StoreSmart

Allen Doyle
UC Davis apdoyle@ucdavis.edu
Kathy Ramirez Aguilar
CU-Boulder Kathryn.Ramirez@Colorado.EDU

StoreSmart:

a packaging of best practices around many issues within cold storage management

- Sample integrity
- Sample access
- Energy savings

STORE SMART

StoreSmart Connections

- Universities Identified issue

DOE: Energy Efficiency and Better Building Alliance (BBA) member campuses

NIH &CDC: Interagency StoreSmart Initiative

Healthcare, Pharmaceutical

ISBER; NCI; Labs21 (I2SL)

StoreSmart: DOE & BBA

Member Campuses

Measurable Energy Savings

Participate in program

Report back to UC Davis

Calculate Total Energy and Cost Savings

StoreSmart
Freezer Challenge

- Open to any facility: University, Government; Health Care, Pharmaceutical

- Participate in part, or all programs

- Develop Cold Storage Management on site

DOE BBA Recognition of Winners

1. Overall points
2. Campus scaled to # ultra low freezers

Logo Here

US Department of Energy

Frost Champion

2013 Freezer Challenge Most Points Winner

is hereby granted to:

Winning Name

In recognition of

actions taken to improve sample access and minimize energy use related laboratory freezer sample storage.

Kristen Taddonio & Paul Mathew, DOE

Awarded: Sept XX, 2013 at Labs21 Annual Conference

Freezer Challenge

- Temperature Tuning — Fall
  - -80°C to -70°C (or warmer)
  - Moving samples to warmer temps
  - Data/References
- Retire and Replace — Winter
- Sample Management — Spring
  - Defrosting, cleaning coils/filters
  - Cleaning outs
  - Consolidating and Inventorying
- Cutting Edge — Always in Season!
  - Room Temperature Sample Storage
  - Sharing
  - Barcoding

CU-Boulder's Third Year Participating in StoreSmart FREEZER CHALLENGE

- Improved Sample Access
- Improved Freezer Performance
- Energy Conservation
- Gift Cards, Pizza Parties
- It is the RIGHT THING TO DO

~50 CU-Boulder Labs Participated Last Two Years

Great Opportunity to Reach Out

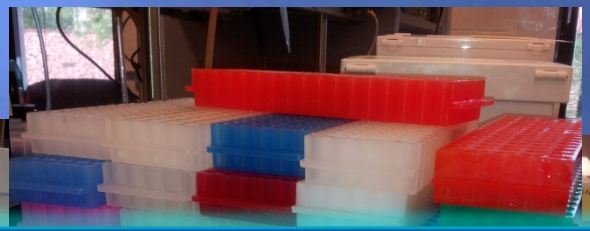
and begin to address issues

Lab freezers frequently house samples that are expired, no longer needed, or cannot be identified.

Samples are often stored at colder temperatures than necessary.

Cleanouts & Consolidation

Retiring or replacing inefficient units



- 170 cu.ft. material disposed
- 64 units inventoried/organized
- 36 units retired
- 24 replaced with Energy Star
- 68 units preventative maintenance

Temperature Tuning

CU-Boulder has
~150 ULT freezers

=

Full size Energy Star
-20 ˚C Freezers

- 45 cu.ft. moved to warmer temps
- 5 labs RTSS test

Citations on DNA & -70

Don't be so COLD

unless absolutely necessary

store freezer samples at the temperature they require rather than colder

An ULT (Ultra Low Temperature) freezer uses 10 TIMES the electricity of an Energy Star -20° C freezer

The ideal storage temperature of your samples may be
eratures

nd temperature wisely

		Consumption
		kWh/day
		kWh/day
Lab grade -20˚C	6-19	kWh/day
Energy Star -20°C	2	kWh/day

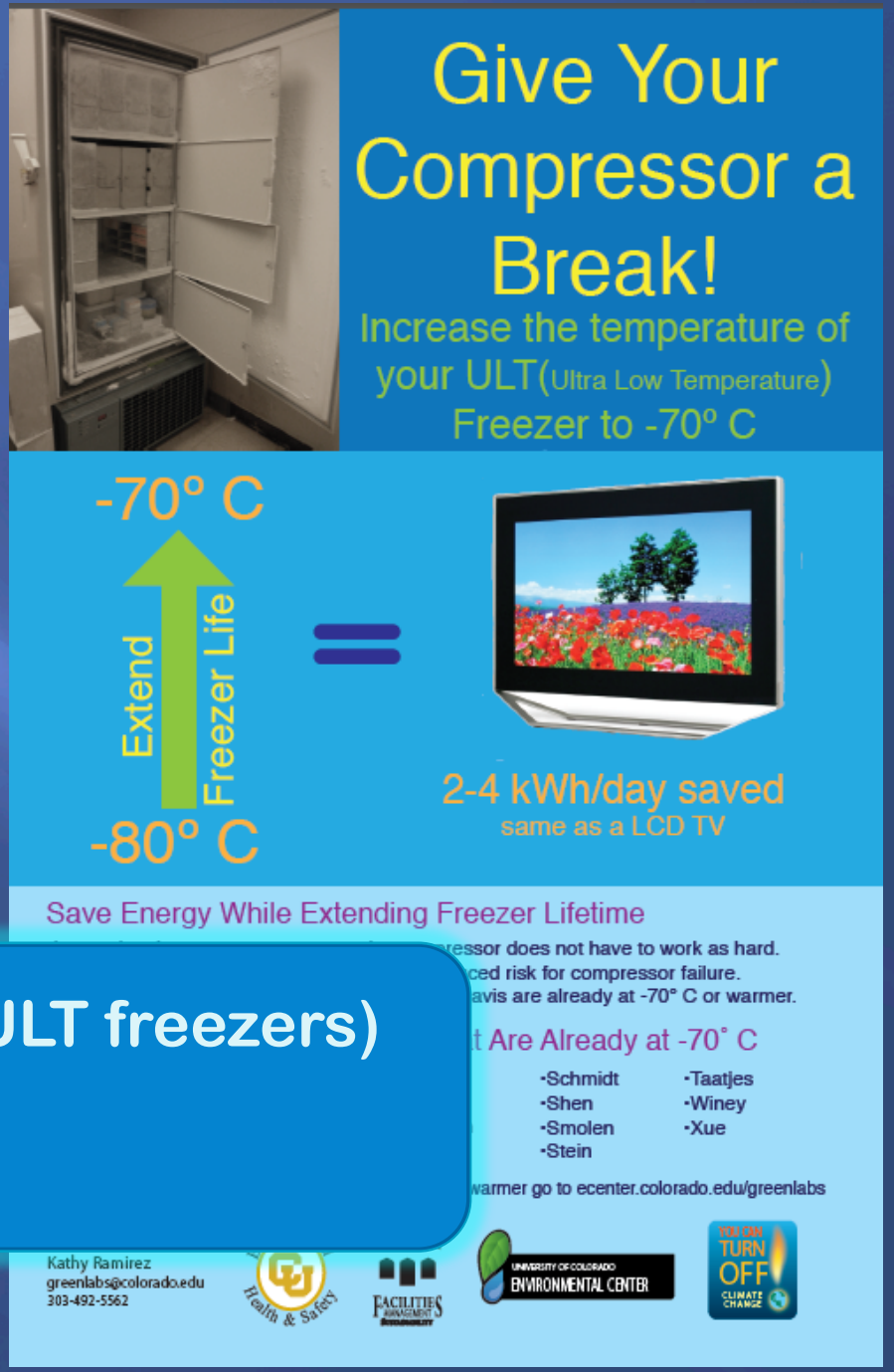
For info on samples that labs are storing at -70˚C or warmer go to ecenter.colorado.edu/greenlabs

CU Green Labs Contact:
Kathy Ramirez
greenlabs@colorado.edu
303-492-5562

ENVIRONMENTAL CENTER

TURN OFF SHMAZE

Temperature Tuning



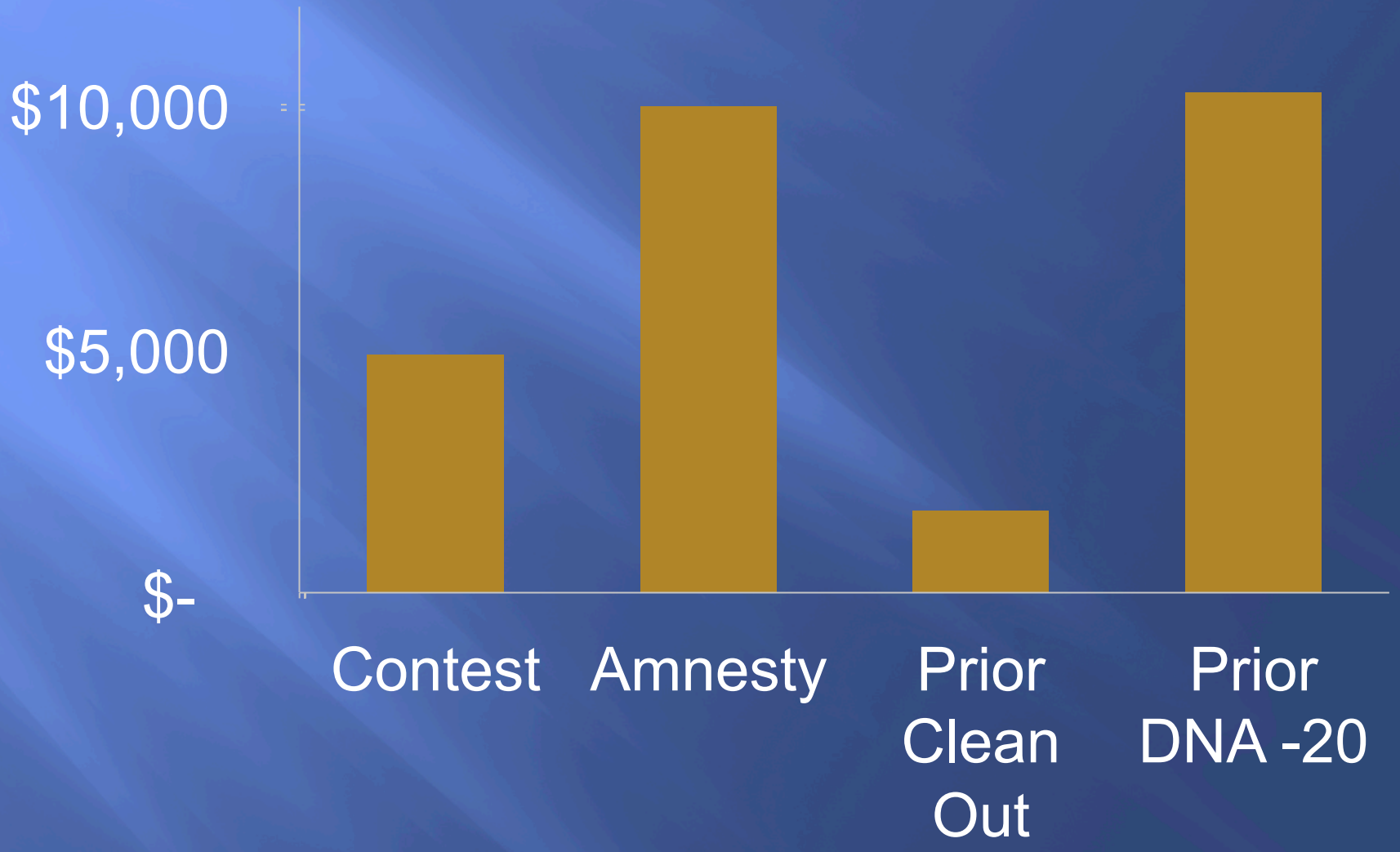
- 45 units at -70°C (35% of ULT freezers)
- 6 shared ULT freezers
- 7 ULT freezers retired

Long Term Impacts at CU-Boulder

CU Green Labs: the go-to place for freezers

- Incentives
- Free disposal if conservation
- Efficient purchases
- Back-up freezers
- Sharing
- Emergency Plans

2011 Savings at UC Davis



StoreSmart —CDC approach

Freezer competition

- θ Sept – Nov, 2012
- θ labs earn points for adopting improved cold storage practices
- θ 11 teams registered over 115 individuals
- θ Each team assigned a Freezer

Challenge coordinator

- θ Website available with useful tools, resources, and example forms
- θ Biostabilizer Pilot Program

"Kuehl, Debra B. (CDC/OSELS/LSPPPO)" <dpk6@CDC.GOV>

StoreSmart —CDC success

Success #1: Clean Out

14 ULT freezers emptied

Reagents consolidated from 7 to 5 freezers

Retired 6 freezers (4 ULT, 2 @ -20)

Success #2: Clean Out

Multi-lab review of ~320,000 samples

Discarded ~96,000 = 30%

"Kuehl, Debra B. (CDC/OSELS/LSPPPO)" <dpk6@CDC.GOV>

Freezer Challenge 2012-2013 "Contest"

- Score sheet: 1 point = 1 kWh
- User oriented
- Self reported
- Start small or large
- Develop a team

StoreSmart: Scoring

Scoring For Freezer Challenge 2013
Higher Education and Federal Research Laboratories

Are You Cool Enough?

- Points are awarded per freezer or refrigerator.
- To clean out shelf space, samples may be processed by alternative storage methods such as freeze-drying, which may be done throughout the Freezer Challenge. If you have already cleaned out your freezer, please make your best estimate of the amount of discarded frozen inventory.
- Campus incentives and rebates are provided to promote lab involvement.

http://sustainability.ucdavis.edu/action/conserve_energy/store_smart.html https://sites.google.com/site/labfreezercompetitionacuboulder/

Points 2013				Description
Campus Participation Points			20	Points per campus just for joining and submitting data
Individual Participation Points			1	Point per PI whose group accumulates any other points
BASIC POINTS	**ULT Freezer**	**-30 or -40°C**	**-20 °C or Refrigerator**	**Points correlate to approximately the equivalent of one point per kWh/day savings.**
Good Management Practices				
Completing multiple steps accumulates points:				
Step 1: Defrost and remove dust from intake or coils	1	1	1	Ultra-low temperature freezer "defrost" can be done by gently brushing or tapping ice off of gasket; others must be emptied and units fully defrosted.
Step 2: Clean out (per ft^3)	1	0.5	0.25	Disposal measurement required (cubic feet or cubic meter). Labs submit their standard box volume and how many complete or partial container fillings were removed. Suggested box volume is 1-2 CF.
Step 3: Sample Inventory	2	1	0.5	Researcher, date, experiment, sample type; may be paper, updated to most recent sample additions and removal.
Step 4: Inventory on file	2	1	0.5	Database or spreadsheet with 95% complete inventory.

https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxsYWJmcmVlemVyY29tcGV0aXRpb25jdW

StoreSmart: Scoring

Temperature Tuning				
Campus Participation Points			20	Points per campus just for joining and submitting data
Chill Up! (points per 10° C)	2	1	-	Labs that already have their freezers at -70° also receive points. Data will be compiled. A campus award given for greatest portion of ULT's warmer than -80.
Samples moved to -20 °C or RTSS	1	1	-	One point per cubic foot of samples moved. DNA extracts at -20°C is standard practice. Many samples are stable at -20 for intervals up to a few years.
Storage Temperature Citations	2 points for example of storage temperature test and results; 5 points for literature citation on storage temperature tests and results. Room temperature to freezer temperatures to liquid nitrogen.			
Retirements and Upgrades				
Retirement	20	10	4	Retirement includes a 1-year pledge to not replace. Multiple points per door for glass door refrigerators. This meets the ultimate challenge! May be eligible for additional subsidies.
Appliance upgrade (per kWh/d)	1	1	1	Must be validated with kW or Amp measurements or data from Labs21 Wiki, Energy Star, or Manufacturer.
Cutting Edge Practices				**Points are not necessarily representative of kWh/day savings.**
Sharing (per additional PI)	4	3	1	Points for additional PIs that store samples in this freezer and thus avoid purchasing a freezer or are able to retire one.
Inventory Barcoded	2	1	1	Submit photo of barcoded storage containers, or display with a visit.
Trying RTSS	5	5	5	RTSS must be tried out on at least one well plate of DNA (96 samples) or 25 tubes of RNA. May be eligible for additional subsidies
Adopting RTSS	2	2	2	Adoption includes at least 2 plates of DNA or 50 tubes of RTSS. Points are awarded per plate of DNA or per 25 tubes of RNA. May be eligible for additional subsidies.
Reduced cooling load in building (per kwH/d)	1	1	1	Measured or modeled and documented by energy manager. Alternate calculation: 1 point per 10 CFM air flow reduction. Must be annual net HVAC reduction due to relocation, Chill Up! or retirement.
Fun Campus Awards:				Frostiest Photo--Send your images to apdoyle@ucdavis.edu. RipVan Winkle Award--Oldest sample discarded.

https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxsYWJmcmVlemVyY29tcGV0aXRpb25jdW

StoreSmart Resouces

- Brochures
- Posters
- Logo: Blue, black, vertical, horizontal
- Citations for temperature tuning
- Websites
- Slideshow 2011 Contest

http://www.cahigheredusustainability.org/program/documents/GBOMRTues8DoyleCHESC2011.pdf

- List Serve for questions
- Drop Box or Sharepoint

•Gumapas, Leo Angelo (NIH/OD/ORF) [leoangelo.gumapas@nih.gov]

StoreSmart Websites

SUSTAINABLE2NDCENTURY UCDAVIS

Campus Progress | Our Research | Take Action | Student Involvement | Map | News | Blog

Conserve Energy | Commute | Buy Smart | Recycle | Host a Zero-Waste Event | Move in, Move out | Compost | Cultivate

Take Action: Store Smart

In this section

- Conserve Energy
- Campus Checklist
- Store Smart

Related news

#1 COOL SCHOOL SIERRA MAGAZINE **8.14.12 — UC Davis is nation's 'Coolest School'**

6.22.12 — Sustainability conference draws record participation

5.30.12 — Planning for uncertainty in power generation

4.26.12 — Expert sources on Calif. governor's new green-building order

4.17.12 — McKibben on climate change: 'We can't let it go on'

All the news...

The Store Smart program was started at UC Davis with a goal of using laboratory cold storage as efficiently as possible. The program seeks to partner with researchers to improve sample access, reduce the risks related to freezer use, and save energy. About 1,000 ultra-low temperature (ULT) freezers are in use at UC Davis and demand is growing.

Each ULT annually uses an equivalent amount of electricity as a typical single family home, as well as incurring maintenance costs. When a freezer fails, samples may be lost permanently or damaged, jeopardizing research projects and data archives. And, without sample management tools, samples and bioassay materials can be misplaced or forgotten about, resulting in an uncertain archive of important scientific data.

Store Smart programs

The Store Smart program has four initial components:

1. **Good management practices**: This educational effort explains how to defrost, clean out, take inventory and care for an ultra-low temperature freezer to save energy and prolong freezer life. The Freezer Cleanout Information flyer, in PDF, provides more detail. To learn about safe sample disposal, see the Disposal Guidelines flyer, in PDF.

Browse site by topic

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- Water
- Land
- Community
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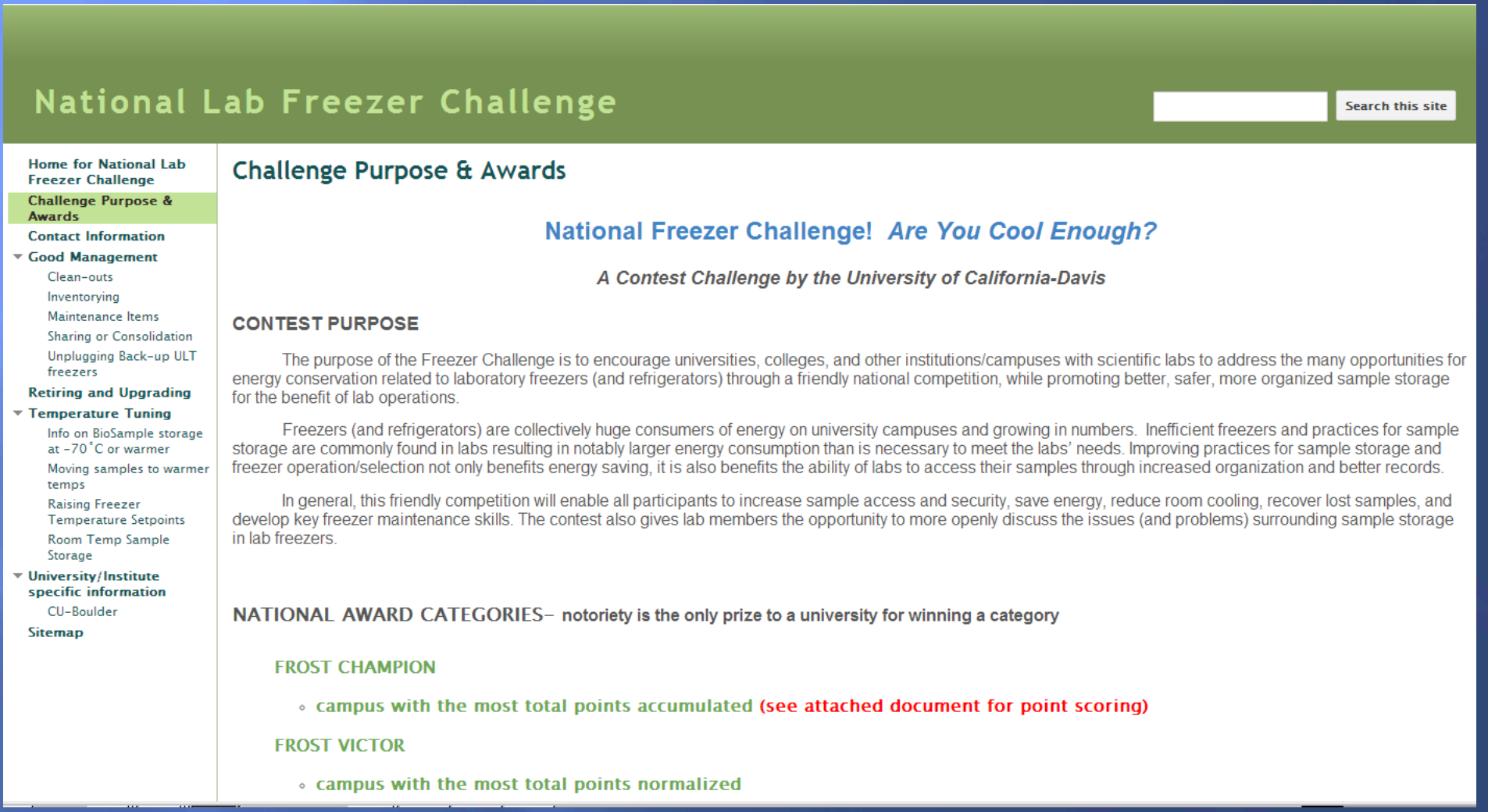
http://sustainability.ucdavis.edu/action/conserve_energy/store_smart.html

StoreSmart Websites



https://sites.google.com/site/labfreezercompetitioncuboulder/national-contest-info

StoreSmart Brochure

GOOD MANAGEMENT PRACTICES

Defrost, clean out, take inventory

An unorganized freezer is not only an inefficient use of space, but it can waste scientists' time and impair research when samples cannot be easily located.

Simple maintenance practices like cleaning the freezer lint tray, vacuuming the coils and regular frost removal improves freezer life and performance.

Contact ESS for free freezer racks. Available in various sizes.

TIP: Many freezers have 10 percent to 30 percent unidentifiable containers or expired samples. Don't lose your samples to frost! Create an inventory.

Cutting Edge Practice: Store Smart will subsidize sample inventory software that enables scientists to barcode their samples and easily access the information.

Freezer Challenge: Win points per freezer for thorough clean-out and for electronic inventory!

To win awards, contestants must record actions on page 1 of the **Clean-out RTSS survey**, accessed at:

sustainability.ucdavis.edu/action/conserve_energy/store_smart.html

CUTTING EDGE TECHNIQUES

Room Temperature Sample Storage (RTSS)

Most DNA and RNA extracts are stored in freezers that can fail. RTSS uses organic or inorganic solutes as a chemical support lattice to stabilize genetic polymers.

Switching to RTSS secures your samples independent of mechanical failures, and saves energy. Sample costs are low thanks to campus subsidies during an introductory period.

RTSS subsidies cover materials (96-well microplates and dessicators), transfer labor and sample management software.

When to Use RTSS:

- **Starting new experiments or a new appointment**
  Ideal for graduate students and new faculty members
- **Retirement or long-term archival**
  Preserve a career's work with less risk
- **Shipping**
  No dry ice needed, no worries about summertime shipments
- **Equipment retirement and lab space**
  Retirement of old, inefficient freezers saves lab space, energy, greenhouse gas emissions and money

Freezer Challenge: Sample transfer subsidy up to 75% of materials and labor!

To win awards, contestants must record actions on page 2 of the **Clean-out RTSS survey**, accessed at:

sustainability.ucdavis.edu/action/conserve_energy/store_smart.html

SECURE YOUR SAMPLES AND SAVE ENERGY...

STORE SMART at UC DAVIS

Why Store Smart?

Mechanical freezing preserves millions of precious samples at UC Davis, yet freezers ***risk failure and need vigilant oversight.*** UC Davis has about 1,000 ultra low temperature freezers (ULT) and your participation will help reduce your risk and campus overhead. Optimal storage practices increase efficiency, save time and money, and enable scientific research. There are several ways you can join in and make a difference.

For more information, contact:
Store Smart Project Assistant, Samantha Ip, sjip@ucdavis.edu
Sustainability Manager, Allen Doyle apdoyle@ucdavis.edu

UCDAVIS ENVIRONMENTAL STEWARDSHIP AND SUSTAINABILITY

http://sustainability.ucdavis.edu/action/conserve_energy/store_smart.html

Available in document form

Temperature Citations: DNA @ -20 °C

SeraCare LIFE SCIENCES

Stability of Genomic DNA at Various Storage Conditions

Wu J, Cunanan J, Kim L, Kulatunga T, Huang C and Anekella B
SeraCare Life Sciences, Milford, MA

ISBER

INTRODUCTION

Advances in recombinant technology and completion of the Human Genome Project paved the way for identification and detection of genetic markers of disease. DNA, though considered a relatively stable macromolecule, is susceptible for hydrolysis, DNases, radiation, free radicals and a number of destabilizing conditions (John GB, 2008). Availability of high quality DNA is essential for incidence and epidemiological studies. The increasing trend to study disease and drug response at the genetic level has focused attention on DNA as a precious resource (Jennifer Joiner, 2002). Degradation of DNA has a major effect on the results generating errors that are both quantitative and qualitative. Reduction in DNA size may have an effect on downstream applications such as PCR-based and hybridization assays. For Whole Genome Amplification it is critical that the DNA is of high molecular weight so the amplified product has low level of locus or allelic bias (Lasken et al, 2003). Therefore, determination of efficient storage methods is critical to maintain the quality of isolated DNA. Several storage conditions were evaluated to determine the best method to store genomic DNA without compromising quality.

In this study, high quality genomic DNA was extracted from whole blood using the Autopure Workstation. The DNA was dissolved in TE buffer and stored at various conditions: room temperature (RT), 4°C, -20°C and -80°C. Real time and stress stability studies were performed. DNA quality was evaluated by agarose gel electrophoresis, PCR amplification of an indicator housekeeping gene (β-globin), and SNP assays on various platforms.

MATERIALS & METHODS

DNA Extractions: Genomic DNA from whole blood was extracted using Gentra System's Autopure LS work station. The DNA was dissolved in TE buffer, and the yields were quantitated by OD reading at 260 nm using the SpectraMax Plus Spectrophotometer (Molecular Devices) and Picogreen quantitation was performed using Quant-iT™ PicoGreen® dsDNA Assay Kit From Molecular Probes (Invitrogen). DNA was normalized to 2 concentrations, 100+/-20µg/mL and 20+/-5µg/mL. The normalized DNA was aliquoted into multiple tubes at 50µL volume. The tubes were then moved to the respective test conditions for the study (Table 1). All the testing was performed in triplicates.

Analysis of Extracted DNA for Quality Control: Quality of the DNA is determined by performing agarose gel analysis and PCR amplification on the extracted DNA. The presence of high molecular weight DNA with no

RESULTS

Table 1: Parameters to analyse the stability of genomic DNA

DNA Concentration	Test Parameters	Time Interval
100 µg/mL and 20 µg/mL	RT	0, 7, 14, 21, 28D, 3M, 6M, 9M and 12M
	4ºC	
	-20ºC	0, 9, 12, 24, 36, 48 and 60M
	-80ºC	
	Freeze Thaws	1, 3, 5, 8, 10, 12, 15 and 19FT

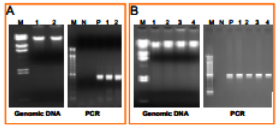


Figure 1: Stability of Genomic DNA at -20°C and -80°C

Panel A: Agarose gel electrophoresis and PCR amplification (536 bp) of Genomic DNA at zero timepoint
Lane M: DNA Marker
Lane N: Negative control
Lane P: Positive Control
Lane 1: -20C
Lane 2: -80C

Panel B: Agarose gel electrophoresis and PCR amplification (536 bp) of Genomic DNA after 24 months of storage at -20°C and -80°C
Lane M: DNA Marker
Lane N: Negative control
Lane P: Positive Control
Lane 1&2: -20C
Lane 3&4: -80C

Panel C: Genomic DNA stored at -20°C and -80°C remains stable for 24 months (studies still ongoing). Concentration of DNA had no effect on the stability.

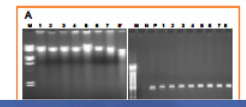


Figure 2: Stability of Genomic DNA at Room Temperature and 4°C

Panel A: Agarose gel electrophoresis and PCR amplification (536 bp) of Genomic DNA at various time points
Lane M: DNA Marker

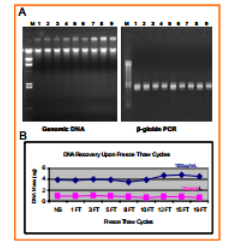


Figure 3: Stability of Genomic DNA Upon Multiple Freeze Thaw Cycles

Panel A: Agarose gel electrophoresis and PCR amplification (536 bp) of Genomic DNA after multiple freeze thaw cycles
Lane M: DNA Marker
Lane 1: NS
Lane 2: 1FT
Lane 3: 3FT
Lane 4: 5FT
Lane 5: 8FT
Lane 6: 10FT
Lane 7: 12FT
Lane 8: 15FT
Lane 9: 19FT

Panel B: Recovery of genomic DNA was not effected upon multiple freeze thaw cycles.

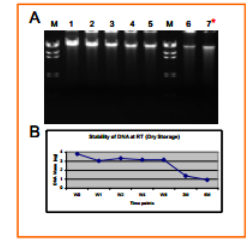
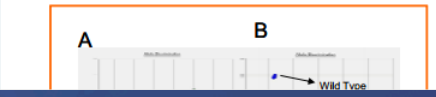


Figure 4: Stability of Genomic DNA at RT in Dry State

Panel A: Agarose gel electrophoresis of Genomic DNA stored in dry state at RT
Lane M: DNA Marker
Lane 1: W0
Lane 2: W1
Lane 3: W2
Lane 4: W4
Lane 5: W8
Lane 6: 3M
Lane 7: 6M
*Degradation of genomic DNA

Panel B: Genomic DNA stored at room temperature under dry state shows loss of DNA recovery after 8 weeks.



SUMMARY

Genomic DNA aliquots stored at -20°C and -80°C were stable for over 24 months (real time stability still ongoing) (Figure 1). Multiple freeze-thaw cycles up to 19 freeze thaws showed no detectable DNA degradation as assessed by agarose gels, PCR amplification and genotyping (Figure 3). DNA samples stored at 4°C and RT showed varying degrees of evaporation but DNA was stable for up to 12 months at 4°C. Samples stored at room temperature totally evaporated by 6 months (Figure 2). At RT, DNA degradation was seen at 9 months. DNA stored in dry state at room temperature showed degradation at 3 months of storage (Figure 4).

Table 2: Summary of DNA storage conditions on DNA stability

Test condition	Results
-20º and-80ºC	Stable up to 24M, studies ongoing for 5 years
4ºC	Stable up to 12 M
Freeze Thaws	Multiple Freeze Thaws (19FT) from -80C stable
Room temp (TE Buffer)	Degradation observed from 6M
Room temp (Dry state)	Degradation observed from 3M

CONCLUSIONS

- Genomic DNA stored at -20°C and -80°C was of good quality, and these samples withstood multiple freeze-thaw cycles.
- For short term studies genomic DNA can be stored at 4°C or even RT without degradation, but samples should be monitored for DNA concentration and evaporation.
- DNA stored in dry state at room temperature showed degradation more rapidly then other storage conditions.

REFERENCES

1. Jennifer Joiner , Molecular Staging Inc. New Technology Increases the Availability of High Quality DNA for Genetic

http://www.seracare.com/Portals/0/Posters/Stability%20of%20Genomic%20DNA%20at%20Various%20Storage%20Conditions%20ISBER2009_Bharathi.pdf

Temperature Citations: Long Term Storage at -70 °C

SeraCare LIFE SCIENCES

Twenty Year Stability Study of HIV, HBV, and HCV Antibodies, Antigen and Nucleic Acids in Plasma

MONTRÉAL 2008 ANNUAL MEETING & TXPO OCTOBER 4-7

L Miller, B Anekella, M Manak, and P Garrett
SeraCare Life Sciences, Milford, MA

Poster Number: 1179
Abstract Number: SP192
Poster Session Title: TTID1: Testing Issues (Virology)

INTRODUCTION

Plasma samples that are stored frozen for prolonged periods are important for retrospective and epidemiological studies in infectious disease. Antibody, antigen, and nucleic acid detected in retention samples can also provide important information for treatment, assessment of disease progression, and drug discovery. Frozen human blood from 1959 has been used to trace the spread of HIV group M in Africa.[1] Frozen serum samples collected from military recruits in 1948-1954 were found to contain HCV RNA and antibody, demonstrating that these can be detected 45 years after collection and storage at -20°C.[2]

Seroconversion panels (undiluted, minimally processed serial bleeds collected from individual donors while markers of an infection are emerging) have been used for twenty years for research in early infection and in the development of assays for markers of infection.

HIV and HCV antibodies, HBsAg, and viral RNA and DNA were evaluated in seroconversion panels collected between 1981 and 2000 to determine the stability of these markers after prolonged frozen storage.

MATERIALS & METHODS

Plasma: Serial bleeds from plasma donors collected prior to and during very early infection between 1981 and 2000 were characterized, aliquoted, and stored at -20ºC (prior to 1996) or -70ºC (after 1996) in 0.25 to 1.5 mL aliquots or larger volumes, and retested in 2007 and 2008.

Test Methods: Panels were tested at SeraCare in 2007 and 2008 using current serology or NAT methods. Serology tests were performed with Abbott EIA, following manufacturer's instructions; data are reported as s/co. Western and RIBA blots (from Medmira and Ortho) were performed for HIV and HCV respectively. Serology comparison was available for similar or identical methods used to test antibody or antigen in 1988 through 1996.

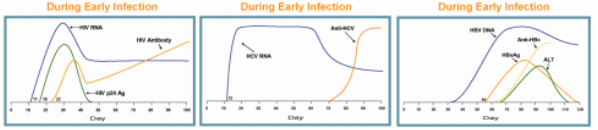
Series collected in 1981, 1989, 1990 and 1995 were tested for HIV RNA with Roche PCR methods in 1995-6 (qualitative) and 2007-8 (quantitative). Panels collected in 1993, 1995, 1996 and 2000 were tested for HCV RNA with Roche PCR in 1994-5 (qual) and 2007-8 (quant). Panels collected in 1990 and 1991 were tested in 1994 with an in-house method for HBV DNA or in 2005 by Roche PCR (both qual), and panels from 1993 and 1997 were tested in 1998 and in 2007-8 by Roche PCR (quant).

EIA and nucleic acid tests were performed in duplicate while blot tests (Western and RIBA) were single assays.

Data Analysis: Correlation was determined by comparing initial test results (1988-1996) to 2007-8. Correlation was positive if results agreed, and negative if results did not agree.

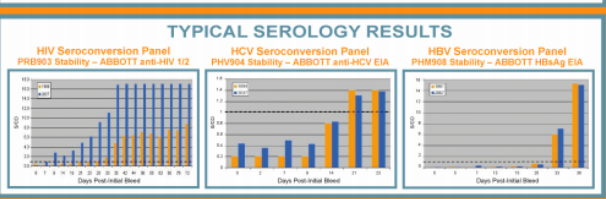
TABLE 1. SEROLOGY RESULTS COMPARED 1988 - 1996 vs. 2007

HIV AND HEPATITIS SEROCONVERSION



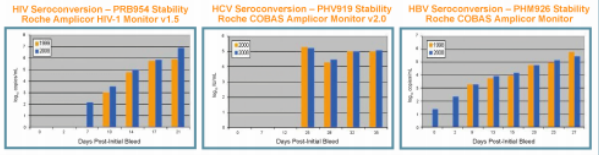
Time to antibody response (HIV, HCV) or antigen appearance (HBV) following virus exposure and detection of viral nucleic acid in plasma is on average shortest for HIV, longest for HCV and intermediate for HBV.

TYPICAL SEROLOGY RESULTS



QUANTITATIVE NUCLEIC ACID RESULTS

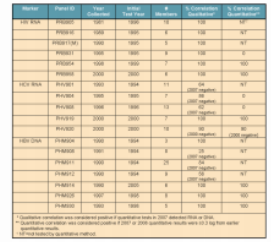
(For Plasma Stored at -70°C After Characterization)



QUANTITATIVE NUCLEIC ACID RESULTS

(For Plasma Stored at -70°C After Characterization)

TABLE 2. VIRAL NUCLEIC ACID STABILITY IN PLASMA
(Storage: -20°C Before 1997, -70°C After)



HIV SEROCONVERSION WESTERN Blot

Anti-HIV-1 Western blot in Panel PRB903 from 1990 (left panel) and 2007 (right panel). The antibody profile and intensity were retained for all members. These data are representative of Western blots for other HIV panels tested.

HCV SEROCONVERSION RIBA Results

RESULTS

- As previously reported, anti-HIV, anti-HCV and HBsAg are stable in plasma samples stored frozen at -20°C or colder for 13-20 years.[3]
- No trend toward deterioration over time of anti-HIV, anti-HCV or HBsAg is apparent in these seroconversion series.
- Plasma stored at -20°C for years demonstrates degradation of HCV RNA (most), HIV RNA (significant), and possibly HBV DNA. (1994 in-house HBV DNA assay was not validated/calibrated to current standards.)
- HIV RNA is still detectable in samples stored at -20°C for years, though in much lower concentration than originally found. HCV RNA becomes undetectable in some samples.
- HIV RNA, HCV RNA and HBV DNA in minimally processed plasma are stable for at least eight to ten years after transfer to long-term storage at -70°C.

CONCLUSIONS

- The absence of a trend toward deterioration over time of anti-HIV, anti-HCV and HBsAg, and the literature precedents,[1,2] justify the setting of expiration at 25 years for minimally processed plasma, stored frozen and characterized for these analytes.
- HIV and HCV antibodies in plasma stored frozen produced equivalent staining patterns and intensity in Western blots and RIBA over 15+ years.
- HIV RNA, HCV RNA and HBV DNA in minimally processed plasma were also stable after long-term storage at -70°C.
- Serology tests in 2007-8 are more sensitive than those available in 1988-1996.
- Higher results seen in quantitative nucleic acid tests for HIV and HCV RNA may be due to improved sensitivity or calibration differences.

REFERENCES

1. Zhu et al., *An African HIV-1 sequence from 1959 and implications for the origin of the epidemic.* Nature 391:594, 1998.

2. Seeff LB, et al. *45 Year follow-up of Hepatitis C virus infection in healthy young adults.* Ann I

3. Garrett PE, Mille *plasma.* Poster, 24th Clinical Virology Symposium, April 27-30, 2005, Daytona Beach, Fl

http://www.seracare.com/Portals/0/Posters/AABB%20POSTER.pdf

StoreSmart WorkGroups

Strategic Delegation of Cold Storage Solutions	"Consumer Reports"		Temperature Tuning		Sample Management	Technical Design		Communication	
	Testing Protocol	Buying Guide	Temperature Guide	Alternates RTSS, Lyoph. LN2	Software, Cleanout guidelines, incentives	Best Operation Guide	HVAC optimizing & Integration	StoreSmart	EPP, Contracts, Labs, Incentives
CoChair	Leo Gumapas		Alicia Murchie		Kathy Ramirez Aguilar	Allen Doyle			
CoChair								Doyle, Ramirez, Gumapas	
Manufacturers	XX	X	x			x	X	X	x
Researchers	x	XX	XX	XX	XX	XX	X	X	XX
Operations		x	x	x	x	X	XX	X	X
Funding agencies	x	X			x	x	x	X	x
Utilities	x	x	x	x	x	X	X	X	X
Reclamation		x						X	x

Databases

- Improves sample access
- Expiration dates

Performance Monitors

- Power diagnostics—Predictive Failure
- Energy conservation 30-50% wasting 30%
- Some PM low cost

Next Steps

- Sign Up
- Select focal areas, Scoresheet On-line?
  - Join a workgroup?
- Conference calls January, February.
- Enroll Leadership, Managers, PI's
- Intermediate assessment, March

- Contest close August 31

Questions?