's first commercially available non-invasive fetal monitor, developed in collaboration between Professor Konrad Hammacher and HP Medical, now part of Philips. Since then, we have played an active part in shaping trends in obstetrical care – a field that has evolved beyond our imagination.

Throughout that time, it has been our passion to deliver freedom and flexibility in pregnancy and labor, combining our relentless thirst for innovation with a deep understanding of the ever-evolving needs of mothers and caregivers.

This year's anniversary provides a unique opportunity to celebrate this rich history and reflect on how the pregnancy and labor experience has evolved over the last half a century. At the same time, it also offers a chance to reflect on the challenges that lie ahead, both now and in the years to come.



A rich history of creativity

In conversation with David A Russell

David A Russell is a former Vice President of Global Segment Marketing & Market Intelligence within Patient Care and Monitoring Solutions at Philips Healthcare. Prior to this, he held roles including Vice President and Chief Marketing Officer of Patient Care and Clinical Informatics, and Vice President and General Manager of the Global Mother and Child Care Hospital Business.

Looking back over your time in obstetrical care, what significant innovation milestones stand out?

I've been fortunate to witness and drive forward a wide range of major developments in obstetrical care, working in this space for over 36 years. For instance, the 8040A in 1982 was a big breakthrough moment for us, as the autocorrelation technology enabled wide-beam ultrasound non-invasive monitoring that was accurate and easy to use. I'd also highlight the advances we made in monitoring triplets plus the development of the non-invasive fetal telemetry system, the 80240A, which we released in 1986. This addressed a clear clinical and patient need, and made a positive impact in enabling maternal ambulation with continuous fetal monitoring.

What role has our Böblingen site played in our obstetrical care journey?

Back when Professor Hammacher first came up with his fetal monitoring concept in 1965, he ultimately approached HP Medical – now part of Philips – and it was decided that the product would be developed at HP Medical's site in Böblingen, Germany. Today, all our high-end monitors are built in Böblingen and can be traced back to our partnering with Professor Hammacher. That illustrates how Böblingen is a key location for patient monitoring and also still for today's obstetrical monitoring product development and manufacturing.

Were there any developments or trends that surprised you in obstetrical care?

The increase in C-sections has been remarkable, if not always positive from a clinical perspective. Many are elective C-sections, but this is a big operation and carries certain risks of its own, so that is not a choice that should be taken lightly.

Thinking about technological developments, 'Smart Pulse' was less of a surprise. Even as early as the 1990s, we wanted to create a solution that could automatically compare fetal and maternal heart rates during monitoring by preventing unintentional monitoring of maternal heart rate instead of the fetal heart rate. More advanced signal processing technology and improved algorithms made this possible – and meant another 'first' for Philips!

In your experience, what does 'passion for innovation' mean in practice?

I believe you've got to be creative and passionate to work in this field; it comes with the territory. Obstetrical care is such an emotive and worthwhile subject – anyone who sees the technology's benefits in practice is moved by the experience. Our R&D teams also share that passion. They care about what our customers want, and have the creativity and motivation to implement ideas. Throughout the whole value chain, people are highly motivated to innovate.

As a company, we're a leader, not a follower. We've shown that we get out there and understand what the market needs – and that we can address these needs with exceptional solutions. Ultimately, that's what allowed us to become a leader in obstetrical care products over the past 50 years.

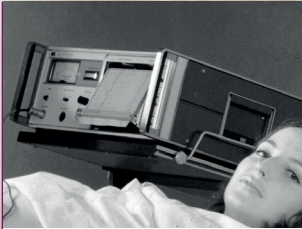


“You’ve got to be creative and passionate in the field of obstetrical care. The work is so worthwhile – anyone who sees the technology in action is moved by the experience.”

David A Russell

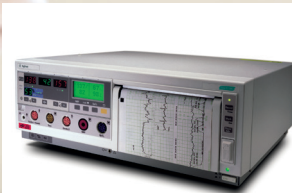
50 years of innovation

Over 50 years, obstetrical care has evolved beyond our imagination. Throughout that time, it has been our passion to enhance the labor experience for mothers and caregivers alike.



1968
8020A

World's first commercially available non-invasive fetal monitor, manufactured in southwest Germany



1990
Series 50 monitor

Simultaneous ultrasound measurement of twins

1970

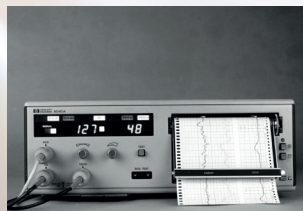
1980

1990



1975
8030A

Compact Fetal Monitor



1982
8040A

Digital signal processing and autocorrelation for external monitoring



1986
OBMS and 80240A

Obstetrical Management System; Fetal Ultrasound Telemetry

ns



2005/2006
Avalon FM20/30
Smart digital transducer
technology



2018
**Avalon beltless
solution**
Enhanced comfort
for mothers



1995
Series 50 XM
Fetal/Maternal Monitor
with integrated maternal
SpO₂ and NIBP



2010/2011
Toco MP transducer
Cross-channel
verification and Smart
Pulse technology



2014/2015
Avalon CL
Avalon Cableless smart
transducer system –
measure twins and
triplets wirelessly

2000

2010

2020

Global perspectives on 50 years o

Clinical opinion leaders from around the world share their perspectives on the changes and developments they have witnessed in obstetrical care – and outline their hopes and visions for the future.



Prof Sir Sabaratnam Arulkumaran
Professor Emeritus at St George's
University of London, UK



Prof Dr Diogo Ayres-de-Campos
Associate Professor, Medical
School – University of Lisbon, and
Secretary-General of the European
Association of Perinatal Medicine
(EAPM)



Dr Deborah Fox
Lecturer in Midwifery at the
University of Technology Sydney,
and Member of the Scientific
Review Advisory Committee of the
Australian College of Midwives



Prof Dr Harald Abele
Deputy Medical Director at
Universitäts-Frauenklinik Tübingen,
Germany, and full member of
the Faculty of Medicine at the
University of Tübingen

The role of technological innovations



Prof Dr Diogo Ayres-de-Campos: There is far more technology in clinical care nowadays than when I first started practicing, and huge progress has been achieved in pregnancy outcomes for both mother and child. At the same time, it's about incorporating technology wisely into clinical care, and focusing more on adequate communication with patients, as well as effective interactions with other healthcare professionals.

Prof Dr Harald Abele: In the past, we moved from bed to bed and room to room to monitor each mother and fetus, but now we have central monitoring systems that allow multiple caregivers to check for changes in maternal blood pressure and fetal heart rate, or to review CTGs, pulse rate data and so on. These technologies are an integral part of modern-day obstetrical care. However, they only provide indirect indications of how the mother and child are doing; that's where the experience of the obstetrician continues to play a greater role.

Dr Deborah Fox: Out of all the advances I've seen in over a decade as a midwife, I would particularly highlight cordless waterproof fetal monitoring technology – I think it has been crucial in enhancing how we support women who require continuous fetal monitoring during childbirth.

f fetal monitoring

The evolution of the **labor** experience

Prof Sir Sabaratnam Arulkumaran: In the past, it was more typical for a midwife to look after three or four women, but now we strive to provide one-to-one care if possible. Labor and delivery is a very anxious moment; a mother doesn't know if she or the baby is going to be all right at the end of the process, so having someone to reassure them throughout the experience is quite crucial.

At the same time, the technology has helped mothers by allowing them to choose what is most comfortable for them – with ambulatory epidurals and monitoring, for example. And if the mother wants to get into a pool, we can use waterproof transducers so that she can still be monitored without any difficulty.

Dr Deborah Fox: Women are becoming more informed about their options, and I think that's something we should embrace. The more information we can share with them to help them make choices, the better. While the midwife is the expert in childbearing, the woman is the expert in her own life and needs, and those of her family. Those two things have to go together, and that means understanding and responding to the mother's emotional, psychological, cultural and social needs – rather than treating childbirth as a purely medical procedure.

Changing attitudes to **freedom in labor**

Prof Dr Diogo Ayres-de-Campos: In the 1990s, it was widely believed that expectant mothers could not remain fully mobile while being continuously monitored during labor. This led many women to decline continuous monitoring during childbirth; the technology was seen as providing a negative experience. Advances in wireless transmission of signals now allow women to remain fully mobile during the whole process, while at the same time supporting continuous monitoring of the fetus.

Prof Dr Harald Abele: From a clinical perspective, I notice that younger midwives are often incredibly motivated to ensure as much of a natural physiological labor process as possible, even though this can be physically intensive. Older midwives tend to use their experience and understanding of each mother's needs to adapt their approach.

Ultimately, different women have different needs. Some prefer freedom of movement; others prefer a bed. In that sense, our experience as obstetricians is vital. While it is good to have a clear idea of what a 'good birth' should be, the mother may have a different perspective, so we must learn and implement different strategies to manage that and give the woman the freedom and space she needs.

The future of **obstetrical** care

Prof Sir Sabaratnam Arulkumaran: Firstly, we need to make further progress in AI and machine learning for the interpretation of CTG – finding out whether computers can assist in providing a better level of knowledge to the clinician and the mother. Secondly, a minimally invasive technique to measure pH or lactate in fetal blood would capture data that could offer a great deal of insight and reassurance.

Finally, we should make the labor and birthing environment as unthreatening, welcoming and natural as possible; a calm, clean, low-tech environment with ample space to move.

Prof Dr Diogo Ayres-de-Campos: Firstly, I would like to see evidence that the quality of fetal monitoring remains high during mobility. Secondly, I hope that innovations will support a more objective and non-invasive monitoring of labor progress. Thirdly, computer analysis could allow a more objective, discriminative method of assessing fetal oxygenation and labor progress.

Dr Deborah Fox: My dream birthing room would have a bath, waterproof cordless monitoring, and comfortable chairs, stools, cushions and other furniture for the mother to lean on. This would be combined with midwifery continuity of care; if we could deliver that for all women, not just those with a low risk of complications, I think that it would have a huge positive impact on the quality of maternity care overall.

