NEW YORK STATE MODEL FOR REGULATORY OVERSIGHT OF ART AND GENETIC TESTING.

Ann M. Willey, Ph.D

Adjunct Professor, University at Albany & Albany Law School

PROFESSOR WILLEY:

First I want to congratulate Katie and the *Law Journal*. Ten years ago on the tenth anniversary of the journal I was the editor-in-chief, so I'm very excited to see the *Journal* make another ten years on this status and the legal literature.

I am going to give a very different perspective. As the immediate past Director of the Office of Laboratory Policy, I retired from the State New York approximately one month ago. And so I am going to talk a little bit about the unique features in New York State, about state statutory and regulatory oversight of those facilities that practice assisted reproductive technology, everything from the collection of semen donors, the storing of semen, insemination of semen as a medical practice or egg donors or the production of embryos, and also very briefly about the testing of those embryos by any genetic laboratories for selection of implantation.

All right. The statutory authority that we are looking at comes from two major sources; the reproductive tissue banks are regulated under New York State Public Heath Law, Sections 4360 to 4367.

This is an outgrowth of efforts in New York State to encourage organ and tissue donation for transplantation and medical therapeutics, including therapy for infertility. And the definitions of tissues requiring tissue bank being in compliance with this statute include human gametes and human embryos.

We have to remember that until very recently human eggs could not be stored for any length of time. There are a few gamete banks now that perfected a mechanism of claiming to be able to store and retrieve eggs. But in order to save female

reproduction tissue, those eggs were generally fertilized by human sperm and stored as embryos.

So facilities that store semen, eggs or embryos are referred to as reproductive tissue banks, and that would probably also include the latest effort, which is actually for stored gonads with the intent of retrieving gametes from those gonads.

The other sections of the New York State Public Health Law regarding clinical laboratory permanence, Sections 570 to 583, which define the criteria that any laboratory performing any testing on any specimen derived from the human body must meet. Now, that—whether I am testing the donor for infectious diseases or possibly genetic conditions or I am testing the embryo because I cannot test the gametes because to test the gametes would destroy the gametes, so I would have to create an embryo, extract cells and DNA from the embryos to look at the genetics of the prospective implanted embryo.

And in terms of genetic testing we also have to look to New York State's Civil Rights Law, Section 79L, which defines exceptional standards of confidentiality for genetic information about the donors or about the embryos, and the consent process that must be executed in order to test any of that material.

In regards to the reproductive tissue banks, these are sperm banks, these are insemination or implantation sites. So any facility which implants an embryo or any facility which inseminates a woman, yes, we know it happens at home with turkey basters and, no, those sites aren't regulated, but if done by a medical practitioner the sites are, IVF facilities and those organizations would solicit donors. Whether those are organ donors, tissue donors, gamete donors, state donors, must be licensed as reproductive tissue banks.

There are currently approximately 60 such reproductive tissue banks licensed by the State of New York that exist outside the State of New York because they provide services to residents of New York or because they ship gametes or embryos to the State of New York. And there are approximately 200 such facilities in New York State.

The tissue bank regulations, relevant to reproductive tissue banks, are found at 10 NYCR Part 52-8. The rest of Part 52 is generic tissue bank rules about facilities and applications and director credentials. But this section is specific to reproductive tissue.

Specific related to donor consent, donor agreements are not

referred to in the regulation, the elements of consent are. I think I would agree with the earlier speakers, because of a legal agreement contractual language more than a consent document approved by an IRD or approved by the medical advisory committee of each bank would be appropriate.

Donors of gametes must be screened for a long list of infectious diseases. That includes egg donors although there is no evidence of transmittal of an egg that has been fertilized in a Petri dish actually transfers infectious diseases to the gestational woman. But infectious diseases may have adverse affects and still we have retained all of those requirements. And this is everything from the sexually transmitted diseases to a long list of other infectious diseases.

That testing is not usually done at the reproductive tissue bank. The blood specimens from the donor are shipped off to a licensed laboratory for that testing.

The current regulations state that each donor, gamete donor - egg and sperm, must be tested for those genetic conditions, which based on the racial and ethnic background or family history who these individuals have been identified at increased risk of being carriers of Tay-Sachs, Thalassaemia, Cystic Fibrosis or Sickle Cell Disease carrier—tested for carrier status.

This is the outgrowth of a direct recommendation in the New York State Taskforce on Life and the Law and their report on *Assisted Reproductive Technology* published in the mid 1980's.

Yes, carrier testing for these diseases is generally available, it is generally recommended by most obstetricians prior to conceiving a pregnancy the good old-fashioned way. And the American College of Obstetrics and Gynecology recommends such testing. So testing gamete donors for conception of pregnancies, assisted technology for these conditions would not be unreasonable.

When you select a mate there is no requirement that you undergo genetic testing. You may choose to at the advice of your ob/gyn, certainly CF screening of all Caucasian couples is recommended. Tay-Sachs screening of all Jewish couples is recommended. Sickle Cell testing of all African-American couples is recommended. And Thalasseaemia testing of all Asian couples is recommended.

So everyone has a genetic risk for at least one of these conditions. So every gamete donor probably has a genetic risk for one of these conditions and probably by this rule should be

tested. The number of gametes tested is very small.

However, if a recipient of one of these gametes is seeking to—assisted reproductive technology in order to avoid a risk of a known genetic condition in their own family history, say a Jewish couple who has had a previous child with Tay-Sachs or knows that they are both carriers of Tay-Sachs, is seeking a donor probably of Jewish decent, but known not to carry Tay-Sachs mutations, then knowing the genetic carrier status of that donor is critical to that selection of that gamete donor.

It was the expectation of the New York State Task Force on Life and the Law that if you screen gamete donors for these conditions and found them positive for any of these mutations that they would simply be excluded as a prospective donor.

We do not exclude our mates because they are carriers. There is nothing in the rule that says having done the test you must include the donor, there is only that you have to have that information available to the recipient if they need it.

So you could go down the list and say this person is a carrier, this person isn't a carrier. They could be a carrier for Tay-Sachs that is not of issue to you, and they have all the other attributes that you are seeking then there would be no genetic risk in selecting that donor.

The genetic testing regulations in terms of laboratory permits are found in Part 58 of New York State Regs, requires that these facilities have a permit. It requires that their personnel meet certain requirements. The facilities are inspected upon initial application and thereafter every two years.

And relevant to genetic testing, the unique feature in New York State is that every laboratory test performed by a laboratory must meet scientific validity and clinical validity standards and they must submit that data to the New York State Health Department for review and approval.

Only the State of New York regulates genetic testing laboratories as a specific permit category and only the State of New York actually reviews the data generated by the laboratories to prove that the tests they are offering are accurate and reliable and can be used to make clinical decisions.

The Federal Government has decided that testing of embryos for genetic conditions or anything else is not subject to federal oversight of the laboratory that performs those tests because they have decided that embryos are not derived from the human body.

Now, the gametes that gave rise to those embryos were derived

from the human body, and our position is that the embryo is only a surrogate for the testing of the gametes. So only New York State regulates laboratories that offer pre-implantation genetic diagnosis as genetic testing labs.

The other part of the relevant regulations are the credentials of the lab director who must be qualified in the category of genetics, or if it were infectious disease testing, in infectious diseases.

Donor genetic testing does require that the donor in addition to executing those agreements and those consents to undergo potentially invasive medical intervention in the case of females and minimal intervention in the case of males, must be compliant with New York State Civil Rights Laws 79L, which specifies in Statute 8 specific elements of that consent. You must tell them what tests are being done, what the diseases are being tested for, what a positive and negative result means, who's going to have access to those test results, how it is going to be maintained confidentially, what is going to happen to the specimen after the testing is completed and it must be a written and signed consent.

Carrier testing for monogenic diseases like Tay-Sachs Disease, these are genetic diseases caused by mutations in a single gene, are performed in laboratories approved for genetic testing by—generally by DNA, can be done by enzymes and other elements in a blood specimen.

These are the common genetic diseases that we hear about, they easily identify to clinically diagnosed genetic diseases. You all hear all kinds of things about new genetic markers for multifactorial possibly multigenic conditions, like the ability of the individual to excel at sports. There are intellectual tests, their height, their susceptibility to possibly risk factors for cardiac disease. These kinds of genetic markers are tested in a few laboratories, not those approved by the State of New York because of these genetic markers involve nonspecific changes in the DNA, which are not yet known to be analytically valid. That is the ability of the lab to get the same answer multiple times on the same specimen from the same person may lack validity and are not known to be clinically valid.

The association of markers with known outcomes is highly skeptical. So while we have emphasized that we might be testing gamete donors for their ability to pass on genetic factors that would allow their offspring to excel in some behavioral activity or the probability that their offspring might have some future behavioral problem that is purely skeptical of this—the

speculation at this time and really should be avoided, and I hope it is being avoided by all of your clients.

One of the other areas that gametes are sometimes tested for, or donors are tested for, is chromosomal abnormalities. That is what cytogeneticists do, they look at chromosomes those, little colored bodies that carry all the genetic information.

And so we look at individuals who might be gamete donors to see if they have structurally abnormal chromosomes, which do not affect the person themselves, but at the time the gametes are produced they can produce unbalanced rearrangements, which can result in abnormal offspring or abnormal gametes. And you can do the same testing on the embryos themselves.

These are laboratories that are approved to perform cytogenetic analysis. Those laws predate the ones that can do genetic testing.

Pre-implantation genetic testing, same tests can be done on the cells from the embryos, generally either for monogenic diseases or for chromosomal diseases.

I find the title a catchy title "*Diving Into the Gene Pool*", and I like the very pointed toes about to ascend into the pool. But I would like to make a comment. Can genetic selection by a few, those who elect to engage in assisted reproductive technology, or those pregnancies that elect to have prenatal genetic testing, chromosomal testing, genetic testing, either by a chorionic villis sampling at eleven weeks gestation or by amniocentesis at 14 to 16 weeks, can they affect the gene pool? And as a geneticist I can assure you, no. The definition of the gene pool is the relative frequencies of all genetic alleles present in the entire human population.

So I do not think we are putting any ripples on the surface of the gene pool. But I absolutely believe that genetic selection of a fetus by amniocentesis, by pre-implantation, I should say can have a huge impact on the individual families, whether that is gender selection, we could have a whole symposium just on that, or whether that's for chromosomal abnormalities like Down's Syndrome or whether that is for Tay-Sachs and the terribly fatal infantile neurodegenerative disease.

Thanks.