SRBT WEBINAR

Disaster preparedness – Is your lab ready?

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Hosts

SRBT | Sue Gitlin, Ph.D., SRBT Education Committee Chair

CRYOPORT | Shannon Curiel, Business Development Manager, Cryoport

Webinar Instructions

Learning Objectives

After attending this webinar, the participant will be able to:

1) Review their laboratory's emergency management plans for completeness

2) Discuss additional procedures that may be added to their SOPs

3) Learn how to mitigate and take appropriate action should emergencies strike.

Alexis Adler, B.S.

Embryology Laboratory Supervisor

NYU Fertility Center

New York, New York

- Over 25 years experience in Embryology Laboratories.
- Past chairperson of the Reproductive Laboratory Technologists Professional Group (predecessor to SRBT)

Kay Graff, M.S., ELD

B.S. from Texas A&M University 1989

M.S. Louisiana State University 1992

- Embryology Lab Director at Ochsner Clinic Foundation in New Orleans, LA
- Senior Embryologist at Clovis Community Medical Center, Clovis, California

Charles Bormann, Ph.D.

Associate IVF Laboratory Director

Partners HealthCare System, Inc

Harvard Medical School, Boston, MA

- B.S. Iowa State University 1999
- M.S. Purdue University 2001
- Ph.D. University of Connecticut 2005
- Post-Doc University of Michigan 2008

- President-Elect: SRBT

EMERGENCY PREPAREDNESS

Hurricane Sandy Experience

Alexis Adler

Embryology Supervisor

New York University Fertility Center

History

- Previous recent disasters in New York City
- The 1993 and Sept 11, 2001 bombing of the World Trade Center
- Blackouts including the 2003 event that affected the entire North East
- Bomb scares and crane collapses, water and steam main breaks
- Global climate change, rising sea levels, increasing intensity of storms, Irene 2012

NYULMC

- As a society, we are being asked to be prepared, with a “see something-say something expectation”
- We are in a “not just fire drills” kind of reality
- Based on the recent history of potential emergency possibilities, New York University Medical Center devised a series of disaster planning programs
- Groups and phone trees were organized in each department, we were provided check lists to make sure that we were prepared for all kinds of disasters, both man-made and natural

Emergency Preparedness

- We were asked to contact alternate clinics if our facility became inoperable
- Competitors were contacted and lists were established as to what we would do in emergency
- Back up battery UPS units were purchased
- Flashlights were purchased and placed around the facility
- Cell phones were purchased

Pre-Sandy

- Pre-Hurricane Irene (2012)-NYUMC Hospital was evacuated, however, NYC did not receive direct hit and we were not affected adversely
- Pre-Sandy, a decision was made to **not** evacuate the main hospital as it was felt the risk of evacuation was more than the storm threat
- However as before major holidays, extra liquid Nitrogen was purchased and delivered

Sandy

- Oct. 29, 2012 Hurricane Sandy hit NYC at high tide of a full moon, it was a perfect storm
- Storm surges of 16 feet were recorded on the Atlantic coast as well as the rivers in the area including the East River that runs next to the hospital
- The main hospital and low lying “zone A” areas including the Con Ed power plant on E. 14 St. were inundated by the storm surge and 3 explosions knocked out the E. 14 St. power plant that supplies electricity to lower Manhattan including NYUMC
- Back-up diesel generators took over supplying power
- Surges broke out windows and parts of the building structures and flooded basements and first floor in main medical center complex as well as our facility 3 blocks north of the hospital
- Back-up generators in main hospital flooded and failed, and the hospital had to be evacuated in total darkness by flashlight and cell phone light

The Morning After

- Our generator was smartly located on our roof and continued working through the night
- However our fuel pump was in the basement and even though our support staff was able to pump out basement, the pump failed and we lost power in the morning when the fuel on the roof ran out.
- With all power interrupted, a decision had to be made as to what to do with the 90 embryos in the incubators, transfer them to another facility or cryopreserve. A decision was made to vitrify all the embryos.

The Morning After-Cont.

- All those embryologists who lived in Manhattan had made their way in to the lab and with our flashlights in hand, we methodically moved all the embryos into incubators with UPS units, and with 2 functioning dissecting scopes, also powered by UPS units, all fresh embryos were vitrified
- The one retrieval planned for that day was done at one of our competitors clinics not as affected by the storm (RMA-NY)
- Fuel was manually brought up to the roof (8 flights) and back-up power was restored
- A decision was then made that even with back-up power restored, we could not do procedures without full power as water was not being pumped and we had no water (no toilets)
- Another competitor was called on and said ok to doing retrievals at their facility in mid-town Manhattan (New Hope)
- A crane accident also impacted Columbia and all embryos had to be frozen as that facility, as access was denied for safety reasons

Issues

- There is no way to fully anticipate issues that may arise, but it is really good to be as prepared as possible
- UPS units are crucial
- Vitrification was also crucial for saving those embryos in the incubator at that time
- Fuel quickly ran out in the tri-state area, having the extra liquid Nitrogen was crucial
- Cell phones helped as those of us without power could not charge without generator and even with generators, getting more fuel was an issue

Results of vitrification

- Of the 90 embryos vitrified Oct, 30, 2012

Table 1.Hurricane Sandy Emergency Embryo Vitrification/Warming Outcomes

Embryo developmental day	# Embryos emergently vitrified (patients A-J)	# Embryos warmed	ET	Pregnancy outcome GS (FH)
1	A: 8	8	N	-
2	B: 8	8 [a]	N	-
	C: 16	9	Y: 1	1(1)
	D: 1	1	N	-
3	E: 13	2	Y: 2	2(2)
	F: 13	13	Y:2	2(2)
	G: 12	12 [a]	Y: 1	1(1)
5	H: 5	5 [a]	N	-
	I: 11	2	Y:2	1(1)
	J: 3	2	Y:2	1(1)

Table 1.[a]Embryos underwent TE biopsy/ aCGH. [b]No euploid embryos for ET.
ET=embryo transfer. GS= gestational sac. FH= fetal cardiac activity.

Hurricane Sandy Egg Freeze and Thaws

Date Freeze/Thaw	Age at Frozen	# Eggs	MII	Recovered After Freezing/Thaw		Total Egg Survival		Egg Survival of Eggs Recovered		Fertilization w/ICSI		Cleavage D2		≥8c D3		Morulae D5		Blastocysts D5		Additional Blast D6	ET	Sac(FH)	Comments
				# Rec	Total	# Surv	Total	# Surv	Total	# Fert	Total	# Cleave	Total	# 8c	Total	# Mor	Total	# Blast	Total				
10/12-11/12	recip	11	11	11	11	6	11	6	11	3	6	2	3	1	2						2	Neg	
10/12-11/12	33	10	10	10	10	5	10	5	10	5	5	4	5	4	5	1	5	3	5	1	1	Neg	PGD TE rush
10/12-11/12	39	8	6	8	8	8	8	8	8	6	7	5	6	0	6	1	5	1	5	0	2	Biochem	
10/12-11/12	36	14	13	14	14	12	14	12	14	6	12	4	6	1	6	0	5	1	5	0	1	1(1)	
10/12-11/12	36	7	5	5	5	5	5	5	5	3	5	3	3	0	3	0	3	1	3	0	1	Neg	
10/12-11/12	28	14	14	14	14	5	14	5	14	3	5	3	3	0	3	2	3	0	3		2	2(2)	
10/12-1/13	41	10	9	9	9	9	9	9	9	7	9	6	7	4	7	1	7	0	7	1	0	TE/PGD	
10/12-1/13	37	10	9	9	9	9	9	9	9	1	9	1	1	0	1	0	1	1	1		1	1(1)	
10/12-2/13	41	8	7	7	7	7	7	7	7	6	7	5	6	1	6	0	5	4	5	0	1	Neg	PGD TE rush
Totals	**36**		**84**	**87**	**87**	**66**	**87**	**66**	**87**	**40**	**65**	**33**	**40**	**11**	**39**	**5**	**34**	**11**	**34**	**2**	**11**		

- **Special Thanks to Kara Goldman, Cindy Lee, and Caroline McCaffrey and all the NYUMC staff, especially the embryologists who stepped up during Sandy for the hard work!**
- **Also thanks to RMA-NY, Greenwich Fertility, and especially thanks to Dr. John Zhang and his entire staff at New Hope Fertility for opening up their facility to us for those 5 days last Fall in our time of need.**

Hurricane Cryobank Preparedness

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Embryology Laboratory Director
Ochsner Clinic Foundation
New Orleans, Louisiana

Frequency

On average, we can expect 5-6 hurricanes annually in the Atlantic Basin

Varying degrees of severity

Usually have advanced warning to prepare

IVF labs have two distinct groups of patients to consider: Fresh and Frozen

Cryobank Considerations

- Are consents written to protect you in the event of disaster?
- Do you have a plan in place for your cryobanks that will run smoothly?
- Are your cryobanks in a safe location? Should they be relocated?
- Are they accessible in the event of an extended disaster?
- Do you have access to liquid nitrogen if needed?
- Do you have copies of tank inventory data?

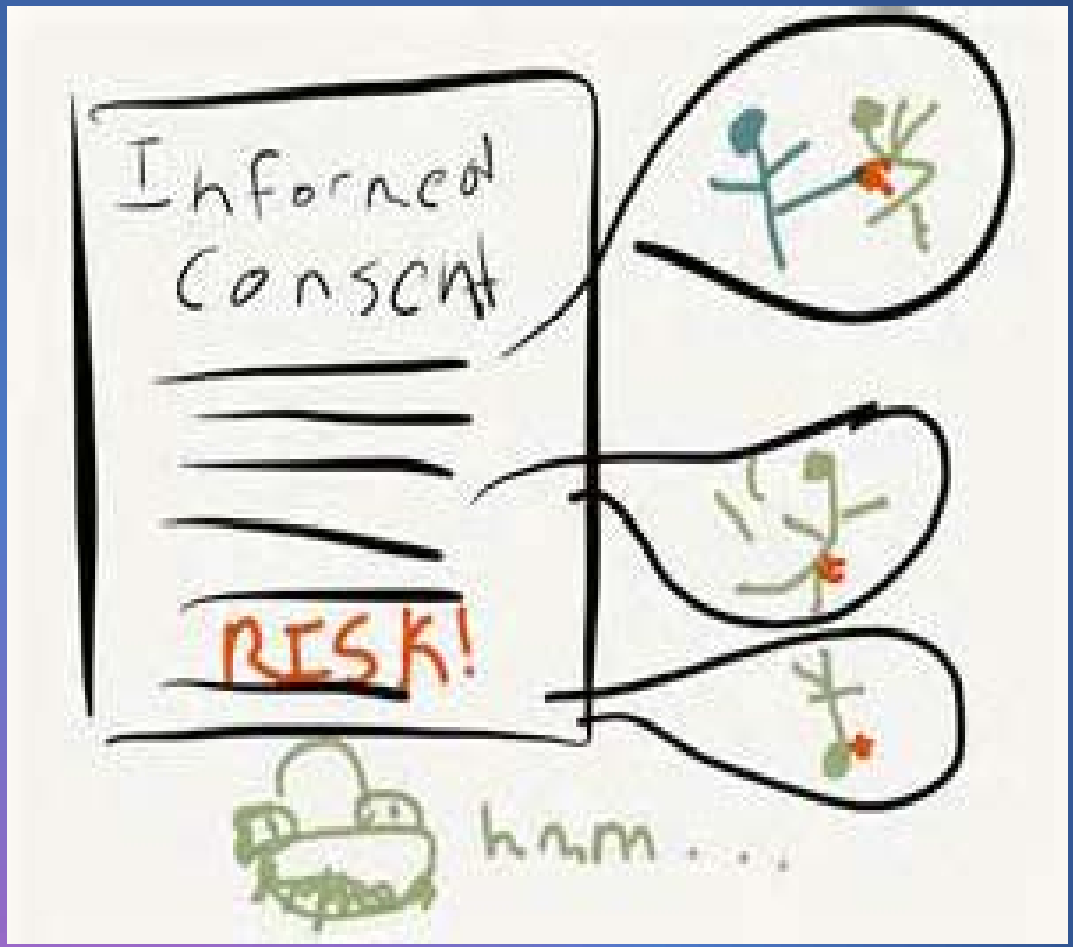
Are consents written to protect you in the event of disaster?

Do consents assure patients that your practice will do everything possible in the event of a disaster that may threaten their cryopreserved samples?

“Acts of God”

“Manmade disaster”

Electrical outage



Plan!

Do you have a plan in place that will run smoothly and automatically in the event of disaster?

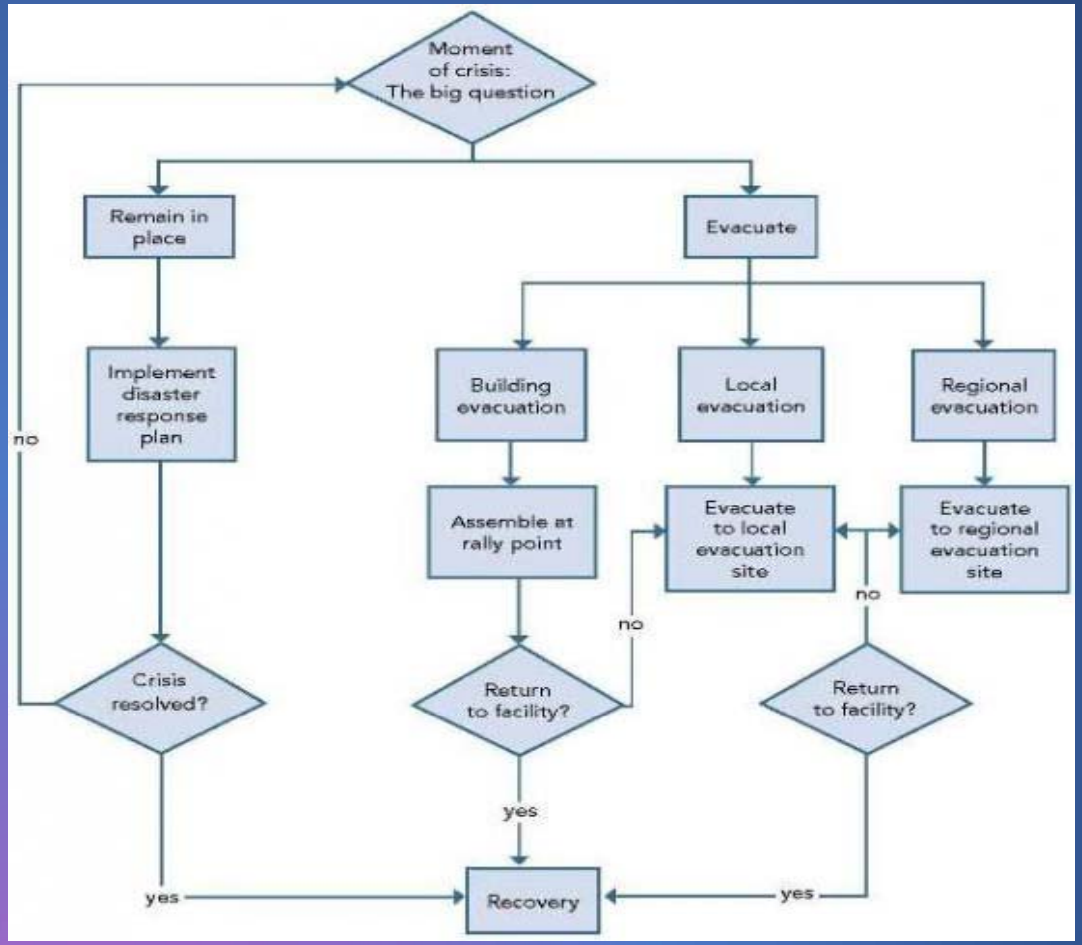
What is your “Red Line” event that triggers your plan?

Does everyone know the plan and their responsibilities?

Rehearse your plan with everyone involved

Private vs. Institutional practices will have different concerns and solutions.

Every practice is different!



Are cryobanks in a safe location?

Internal room

Above flood danger

Should cryobanks be moved, either permanently or at time of Red Line Event?

Who will be responsible for maintaining the banks if moved?

Accessibilty

Will your cryobanks be accessible to you after the disaster has occurred?

Do you have a plan in place if you cannot reach your cryobanks?

Liquid Nitrogen

Do you know the limits of nitrogen maintenance on all of your tanks?

Are you sure you will have access to liquid nitrogen for tank maintenance?

Should you have an extra delivery of liquid nitrogen at the time of your Red Line Event?

Inventory

Do you have access to a copy of your cryobank inventory in the event of a disaster?

If electronic data is lost?

If a paper cyrobank inventory is lost?

Conclusions

- 1. Review consenting signed by patients before cryopreservation of gametes, embryos or tissues
- 2. Make a plan suited to your individual lab and situation and review it with your team
- 3. Apply some critical thinking in regard to location of your cryobanks in the “worst case” scenario
- 4. Consider your options for accessibility to cryobanks if your normal routes are not available
- 5. Consider keeping an extra supply of liquid nitrogen on hand
- 6. Make sure you have an extra, safe copy of your cryobank inventory in the event of destruction of “regular” inventory source

Disaster Preparedness

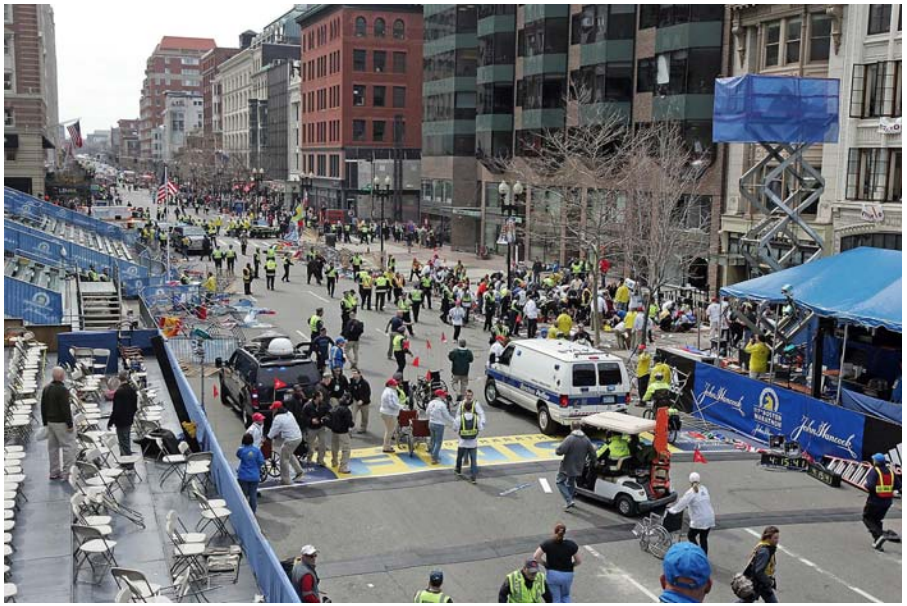
Boston Marathon Bombing

Sequence of Boston Events

- Boston School Vacation (April 15-19)
- Marathon Monday

Sequence of Boston Events (April 15th)

- Marathon Bombing 2:49
  - Limited to no cell phone service
- BWH: Code Amber 3:43
- BWH Lockdown 3:59
- MBTA suspended service
  Shuttle routes closed



Sequence of Boston Events (April 16-18th)

- Hospital Lockdown
- Limited Shuttle Service to Hospital
- Heightened Security
- Streets closed due to suspicious vehicles
- Visit from President Obama

Boston Shutdown (April 19th)

- One suspect killed
- Public Transit Network Suspended: 5:40AM
- Businesses Closed
- Essential Staff Allowed to Enter Hospital: 6:22AM
- Staff not allowed to leave hospital: 8:27AM
- Code Amber Terminated: 6:29PM
- Second Suspect Captured: 8:42PM
- MBTA Restored: 10:48PM

Develop and Emergency Plan

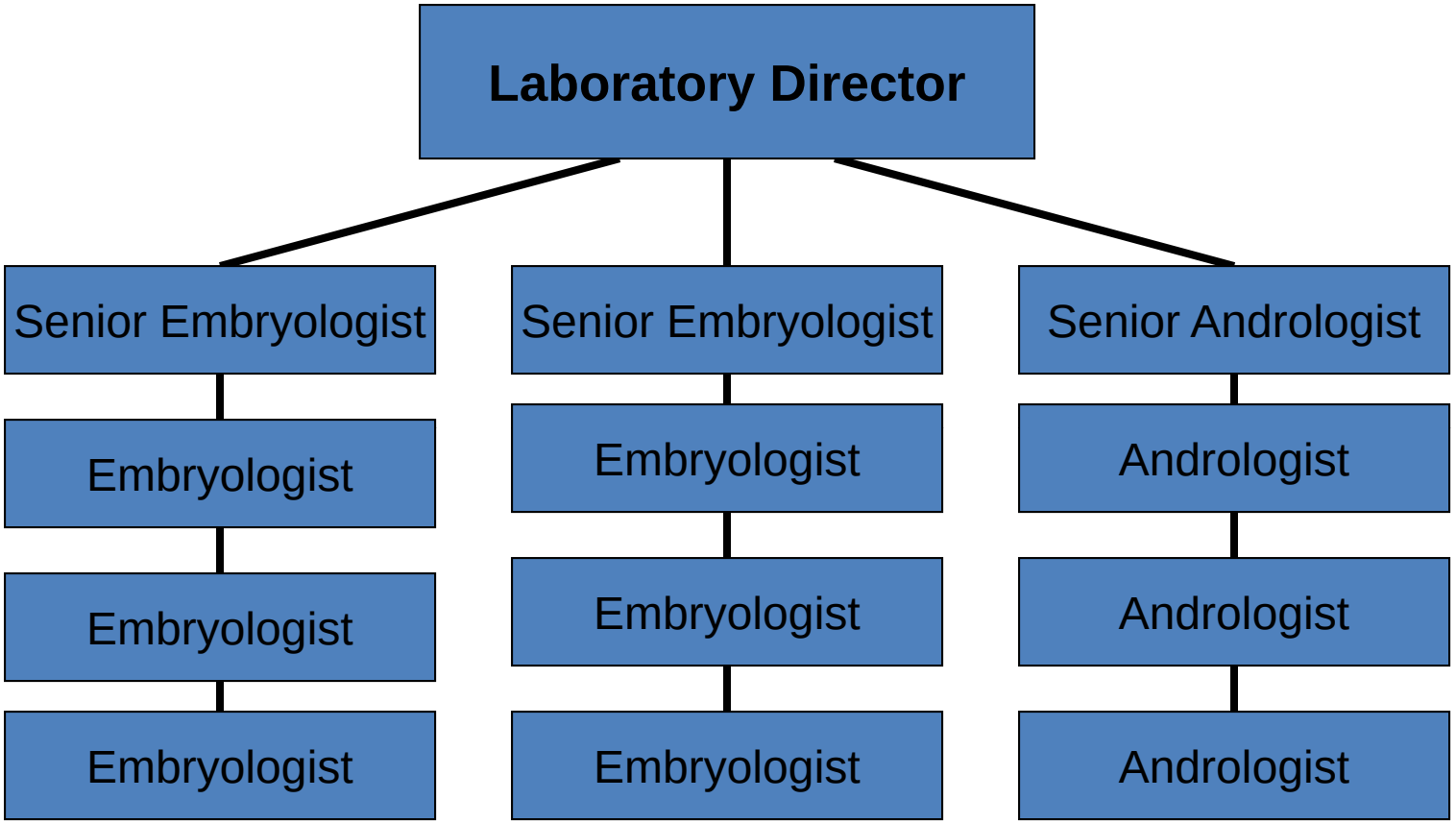
- Provide safety and protection of program personnel and patients
- Provide safety and preservation of fresh and cryopreserved human tissue
- Provide protection and security of patient and laboratory records

Personnel

- Safety and security of persons working in the clinic and patients who may be in the clinic at the time of the emergency are of primary concern
- Minimize the number of employees needed to cover shift
- Constant Communication

Phone Tree

1. Decides what constitutes an Emergency
2. Determine who will need to know the information your phone tree will communicate
3. Make a list of names and contact information: Get **2** phone numbers from each person; at least one should have voicemail
4. Decide who will sit on top of the tree
5. Test your phone tree on a regular basis
   - Staff should keep printed copies of the phone tree



- Text Messaging
- Email
- Social Media

Patient Safety

- Direct patients "in cycle" to another facility for care
  - Clinic should have backup agreements with another fertility centers
  - Provide patients with SART website information
- Consider canceling fresh embryo transfers
    - Consider pushing Day 3 and 5 embryo transfers out to Day 6
    - Consider freezing embryos for a future Frozen Embryo Transfer

Safety of Fresh and Frozen Tissue

- Top off all gamete and embryo dewars
  - Know the rate of liquid N2 loss for each dewar
- Cancel all embryo imports and exports
- Cancel shipment of PGT biopsies
- Place an order for liquid nitrogen and incubator gases

Lab Procedures: Limited or No Staff

Egg Retrieval	• Direct to another facility • Cancel cycle
IVF/ICSI	• Freeze Oocytes
Fertilization Check	• No assessment, leave in culture medium
Embryo Culture	• Freeze all embryos • No assessment, leave in culture medium
PGT	• Push Day 3 biopsies to Day 5/6 • Freeze all embryos
Embryo Transfer	• Push Day 3 transfers to Day 5/6 • Cancel transfer and freeze all embryos
Embryo Freeze	• Push culture to day 6 and freeze

Patient Records

- Have back-up copies of all patient records
  - Paper: Copies should be kept in an offsite location
  - Electronic: Back-up server with remote access
- Frozen embryo inventory
  - Must have a back-up copy assessable from an offsite location


BOSTON
STRONG