

Improving the ODDS

Physicians and researchers in Cedars-Sinai's Division of Maternal-Fetal Medicine focus on the way babies are conceived, carried, and delivered; investigate the role of stress on fetal growth; and explore the potential of prenatal care to create a foundation for good health—from babyhood through adulthood.

BY ROBIN HEFFLER

As a medical fellow in 1967, Dr. Calvin Hobel worked alongside Dr. William Liley, a medical pioneer in fetal therapy. Liley had discovered how to successfully give blood to the anemic fetus affected by the Rh blood factor, a serious condition that can jeopardize fetus and newborn life. Liley's blood transfusion prior to birth has prevented thousands of fetal deaths worldwide.

Today, Dr. Hobel is a pioneer in his own right: For more than 20 years, he has been on the cutting edge of research into the causes and prevention of pre-term birth, which occurs in about 10 percent of all pregnancies and is associated with some 75 percent of all infant deaths.

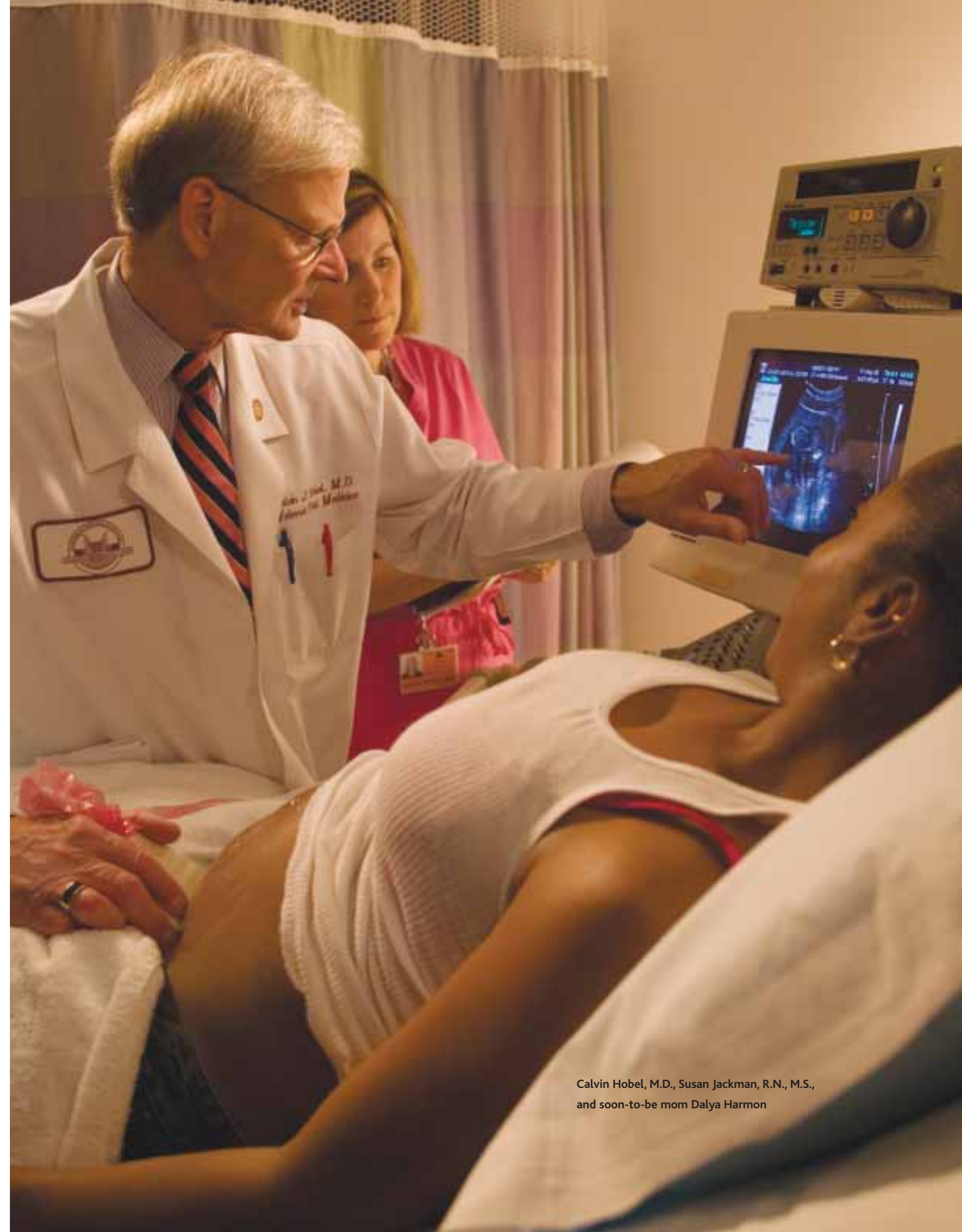
Dr. Hobel is the vice chair of Cedars-Sinai's Department of Obstetrics and Gynecology and holder of the Miriam Jacobs Chair in Maternal-Fetal Medicine. He and other investigators in the Division of Maternal-Fetal Medicine are improving the well-being of women and babies from preconception through pregnancy and birth. They are also investigating the ability of prenatal care to create a foundation for good health extending into childhood and adulthood.

Dr. Hobel came to the medical center in 1983. His formative years with Dr. Liley marked the beginning of Hobel's research training in therapies to improve fetal health. Later, he

conducted studies of drugs to stop women from going into labor prematurely and worked on treatments for the underdeveloped lungs of premature babies.

His work has revealed a wide variety of psychosocial stressors on pregnant women that can lead to premature delivery and inadequate fetal growth. They include anxiety, depression, concerns about labor and the baby, inadequate support from family members, smoking, racial factors, poor nutrition, the job demands of professional working women, and more.

"You have to look at the whole picture, not just one risk factor," says Hobel, who receives strong praise



Calvin Hobel, M.D., Susan Jackman, R.N., M.S., and soon-to-be mom Dalya Harmon

SPECIAL DELIVERY

Cedars-Sinai delivers more babies and high-risk infants than any other hospital in Southern California. The effects of hospital delivery practices on the health of women and their babies are the focus of research conducted by Dr. Kimberly Gregory, vice chair of Women's Healthcare Quality and Performance Improvement, and director of Women's Health Services Research at Cedars-Sinai. She is finding significant variations in childbirth procedures across hospitals in California.

Dr. Gregory's research shows some very low and very high rates of delivery by caesarean section, which is considered major surgery, and in the use of episiotomy, small incisions made in the vagina to ease delivery. "While we don't know what the ideal rates are for these procedures, extremes at either end indicate overuse or under-use, which are not reflective of the best in patient care," she says.



Dr. Gregory is also examining the use of vaginal birth after cesarean (VBAC). In a survey of 225 hospitals, she found that 25 percent do not allow VBACs because of concerns about possible complications, such as uterine rupture. However, Gregory says hospitals can undertake measures to decrease such complications.

"Childbirth is the most common reason for hospitalization, with four million births each year in the United States," says Gregory. "That means that childbearing women are the most likely to be at risk for hospital errors. We want to give hospitals a tool kit that will help apply to obstetrics the same rigorous measurement of quality used for internal medicine and surgery."



Kimberly Gregory, M.D., M.P.H. investigates the effects of hospital delivery practices on the health of women and their babies.



Deborah Krakow, M.D. uses three-dimensional ultrasound imaging and fetal MRI to identify skeletal abnormalities.

from patients and nurses alike for his caring bedside manner. "It's the combination of factors—such as being overweight, having high blood pressure, a stressful job, financial problems, and an ill family member—that adds up over time. When a patient leads a very stressful life, it often takes a toll on the woman and her fetus.

"We've found increased levels of stress hormones in women who delivered their babies early. The most vulnerable time for this increase is in the first trimester of pregnancy, when maternal stress hormones signal to the fetus that things are not going well, which speeds up the timing of delivery. Maternal stress is one of the signals to the fetus for early delivery to potentially increase its chances for survival."

Currently, Dr. Hobel and his research team are engaged in two studies funded by the National Institutes of Health (NIH) examining the role of stress in infections that can lead to

the early onset of labor. One study looks at whether stress causes African-American women and Americanized Latino women to be more susceptible than Caucasian women to bacterial vaginal infections during pregnancy. Another explores how environmental factors may affect gene function and thereby make some women more vulnerable to such infections and/or stress.

THE DAWN OF LIFE

Other investigators in the Division of Maternal-Fetal Medicine are also engaged in research involving fetal genetics.

Dr. Deborah Krakow, director of the Cedars-Sinai Perinatal Center for Clinical Research, is studying the genetic basis of babies born with rare skeletal disorders. In the laboratory, Krakow has identified genes whose mutations are responsible for 10 disorders, including dwarfism and joint

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— Deborah Krakow, M.D.

- ▲ Babies born weighing 5 1/2 pounds or less are considered low birthweight. Babies born weighing 3 pounds 5 ounces or less are considered very low birthweight.
- ▲ Approximately two-thirds of low birthweight babies are preterm, and one-third are low birthweight because they did not grow normally during pregnancy.
- ▲ Low birthweight is one of the leading reasons for mortality or illness in the first year of life.
- ▲ Preterm babies are more likely to suffer life-long complications from developmental, neurological, and learning disabilities, life-long chronic health problems, as well as social and economic disadvantages associated with these biologic impairments.
- ▲ Each year in Los Angeles County more than 10,000 infants are born weighing 5 pounds or less.

Source: LA Best Babies Network

“Maternal stress is one of the signals to the fetus for early delivery, to potentially increase its chances for survival.”
— Calvin Hobel, M.D.

fusions, that occur in about 1 percent of the population. She is also using three-dimensional ultrasound imaging and fetal MRI to compile a profile of fetal characteristics that indicate when these skeletal abnormalities are present.

“Until now, these rare disorders have only been discovered in the post-delivery period,” Krakow says. “Our goal is to educate doctors about what to look for, to determine what features of skeletal abnormalities can be seen pre-natally. Long term, we want to understand how genetic mutations result in skeletal disorders, go around or fix the pathway, and ultimately provide these babies with a better quality of life.”

Making procedures that detect genetic and structural abnormalities in fetuses easier and safer for both mothers and babies is at the core of research conducted by Dr. John Williams III, director of Reproductive Genetics at Cedars-Sinai. Williams is best known for using a procedure called chorionic villus sampling, or CVS, which removes a small amount of placental tissue during the tenth through thirteenth week of pregnancy.

“We have found that CVS is generally safe and reliable,” says Williams, who has performed more than 17,000 of these procedures. “It is not as widely used as it

should be because of the misconception that it is risky for the baby. In the hands of experienced physicians, the risks that either CVS or amniocentesis can cause miscarriage are virtually the same as the risk of miscarriage for women who do not have a procedure—about 2 percent for CVS and half a percent for amniocentesis.”

Williams is currently studying whether pregnant women who undergo CVS are at a higher risk for developing preeclampsia, or pregnancy-induced high blood pressure, which can lead to more serious medical problems.

Dr. Chander Arora, director of the Perinatal Research Laboratory at Cedars-Sinai and Dr. Hobel’s research collaborator for 19 years, recently worked on a breakthrough study showing a connection between preeclampsia and reduced levels of growth factors responsible for the development of placental and uterine blood vessels, important for providing nutrients to the fetus.

“We’re excited about the possibilities that this work will help us to intervene earlier in the case of those babies who are at risk for impaired growth because they are not receiving proper nutrition,” she says.

In an upcoming project, Dr. Hobel and his team will follow up on the health

status of children whose mothers they studied in the 1990s. Those earlier studies produced the first large-scale findings showing that stress is an important factor in both preterm delivery and smaller-than-normal babies.

“When a fetus is small and doesn’t grow, it often imprints a certain type of metabolism that’s fixed for the rest of its life,” says Hobel. “It can lead to obesity and to problems with the ovaries, adrenal glands, and kidneys. So we’re very interested in understanding why babies don’t grow, what are the long-term effects of stunted growth, and what we can do to improve fetal growth.”

PREPARING FOR PREGNANCY

Ensuring the best outcomes for mothers and babies also means giving both medical practitioners and their patients information

that will encourage them to make healthy choices, according to Dr. Hobel.

“By the time we see pregnant women with problems in the hospital, the damage may have already been done,” he says. “We need to emphasize the importance of pre-pregnancy planning and management, because pregnancy itself is hard work for a woman’s body. Proper preparation may be the key to preventing preterm birth.

“Young women need to be educated. They need to understand the importance of not smoking, taking folic acid, good nutrition and weight reduction, using stress-reduction techniques like pacing your work and possibly doing yoga or meditation, and having good support from their families. The future begins outside the hospital in community programs.”

Chander Arora, Ph.D. is director of the Prenatal Research Laboratory at Cedars-Sinai.

