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Twila Brase was not always the kind of person who hands out politically charged propaganda in airports. On a first meeting at her modest office in a shopping plaza in St Paul, Minnesota, she seems more like the unassuming nurse she was back in 1995 — before she began her second life as a bioethical gadfly, and before she had started making YouTube videos that accuse her state of commandeering the DNA of children as “government property” through widespread newborn screening programmes. Her voice is quiet and level. It is difficult to write her off as a conspiracy theorist: she simply doesn’t sound like one, even when, 4.5 minutes into making the case against screening, she suggests that “some researchers” might be trying to convince the state to test day-old infants for genes linked to “a tendency towards violence”.

But Brase may have brought newborn screening and associated research in Minnesota to the point of crisis with her allegations. By tapping into ideological veins that run deep in the United States — wariness of government intrusion and fears about threats to privacy — she could influence the fates of many studies that seek to use human samples from state biobanks, not to mention the fates of thousands of children with rare diseases. Brase has a bent for the hyperbolic: her website features, among other touches, a photo of an infant in a shirt that reads, “Help! The Gov’t Has My DNA”. She also bends the truth at times to make her points. The claim that the state might test for “propensity to violence”, for example, is based on a self-published proposal by a student at the University of Connecticut School of Law in Hartford (go.nature.com/uodhkh) — hardly an imminent programme.

But one argument gives her detractors pause. Parental consent for research on infant blood spots is handled poorly — if it is broached at all — in the laws of many US states. What little parents know about newborn screening often comes from a short brochure given to them just after labour and delivery, when

A spot of trouble

By raising hell about newborn blood-spot screening, Twila Brase could jeopardize public-health programmes and derail research. The problem is, she has a point.

By Mary Carmichael

they're too distracted to process the contents.

Supporters of the screening tend to emphasize the medical benefits. "This is not about privacy or invading anyone's life," says Nancy Mendelsohn, a medical geneticist at Children's Hospitals and Clinics of Minnesota in Minneapolis. "These aren't things that we're doing to children. These are things that we're doing for children." But some state health departments are already rethinking their approach to informing parents and asking for consent.

HEEL PRICKS FOR HEALTH

Among public-health professionals worldwide, newborn screening is generally viewed as one of the most successful innovations of the modern era. Within a few days of birth, infants are pricked at the heel, and their blood is tested for rare genetic and endocrine conditions that can be harmful or fatal if they are not caught early. Screening programmes began in the 1960s with a test for phenylketonuria, a disorder with effects on mental development that can be avoided through dietary restrictions. In the past decade, screening has expanded to encompass roughly 40 diseases. In most cases, DNA is not tested; rather, protein analysis screens for enzymes that might be affected by disease. Most developed countries have some form of newborn screening in place. The US programme alone identifies at least 3,400 children in need of treatment every year.

Beyond the public-health initiative, however, the United States and many other countries save 'blood-spot' samples on cards, and some give them to scientists for use in population-based studies, after stripping away identifying details. Advocates of biobanking view blood-spot repositories as a valuable scientific resource. The samples have been used to develop tests for debilitating and fatal disorders, such as severe combined immunodeficiency, and to ensure the accuracy of existing tests. They have also been used in epidemiological research — for instance, blood spots have helped scientists in Minnesota to examine

blood mercury levels and prenatal exposures to tobacco.

Because it is performed on tissue samples rather than on live human beings, such research generally does not require explicit informed consent. And parents are often uninformed. (Although some countries — such as the United Kingdom, Germany and the Netherlands — do have informed-consent policies for screening.) A 2009 survey conducted in part by Genetic Alliance, a research and health-care advocacy group in Washington DC, found that 62% of new mothers in the United States were not given any information about newborn screening, were not given



Blood spots are used to screen for rare diseases, and sometimes in research.

enough information, or did not remember whether they had been given any.

Informed consent is central to Brase's campaign. This year, she worked with a Minnesota legislator to introduce a bill amendment that would change the state's entire screening programme — not just the research portion — from an opt-out model to an opt-in one. It also required the destruction of blood spots and test results within hours of testing. Opponents said that the policy would result in the deaths of children and the shutdown of labs statewide — federal law requires that test results from the samples be kept for two years for quality control — and the amendment was shelved. But Brase had another weapon. The state's Supreme Court is now considering a case on the same issues, filed

by nine families brought together by the Citizens' Council for Health Freedom (CCHF) in St Paul, an advocacy group that Brase leads. If the group loses, it could appeal. If at any point it wins, it could set a precedent for public-health officials and researchers across the country and around the world.

Brase became a privacy activist in the 1990s, during attempts at health-care reform by the Bill Clinton administration. She believed that government-imposed decisions on health care could affect people at their most vulnerable times. "I was a nurse, so I understood that patients often cannot protect themselves," she says. "I just said, 'I have to do

saying that parents could opt out of screening or storage, provided that they did so in writing. But that wasn't good enough for Brase. "They didn't say that there was an official form or tell people where they could find it," she says. So she began a second campaign, this time arguing that the newborn screening programme violated a genetic-privacy bill passed by the state in 2006. She won that too, although perhaps not in the way she wanted: in 2008, the legislature voted to exempt newborn screening from the bill. Brase's efforts had tied up the capitol for weeks.

She does not shoot for the subtle. Brase frequently name-checks the 1997 dystopian science-fiction film *Gattaca*, in which genetically 'inferior' people form a social underclass, and when she testified to the state House of Representatives in 2009, she placed two books in front of her: one about the US eugenics movement, the other about the Holocaust. She podcasts. She tweets. And every time she flies, she takes a stack of wallet-sized cards to hand out at the gate. "Protect your baby:" they read, "Reclaim their DNA!"

Brase's rhetoric may be overblown, but in Texas, many share her concerns. Two years ago, an investigative journalist discovered that Texas had been shipping blood-spot cards to the US military, which was trying to build a national mitochondrial-DNA database for forensic identification. The state had also been bartering with private companies, trading blood spots for lab equipment. Worse, it had been trying to keep the initiatives under wraps: in an e-mail obtained by the *Texas Tribune*, one researcher argued against informing the public, saying that a press release would "only generate negative publicity". After a series of exposés and a lawsuit, Texas had to incinerate 5.3 million cards. The fallout continues: in May, the state legislature voted to change the research portion of its newborn screening programme from opt-out to opt-in.

The Minnesota Department of Health has never been accused of a Texas-style cover-up. And although many people within the department consider Brase something of an enemy of the state, they

something." Brase took a break from nursing in 1995 to found the CCHF, and never went back. Her attention turned to newborn screening when she was poring through an annual state appropriations bill one day in 2003. "I remember on page 80, I got to this language that said essentially that the health department would have the discretion to test every child for whatever conditions it wanted without having to come back to the legislature. And that was when I realized that newborn screening was not just newborn screening — it was genetic testing."

Brase became the bane of the state health department. She lobbied for better education of parents and got it: in the mid-2000s, Minnesota added a note to its newborn-screening brochure

something of an enemy of the state, they

rarely speak publicly about her. But Edward Ehlinger, Minnesota's commissioner of health, says that she has, in one sense, been helpful. "We think data privacy is incredibly important, and we also think individuals should know how information is going to be used. What Twila has done is to make sure we have those conversations," he says. Still, he adds, "as with any conversation, you do need to come to a place where you can move on."

More than a few of Brase's critics say that she could have an effect similar to that of Andrew Wakefield, the disgraced British doctor whose fraudulent research led millions of parents to believe in a link between vaccines and autism. Brase could cause parents to shun disease screening. She says that according to her figures, more Minnesota parents have declined newborn screening each year since 2003 — the parents of 156 children refused it last year. The more children go unscreened, the more likely it is that some with debilitating or fatal diseases will go untreated, says Mendelsohn. "With some of these disorders, if they're not caught quickly, the kids lose IQ points by the week."

RESEARCH PARALYSIS

Selling parents on the long-term benefits of research can be difficult. Many of the projects listed on the Minnesota Department of Health's website have not been written up and published, despite years of apparent work. The controversy has stymied others. Piero Rinaldo, a researcher into biochemical genetics at the Mayo Clinic in Rochester, Minnesota, had hoped to conduct pilot studies on several rare disorders to add to the state panel. A validated test could help doctors to treat the diseases earlier. Rinaldo says that he has taken all the required ethical precautions, but with the state "in paralysis", he has not been able to begin. "We're doing this because we want to save more lives," he says. "But [Brase] acts as if it's all an excuse for the government to build some inventory of imperfect children. It's like she has the idea that all science is bad."

Brase herself says almost as much. "I have a less glorified

sense of research than some people do," she says. "It seems like there's no final answer to some of the questions." She points to studies overturning previous recommendations on hormone-replacement therapy. For years, apparently well-founded advice urged women to take hormones, only to be overturned when later, better studies showed that they could be harmful.

To ensure that screening programmes aren't affected by attacks on the research, some experts



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propose separating the consent processes — making screening opt-out and research opt-in, with more comprehensive information given to parents. "It seems to me you have to," says James Evans, a medical geneticist at the University of North Carolina in Chapel Hill, who has advised the government on bioethical issues. "If as many people don't participate in research, that is unfortunate. But when people don't participate in newborn screening, babies die." Michigan's public-health department, which has made a point of openly discussing newborn screening with the public, has settled on this approach. Another

proposal that has gained traction among bioethicists is to educate parents earlier. "It's very clear that this shouldn't be done in the peripartum period," says Ellen Clayton, a bioethicist at Vanderbilt University in Nashville, Tennessee. The United Kingdom already has such a policy; its prenatal educational programmes begin with a leaflet given to parents in the third trimester of pregnancy. For that matter, Minnesota already provides information on newborn screening to obstetricians.

complicated — as genome sequencing begins to enter medical practice. Population-level sequence data would be a gold mine for researchers. But many parents who have no problem with limited newborn screening might well feel uncomfortable having their children's entire genome sequences on file, no matter how strict the privacy protections.

Research that makes use of blood spots is likely to increase. The National Institutes of Health has established the Newborn Screening Translational Research Network, a group intended to facilitate data sharing and encourage more scientific work. One of the many goals of the incipient network is to make it easier for scientists to access the millions of blood spots nationwide. The network's proponents recognize that it could engender controversy. In February, in the *American Journal of Public Health*, several members of the advisory committee wrote that parents are too poorly informed, and that "addressing concerns from stakeholders will be necessary for state-level adoption of national recommendations". (E. W. Rothwell *et al.* *Am. J. Public Health* doi:10.2105/AJPH.2010.200485; 2011).

This is something that Brase can agree with. "I really believe if you do not respect the rights of people, research is not going to be trusted in the future," she says. "Researchers will be looked at as people who want to stamp on your rights to get their grants and their fellowships and their chairs to prop themselves up."

There are more nuanced ways of putting it, but many of Brase's opponents concede the essence of her point. "If scientists want to be able to do science, they have to convince the public that it's a good thing to do, that there are protections in place, and that the practices are transparent," says Clayton. "Newborn screening cannot fail to do that." That will mean listening to objections, even if they come from the likes of Brase — otherwise, there might one day be many more like her. ■ [SEE EDITORIAL P.139](#)

Mary Carmichael is a freelance writer in Boston, Massachusetts.

CORRECTION

This News Feature originally stated that US federal law requires newborn blood spots to be saved for two years. In fact, only the results of the tests, not the samples, need to be kept on file for that period. The text has been amended to reflect this.