Read My Poster:

Tips and Tricks to Creating Effective Scientific Posters

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Pediatric Academic Society Meeting
Washington DC 2013

Children's National Medical Center®

Disclosure

- The authors will reference norms based on local experiences & literature
- The authors have no financial relationships with any products described

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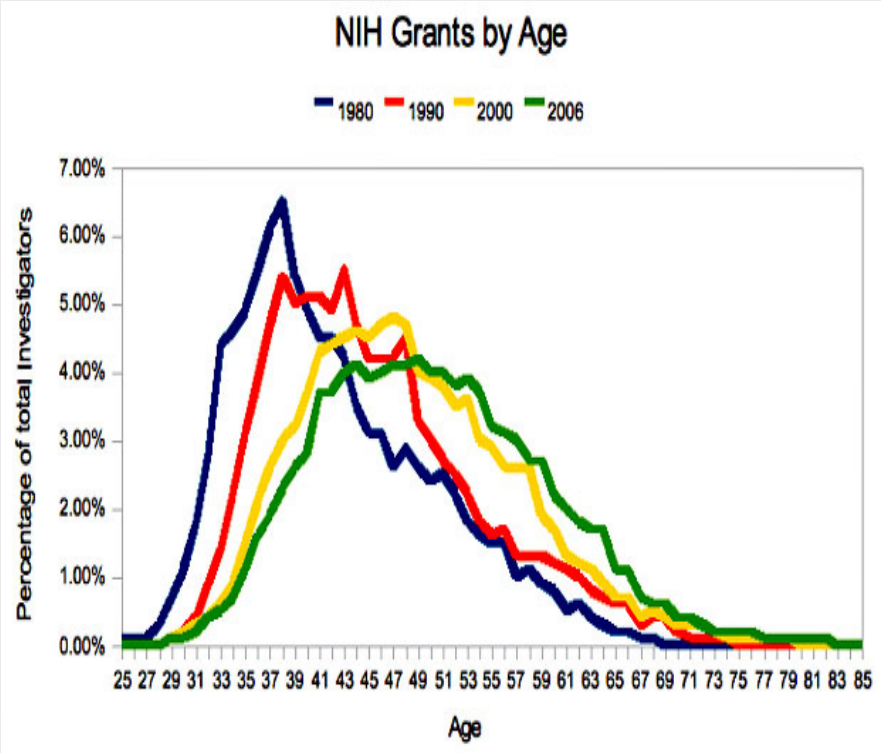
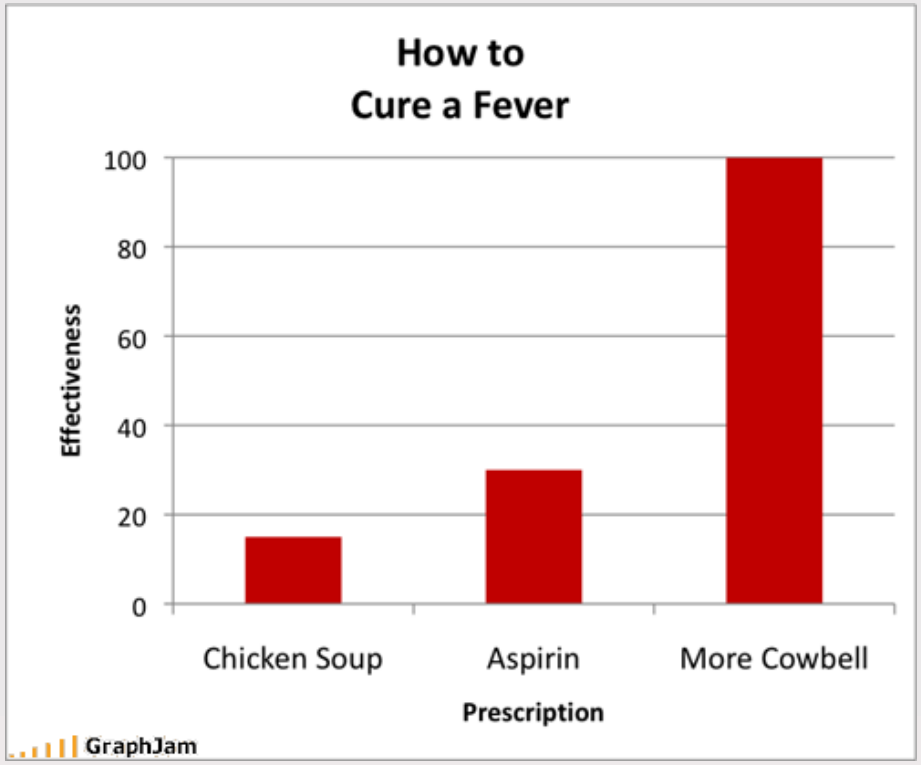
A *VISUAL* mode of communication





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Purpose of Poster Sessions

- Exposure
- Feedback
- Collaboration
- Network
- Advocate for Your Work

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Workshop Goals

- Discuss key factors for
  - Creating a visually effective poster
  - Engaging your audience

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Demographics

- Practice Level
- Practice Setting
- Prior Experience
- Area of Study

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Poster Design

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The Goal

- Engage as many people as possible in a short time period
- Deliver *clear*, highly *visual* message
  - Illustrated abstract

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Successful Poster Design

- **Focused** Single, clear message
- **Structured** Use headings, steer viewer
- **Visual** Abstracts TELL, posters SHOW
- **KISS** Avoid saturation
  Avoid making viewer work

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Content

- Title, Authors, Affiliations, Logos
- *Abstract*
- Introduction
  - Background
  - Significance
  - Objective
  - Hypothesis
- Materials & Methods
- Results
- *Limitations*
- *Discussion*
- Conclusion
- *Future Directions*
- *References*
- Acknowledgements

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Layout

- **Title Banner**
- **Columns** Moves reader left → right
- **Text** 20%, marginalize
- **Graphics** 40%, centralize
- **White Space** 40%, rest eyes
- **Colors** Use set color & template scheme

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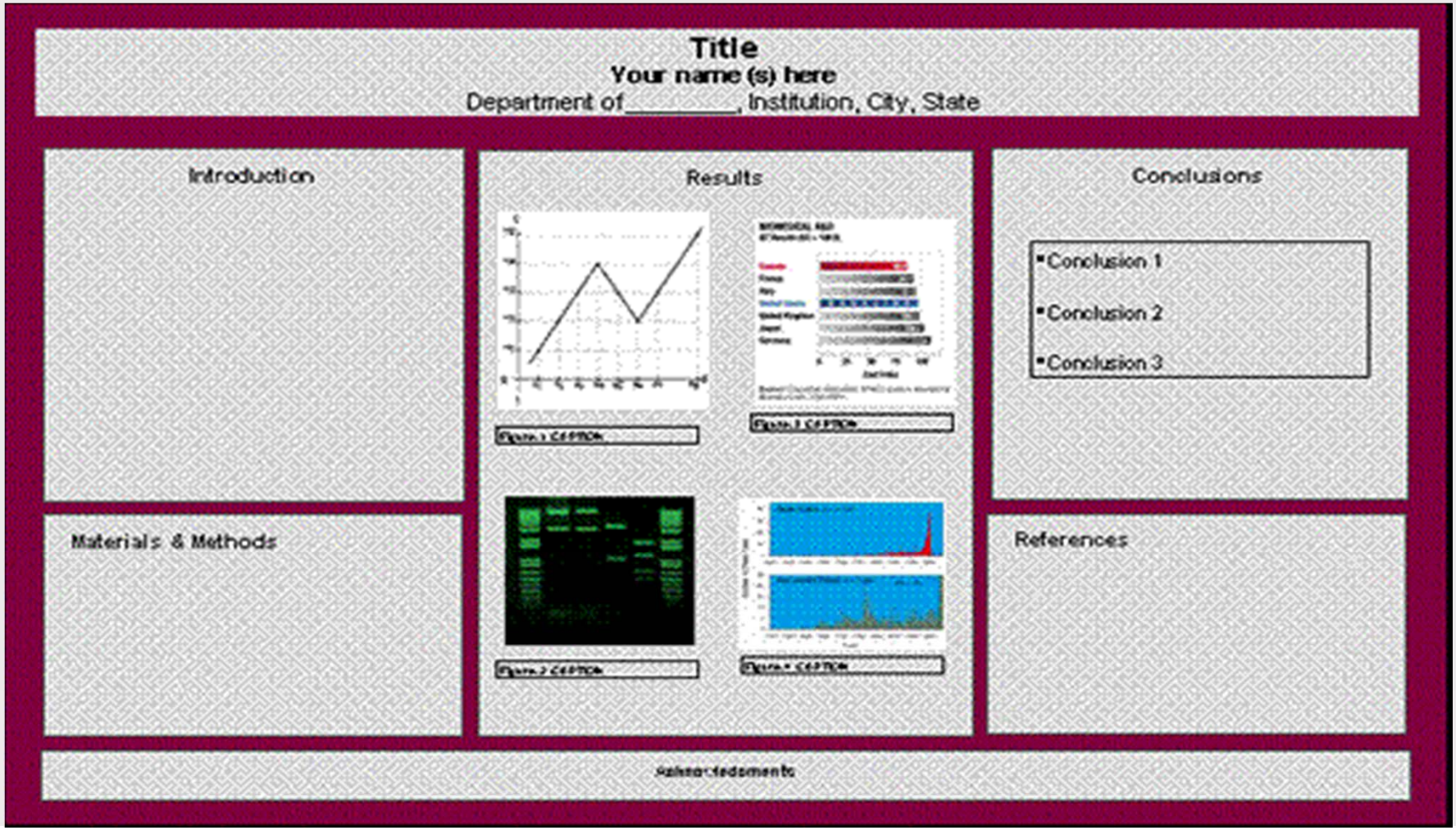
Sample Layout



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Font Size

- Readability
  - 3ft to 6ft
  - Font Size

    ≈ 5 x distance (feet)

- Large titles (**64-96pt**)
- Author/affiliation (**32-48pt**)
- Header (**32-48pt**)
- Text (**32pt**)
  - Bullets
  - Few lines/block
- Caption (**18pt**)

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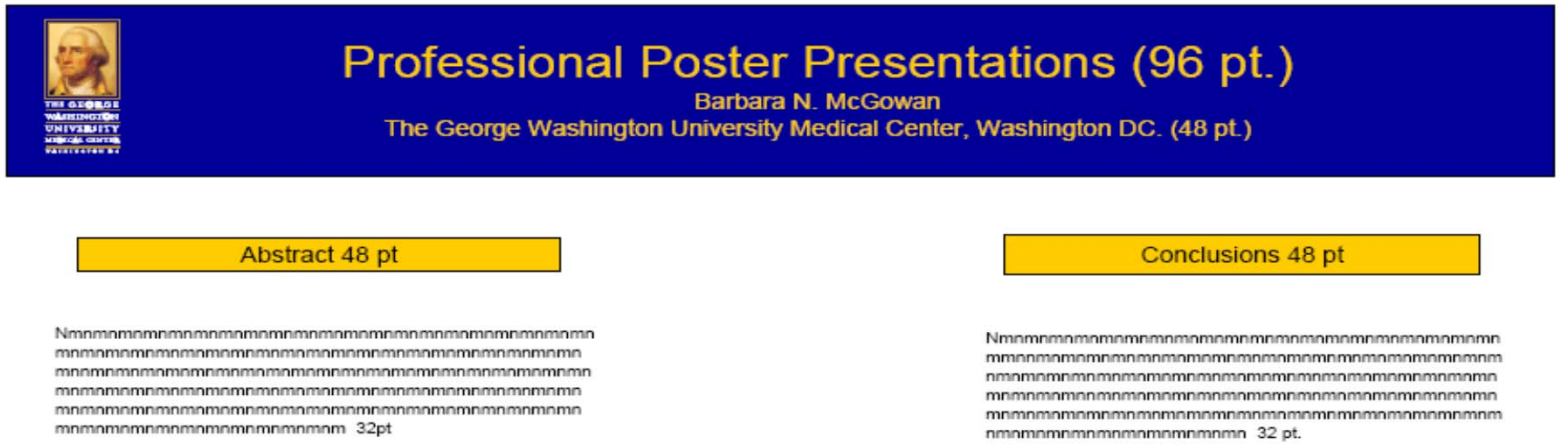
Font Size



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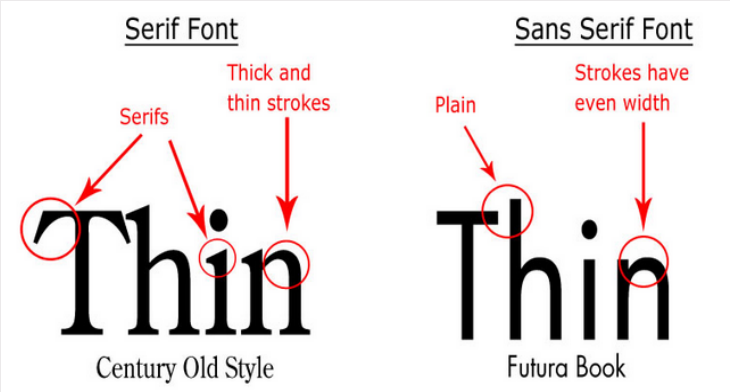
Fonts & Formatting

- Font types



BONDI
Century
Garamond
Georga
Times New Roman

Arial
Futura
Impact
Myriad
Tahoma

  - Serif: moves reader left to right, text
  - Sans serif: attention-grabbing, headers
- Use common fonts

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Fonts & Formatting

- Limit **bold**, *italics,* ALL CAPS
- Capitalization
- Consistency is key!!
- Left justify
  - Justifying text adds space between words to align text to both margins. While it may make your columns look cleaner, you actually make it harder for your audience to read.
  - Left justification, however, aligns all text to the left. While the right margin may not be aligned, you’ve made it much easier for your audience to read your text.

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Figures, Graphs & Tables

- Centralize
- Emphasize
  - ~40% of space
  - Position & size
- Interpret
- Caption
- Relationship, not value
- Eliminate “Chart Junk”
- Avoid tables
- QR Codes

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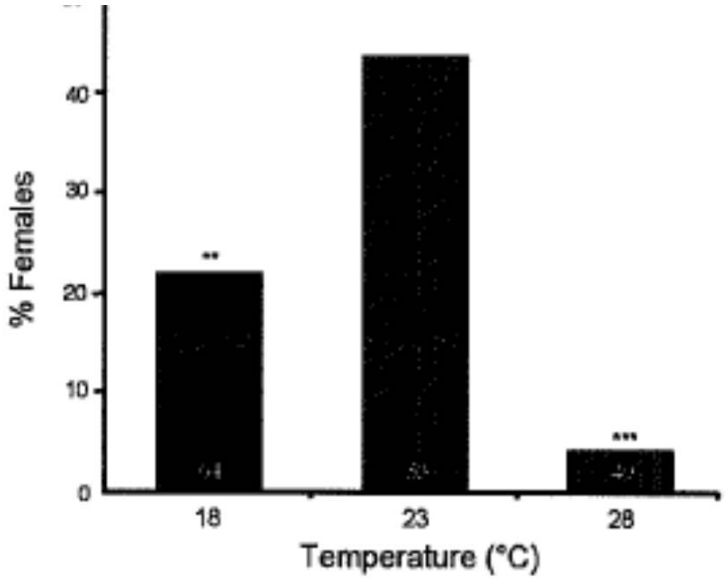
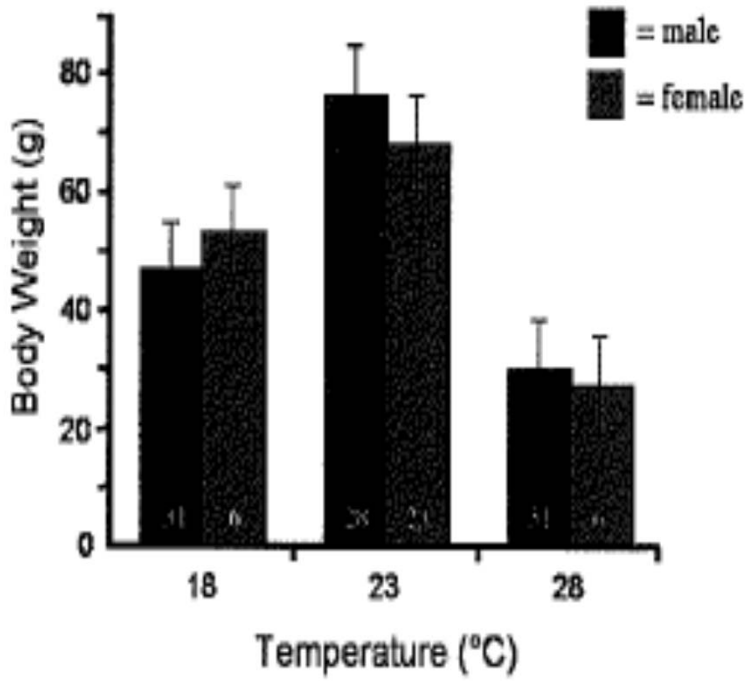
Interpret Your Graph



(**P < 0.01 and ***P < 0.001 represent significant deviations from a 1:1 male:female sex ratio)



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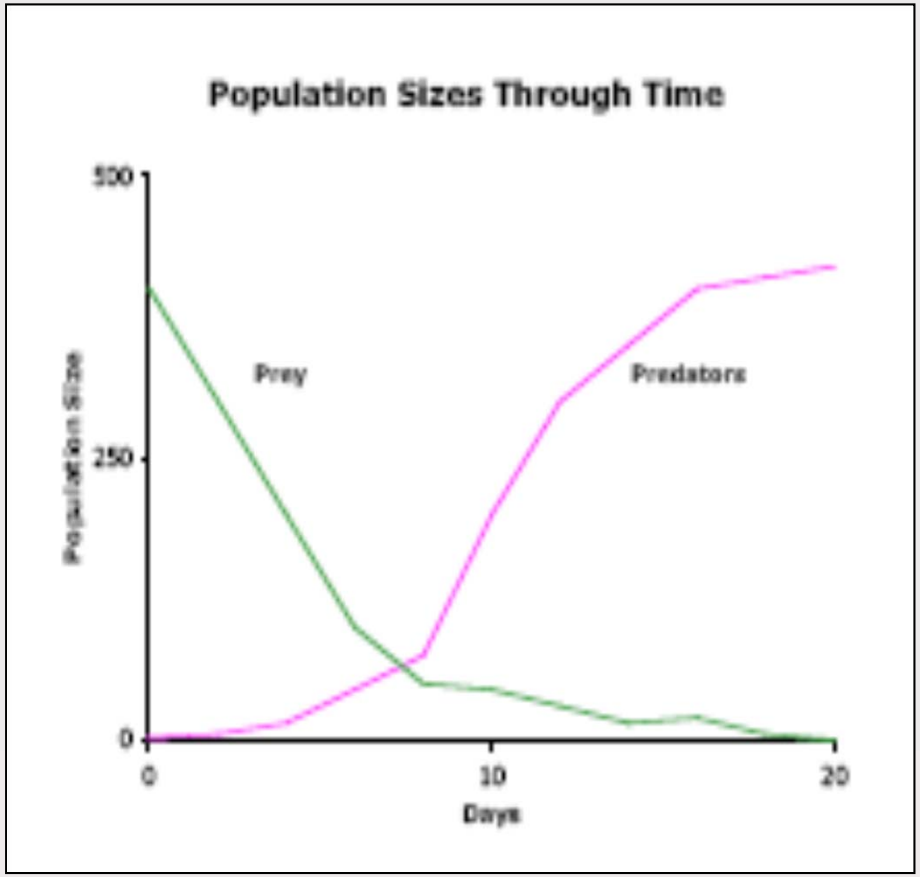
Eliminate Chart Junk



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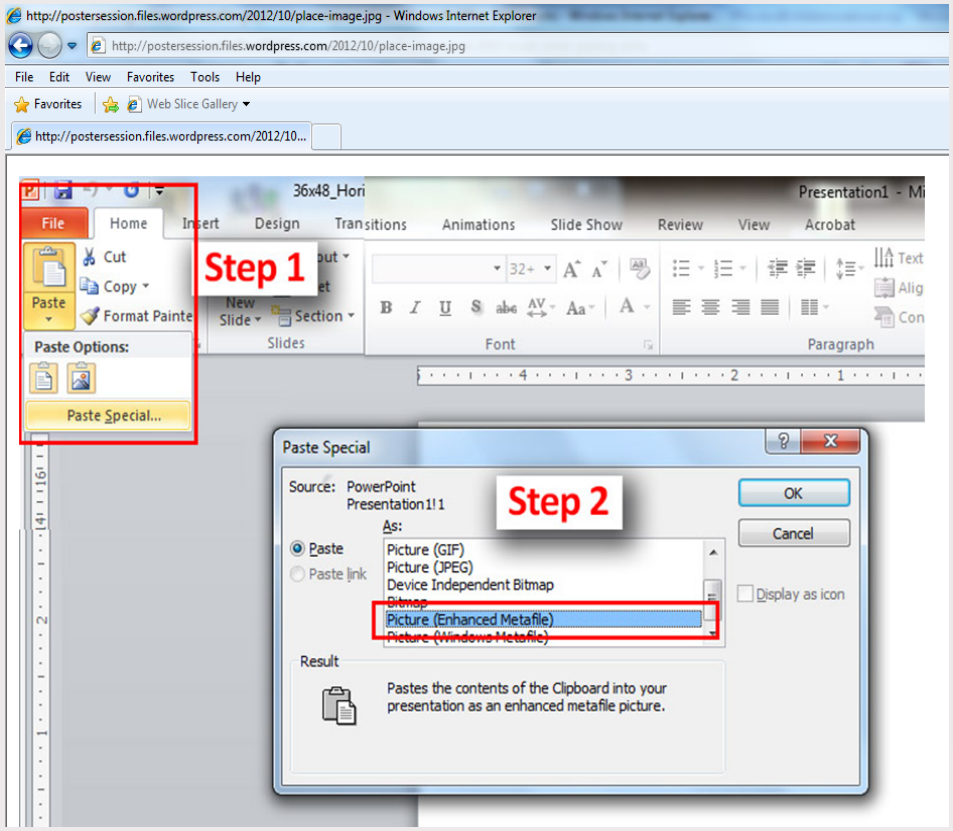
Inserting Graphics

- Cut & Paste
  - Allows editing
  - Formatting issues
  - Resolution issues
- Paste Special
  - MS Graph Chart Object
  - Picture
  - Enhanced Metafile



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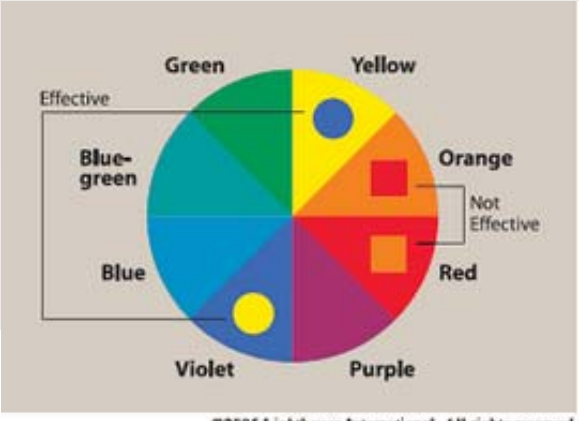
Color Scheme

- Visually accessible
- Lightness, hue, saturation
- Exaggerate contrast b/w foreground vs. background
  - Black & white is best!
- Inspiration: logo, graphic



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Troubleshooting

- Main points hard to find
  - Use headings
- Too much text
  - Use bullets
  - Print handout
- Text too small
  - Print line in MS Word & hang on wall to assess readability from 3'-6'
  - Use LCD projector to visualize at 100%

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Troubleshooting

- Poor graphics
  - Gain Excel/ Power Point/ Access proficiency
  - Save Excel graphs as objects (not screenshots)
- Poor image resolution
  - Save as **jpg**, tif, eps
- Poor organization
  - Feedback, feedback, feedback
  - Colleagues, relatives & friends

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Material Considerations

- Size
- Materials
  - Paper (Regular vs. Glossy)
  - Laminated paper (Matte vs. Glossy)
  - Fabric
  - Posterboard
- Travel restrictions/ logistics
  - Poster tube
- Shipping
- Local printing

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Resources

- Logos & Templates
  - Institutional Public Relations & Marketing

- Vendors
  - In-house
  - External
    - Poster Session (Megaprint)
    - Make Signs

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Group Activity #1: Critiquing Posters

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Poster #1

Bronchopulmonary Dysplasia (BPD) and Neurodevelopmental Outcomes (NDO) at 18 Months in Very Low Birth Weight (VLBW) Infants

and [2]Child Development, Children's National Medical Center and George Washington University, Washington, DC, United States.

Introduction

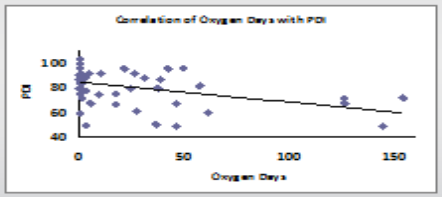
Poor neurodevelopmental outcomes (NDO) are associated with bronchopulmonary dysplasia (BPD). However, the effect of BPD alone is difficult to assess given the multitude of complications in preterm infants. Infants with BPD who were <1500g at birth have increased risk for impairment in fine and gross motor skills, in addition to cognitive and language delay (1). Correlation of severity of BPD with NDO has not been established to date. It is not clear which component of BPD has the most impact on NDO. The currently structured grades of BPD are not classified based on the intensity of respiratory support that a premature infant receives in the NICU. BPD has been classified into mild (any O2 received for at least 28 days of life), moderate (low concentration of O2 <0.3 received by 36 weeks of postmenstrual age [PMA]), and severe (O2 >0.3 and/or ventilator support by 36 weeks of PMA) (2). This study evaluates the impact of different components of respiratory support on NDO.

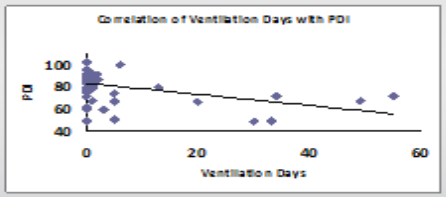
Methods

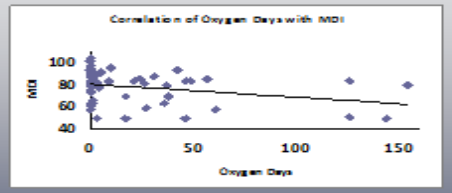
In order to evaluate the impact of different components of respiratory support on NDO, post-hoc analysis was performed on prospectively collected data from VLBW infants (<1500 g) enrolled in a study evaluating predictors of neurodevelopmental outcome in preterm infants. Data analyzed included grades of BPD and Bailey's Mental (MDI) and Psychomotor (PDI) Developmental Indices at 18 months corrected age.

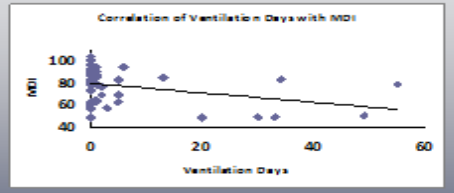
Results

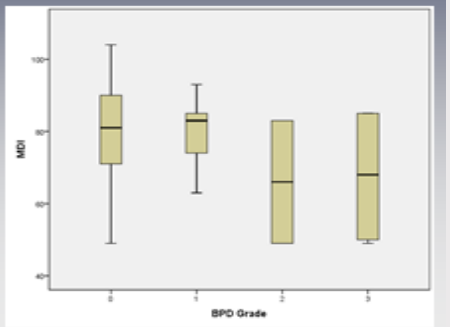
The study included 135 VLBW infants; BW=1013 +/- 290 g , GA= 28.1+/- 2.5 wk). BPD (using NIH definition, Banclari and Jobe, 2001) was identified in 54 infants. PDI but not MDI scores at 18 months significantly differed between BPD and non-BPD infants (mean 72.4±15.1 vs. 83.7±13.1, p=0.009 for PDI and mean 79.7±14.6 vs. 72.7±10.9, p=0.128 for MDI). However, there was no difference in MDI or PDI among the 3 grades of BPD. MDI and PDI correlated significantly with the duration of 0_2 use (p=0.03 and p=0.002, respectively) and the duration of mechanical ventilation use (p=0.009 and p=0.001, respectively). Duration of CPAP use did not correlate with MDI (p=0.065) but correlated with PDI (p=0.03).

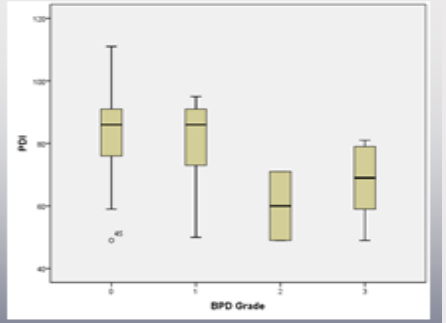












Conclusions

- BPD is associated with adverse neurodevelopmental outcome (NDO).
- The currently used classification of BPD does not reflect severity of future NDO.
- Duration of ventilator and O_2 use are of a more significant importance for NDO.

References

1Anderson PJ, Doyle LW. Neurodevelopmental outcome of bronchopulmonary dysplasia. Semin Perinatol. 2006;30(4):227-232

2Jobe AH, Banclari E. Bronchopulmonary Dysplasia. Am J Respir Crit Care Med 2001; 163(7): 1723-1729

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Poster #2

Apoptotic Signaling in Viral Myocarditis: Potential Therapeutic Target

[2]Univ. of CO Health Sciences Center, Denver CO, [3]NIEHS, Research Triangle Park NC, and [4]NC State University, Raleigh NC

ABSTRACT

Background: Viral myocarditis is a severe disease, resulting in heart transplantation or death in 50% of patients. Exact mechanisms by which viral infection results in cardiac injury are poorly understood and treatments are ineffective. Reovirus infection is a well-characterized murine model of viral myocarditis. We previously demonstrated that apoptosis occurs in virus-injured heart tissue and inhibition of apoptosis (chemical inhibitors or caspase-3 deficient mice) is protective. **Methods:** We characterized the ability of a panel of myocarditic and nonmyocarditic reoviruses to induce apoptosis in primary murine cardiac myocytes and fibroblasts and correlated this with myocarditic phenotype *in vivo*. We characterized specific apoptotic signaling pathways activated in infected cardiac myocytes. We used oligonucleotide microarrays to obtain a comprehensive profile of altered gene expression in infected cardiac myocytes, discriminating between non-specific virus-induced alterations and those likely critical in the pathogenesis of viral myocarditis. **Results:** Apoptosis of cardiac myocytes *in vitro* was required for virus-induced myocarditis *in vivo*. Activation of the extrinsic (death-receptor) pathway was critical, evidenced by activation of caspase 8 following myocarditic viral infection and the protective effect of soluble death receptor treatment. Conversely, the intrinsic (mitochondria-related) pathway was dispensable, evidenced by lack of cytochrome c or SMAC release, preserved mitochondrial membrane potential, and no significant effect of bcl-2 overexpression. Microarray analysis revealed 88 transcripts with significant differential expression between myocarditic and non-myocarditic virus-infected primary cardiac myocytes. **Conclusion:** These studies suggest apoptotic signaling plays a critical role in viral myocarditis, identifies specific signaling pathways involved, and suggests potential targets for development of novel and effective therapies.

BACKGROUND

Viral Myocarditis: Clinical Implications

- Death or transplantation requirement in 10-20% children, 50% adults
- Progression to chronic dilated cardiomyopathy in 10-20%
- Sudden unexpected death in young athletes

Key Problems

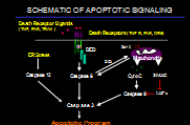
- Multiple viruses cause myocarditis
  - Enteroviruses, Adenovirus, Influenza, Herpesviruses (CMV, EBV), HIV, Hepatitis B & C, Parvovirus, Rubella, Rubeola....
- Mechanism of virus-induced damage to target cells/tissues unclear
  - Early: Direct virus-mediated cytotoxicity to myocyte and vascular endothelium
  - Late: Cellular, humoral and autoimmune responses against viral and cardiac antigens
- Therapies, suboptimal or nonexistent

Reovirus Model of Viral Myocarditis

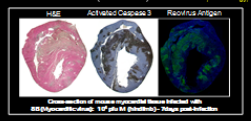
- Respiratory Enteric Orphan Virus
- Well-characterized murine model of viral myocarditis
- dsRNA virus with segmented genome
  - Excellent for analysis of viral pathogenesis
  - Many strains characterized as low or high myocarditic potential
  - Myocarditic potential not explained by viral replication efficiency
- Cardiac injury due to direct viral injury, not secondary immune phenomena

Apoptosis in the Heart

- Apoptosis is a mechanism of cell death distinct from necrosis with characteristic morphologic and biochemical features

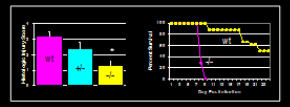


- Apoptosis has been implicated in noninfectious cardiac diseases.
- We previously demonstrated co-localization of myocardial injury, apoptosis, and viral infection in vivo (mouse heart): *DeBiasi et al, J Virology, 2004*



Cross-section of mouse myocardial tissue infected with 88(Myocarditic strain) 10^7 pfu IM (Ventricle) - Stage post-infection

- We previously demonstrated that inhibition of apoptosis (using chemical inhibitors or caspase-3 knockout mice) is protective against viral myocarditis in vivo: reduction in cardiac injury and prolonged survival. *DeBiasi et al, J Virology 2001, 2004*



EXPERIMENTAL GOALS

1. Establish virus-induced apoptosis as a key determinant of myocarditic phenotype utilizing a panel of myocarditic and nonmyocarditic viruses to infect primary cardiac cells
2. Identify cardiac cell type-specific responses involved
3. Delineate specific apoptotic signaling pathways activated in primary cardiac cells in setting of myocarditic viral infection
4. Identify novel signaling pathways acting as critical determinants of myocarditic phenotype (microarray)
5. (Future) Target discovered pathways as potential therapeutic strategy using genetically altered mice, pharmacologic inhibitors

METHODS

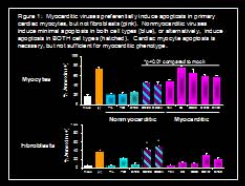
Apoptotic Signaling

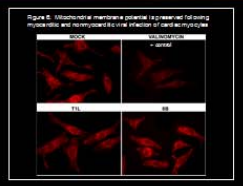
- Cells: Primary murine cardiac myocytes and fibroblasts
- Viruses:
  - Myocarditic: 88, T3A, (DB88, DB181, EW60)
  - Nonmyocarditic: T1L, T3D, (EW29, DB188, DB93A)
- Controls:
  - Mock-infection (negative control)
  - Staurosporine and Valinomycin (positive controls)
- Infections: Performed at MOI 100 with analyses performed at 48-72 hours post-infection.
- Techniques:
  - Assessment of apoptosis:
    - Flow-cytometry analysis of annexin binding (phosphotidyl serine inversion) and propidium iodide incorporation (viability)
    - Immunocytochemical analysis of caspase-3, -8, -9 activation (fluorescent, double label with Hoescht)
  - Assessment of mitochondrial-mediated pathway:
    - MitoShift flow cytometry analysis of mitochondrial membrane potential
    - Immunoblot of cytoplasmic and mitochondrial cell lysate fractions for evidence of cytochrome c and SMAC/DIABLO translocation
  - Competitive inhibition of death receptor-mediated signaling pathway with soluble Fc-coupled death receptors
  - Inhibition of mitochondria-mediated signaling pathway using Bcl-2 overexpression (GFP-linked adenovirus vector)

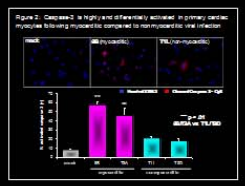
Microarray

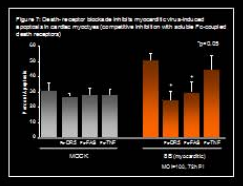
- Cells: Primary cardiac myocytes
  - Wildtype
  - Interferon α/β receptor -/-
- Viruses varying in myocarditic potential
  - Mock-infected controls
  - T1L and T3D - Nonmyocarditic
  - T3A and 88 - Myocarditic
- Single Time Point
  - 18 hours post-infection (preceding onset of apoptosis or interferon effects on viral replication)
- Data Analysis
  - Representation for 26,000 transcripts/chip
  - 10 chip experiment
  - GCOS®, GeneSpring®, NetAffy® pathway analysis

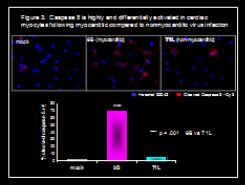
RESULTS

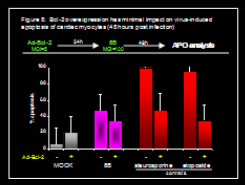


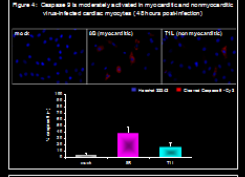


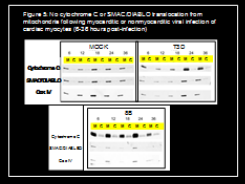












CONCLUSIONS

1. Virus-induced apoptosis of cardiac myocytes is necessary, but not sole requirement, for myocarditic phenotype
2. Fibroblast response to viral infection is also a contributory determinant of myocarditic phenotype.
   - Detailed characterization of cardiac fibroblast/myocyte interactions in the setting of viral infection is warranted.
3. Death-receptor signaling pathway appears critical for induction of apoptosis in cardiac myocytes and serves as determinant of myocarditic phenotype.
   - Caspase-8 is highly and differentially activated in setting of myocarditic as compared to nonmyocarditic viral infection
   - Inhibition of death-receptor signaling protective against virus-induced cardiac myocyte apoptosis
4. Mitochondria-mediated signaling pathway not critical as determinant of myocarditic phenotype
   - Moderate activation of caspase-9 in BOTH myocarditic and nonmyocarditic virus-infected cardiac myocytes
   - Preserved mitochondrial membrane potential
   - NO translocation of cytochrome c or SMAC
   - NO inhibition of apoptosis with Bcl-2 overexpression
5. Microarray analysis of myocarditic and nonmyocarditic virus-infected cardiac myocytes revealed 88 candidate transcripts with significant differential expression between groups. Potential for further insight into key determinants of myocarditic phenotype
   - Prominence of transcripts encoding proteins with roles in:
     - Transcriptional control
     - Protein-unfolded response
     - G-coupled protein receptor signaling
     - Circulation
     - Apoptosis
7. Identified pathways worthy of further investigation as novel therapeutic targets for treatment of viral myocarditis

FUTURE GOALS

- Detailed pathway analysis of gene/protein networks identified by microarray analysis
- Immunohistochemical validation in virus-infected murine cardiac tissues to establish biologic significance
- In vivo manipulation of identified targets using pharmacologic compounds and/or knockout mice, in attempt to modify the myocarditic response to viral infection
- Evaluation of human cardiac biopsy and explanted cardiac tissues from patients with viral myocarditis

GRANT SUPPORT

Current: NIH K08 AI052261-05
Principal Investigator Roberta L. DeBiasi

Prior: Infectious Disease Society of America Young Investigator Award
Veteran's Administration Research Career Development Award

BIBLIOGRAPHY

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Poster #3

THE UTILITY OF AN EDUCATIONAL VIDEO TO IMPROVE THE RATE OF SUCCESSFUL LUMBAR PUNCTURES IN THE PEDIATRIC EMERGENCY DEPARTMENT

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Children's National Medical Center

BACKGROUND

- Unsuccessful lumbar punctures (LPs) with repeated attempts cause patient discomfort, parental anxiety, and contribute to challenges in medical decision-making regarding administration of antibiotics and hospitalization.
- Reported rates of traumatic or unsuccessful LPs range from 10-35%.
- Reported modifiable risk factors for traumatic LPs include: advancement of the spinal needle with the stylet in place and lack of local anesthetic use (Nigrovic *et al*, *Ann Emerg Med* 2007).
- In infants <12 weeks of age, early stylet removal improved LP success rate (Baxter *et al*, *Pediatrics* 2006).
- In comparison to the lateral recumbent position, the vertical sitting position optimizes lumbar interspinous space width (Sandoval *et al*, *Emerg Radiol* 2004 & Fisher *et al*, *Anaesthesia* 2001).
- A reproducible educational intervention that increases the likelihood of LP success could improve patient care and could also decrease length of hospital stay and cost of care.

OBJECTIVE

- To assess the impact of an educational intervention in the form of a video on LP performance in children.

HYPOTHESIS

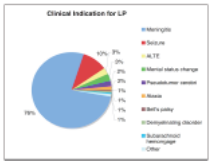
- An educational intervention in the form of a video demonstrating best practices (early stylet removal, use of local anesthetics, and use of the vertical position) and proper LP technique (including importance of spinal alignment) will increase the rate of successful LPs performed in a pediatric emergency department.

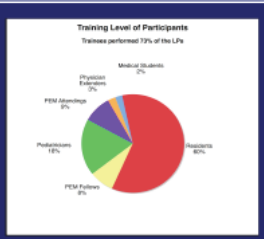
METHODS

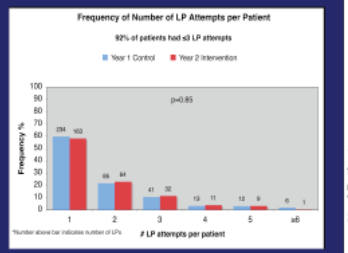
- Prospective cohort study of a convenience sample of all LPs performed in an urban pediatric emergency department over two years
  - Year 1: July 1, 2005 – June 30, 2006 (Control)
  - Year 2: July 1, 2006 – June 30, 2007 (Intervention)
- Patients with previous LP within 7 days, previous CNS surgery or VP shunt, previous CNS hemorrhage within 1 month, or vertebral malformations were excluded.
- A standardized data collection form was completed by the practitioner performing the LP after each procedure.
- Practitioners documented demographic (practitioner level of training, prior LP experience), clinical (reason for LP) and procedural factors (patient position, early stylet removal, use of procedural sedation, use of topical or injected anesthesia, lumbar space, parental presence, difficulty in palpating spine, patient movement) for each lumbar puncture attempt, up to the 5th attempt, and whether fluid was sent for laboratory evaluation.
- During year 1 of the study, LPs were performed in the usual manner.
- The educational intervention was instituted during year 2 of the study. All practitioners working in the emergency department were required to watch a 20-minute video demonstrating best practices and proper LP technique.
- Successful LP was defined as a cerebrospinal fluid specimen with <1,000 red blood cells per mm^3 (Shah *et al*, *Acad Emerg Med* 2003) on the final LP attempt.
- Data were analyzed using SPSS (version 12.0). Odds ratios (ORs) with 95% confidence intervals (CIs) and χ^2 tests were used to compare dichotomous variables, and the Student *t* test was used for continuous variables.

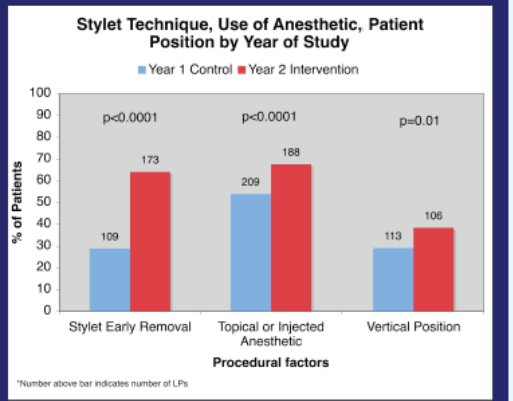
RESULTS

- Patients: 675 total lumbar punctures studied
  - Year 1 (Control) 395 (58.5%)
  - Year 2 (Intervention) 280 (41.5%)
- Gender: 369 (54.7%) male
- Age: 2 days to 21 years, median 2 months
- LP success rate: 71.6% (483/675)



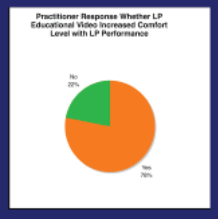


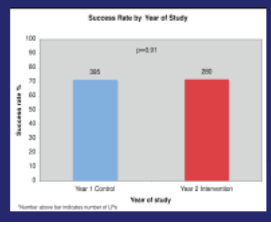




Procedural Factors Affected by Educational Video Year 2 vs Year 1

	OR	95% CI
Stylet early removal vs. left in place (n=648)	4.40	3.15-6.15
PGY 1 (n=81)	7.51	2.69-20.96
PGY 2 (n=166)	5.43	2.79-10.59
PGY 3 (n=135)	2.80	1.06-4.89
PEM Fellows (n=95)	1.69	0.54-5.95
Pediatricians (n=119)	11.47	3.82-34.44
PEM Attendings (n=56)	1.07	0.36-3.13
Topical or injected anesthetic used (n=668)	1.78	1.29-2.45
PGY 1 (n=86)	2.02	0.84-4.86
PGY 2 (n=170)	1.47	0.79-2.73
PGY 3 (n=135)	0.83	0.40-1.73
PEM Fellows (n=95)	1.49	0.36-6.18
Pediatricians (n=123)	3.78	1.19-12.01
PEM Attendings (n=55)	1.99	0.67-5.87
Vertical vs. lateral recumbent position (n=664)	1.52	1.09-2.10
PGY 1 (n=86)	1.06	0.46-2.59
PGY 2 (n=169)	1.30	0.67-2.49
PGY 3 (n=136)	1.37	0.61-3.07
PEM Fellows (n=34)	0.43	0.13-1.46
Pediatricians (n=122)	0.61	0.16-2.25
PEM Attendings (n=58)	4.69	1.52-14.50





CONCLUSIONS

- A one-time simple educational intervention in the form of a video on proper LP technique demonstrating best practices did not improve LP performance as assessed by success rates, despite the practitioner's perception of enhanced comfort with the LP procedure.
- The educational intervention was successful in changing the behaviors of practitioners in key LP procedural factors. In Year 2 of the study, all of the following procedural techniques were significantly more likely to have been used compared to Year 1:
  1. Early stylet removal
  2. Topical of injected anesthetics
  3. Vertical position
- In terms of early stylet removal, which was reviewed and advocated in the video, senior physicians were less likely to have adopted this technique in Year 2.
- In terms of using the vertical sitting position, which was advocated in the video as a method of potentially improving spinal alignment and optimizing lumbar interspinous space width, there was a trend towards more senior physicians adopting this technique in Year 2 than more junior physicians.
- Despite the success of the educational intervention in changing practitioner behaviors, we were unable to show an improvement in actual patient related outcomes, such as LP success rates, from this intervention.
- Potential reasons why we failed to see an improvement in LP success rates in Year 2 despite the utilization of "best practices":
  1. Lack of practitioner familiarity with the newer techniques advocated in the video intervention (early stylet removal, vertical position); hence, a learning curve effect for which one year may not have been a long enough period of study.
  2. More practitioners reported difficulty in palpating the spine with the patient in the vertical position than in the lateral recumbent position (19.0% vs 8.2%, p<0.0001, OR 2.82, 95% CI 1.61-4.26). This may have been secondary to lack of familiarity of the patient holders on how best to induce lumbar spinal flexion in the vertical position. As the vertical position was used more frequently in Year 2, this may have mitigated the effect of improved spinal alignment from the vertical position.
- There were no significant differences between Year 1 and Year 2 on the rate of successful LP by training level (except for PEM fellows) or on the number of LP attempts required per patient.

Poster #4

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IMPROVING MONITOR SAFETY ONE BEEP AT A TIME

Monitor fatigue is a phenomenon described in the literature and the popular media. Monitor fatigue seems to occur when there is an abundance of monitor alarms that are not clinically significant. Biomedical Engineering staff discovered that a 'workaround' had been used at central monitoring stations in response to perceived monitor fatigue. The action was to suspend monitoring of a patient, which posed a significant risk in the event the staff member forgot to resume monitoring. Biomedical Engineering staff collaborated with nursing leadership to educate nursing staff members on the dangers of the practice. Improvements were tracked; data was shared with staff on a monthly basis; and just-in time education or reminders continue as needed. The 'workaround' events decreased dramatically, thus improving patient safety.

A second quality improvement project related to monitoring is currently underway. A proposal has been approved to change the default monitor alarm volumes as well as settings, specifically the oxygen saturation parameters, to decrease alarms for which no clinical intervention is warranted. Additionally, the current age profiles do not closely reflect age-appropriate vital sign ranges. New profiles will replace the current ones to create more appropriate ranges for heart rate and respiratory rate parameters. The team working on this initiative includes nurses, biomedical engineers, and physicians. Monthly reports are generated on monitor response times and alarm counts. The team expects a significant decrease in the number of red alarms caused by a patient desaturating once the defaults have been changed. It is also presumed that if the number of monitor alarms decreases, the response times should become quicker.

Staff Education about the danger of the monitor "workaround"

S: Monitors suspended at central station when alarming (NOT silenced, but suspended altogether. i.e. black screen in patient room).

B: Suspending monitor alarms can result in harm to the patient who is in distress.

A: Suspending monitor alarms is DANGEROUS:

- staff will not respond to the patient who is alarming (make assumptions)
- staff may unintentionally forget to resume monitoring

R: Educate RNs & PCTs to avoid this unsafe practice!

Example of "workaround" report

Unit	Baseline Months	Baseline Counts	# of Silence Workarounds	Pts. *Not Safe
[illegible]	[illegible]	[illegible]	[illegible]	N/A
[illegible]	[illegible]	[illegible]	[illegible]	N/A
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	N/A
[illegible]	[illegible]	[illegible]	[illegible]	N/A
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	N/A
[illegible]	[illegible]	[illegible]	[illegible]	N/A
[illegible]	[illegible]	[illegible]	[illegible]	N/A
[illegible]	[illegible]	[illegible]	[illegible]	N/A
[illegible]	[illegible]	[illegible]	[illegible]	N/A
[illegible]	[illegible]	[illegible]	[illegible]	N/A

Please continue to educate your staff that placing the monitor in STANDBY from the central station for the purpose of silencing the alarm is **not a safe practice**! Not only does this not allow the nurse assigned to the patient to be notified of the alarm, but it actually stops the monitoring of the patient for a period of time.

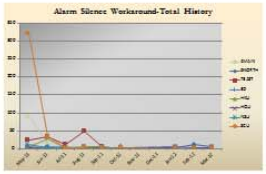
Proposed Reconfiguration to Acute Care Monitors

	Current Settings	Proposed Settings
Volume	8 in patient rooms	↓ to 3; Off on NSU, where verification of patient status can be done via video
O_2 Saturation Parameters	100 high / 94 low; 92% Desat limit	100 high / 90 low; 88% Desat limit
Profiles	Neo: up to 1 month of age	New profiles to be modeled after NIH age appropriate vital sign ranges (below)
	Pediatric: 1 month- 9 years	
	Adult: > 9 years	
	Comfort Care: Used for end of life care	

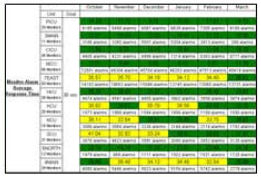
Age	Weight (kg)*	Pulse (bpm)	Respirations (/min)
Newborn	3.3	100-160	30-60
6 months	7	110-160	24-38
1 year	10	90-130	22-30
3 years	14	80-125	22-30
5 years	18	70-115	20-24
10 years	33	60-100	16-22
12 years	40	60-100	16-22
14 years	50	60-100	14-20

*Weight is approximate median of boys and girls combined.

Use of Alarm Suspend Workaround



Monthly Report of Monitor Alarms & Response Times



Unit	Shift	October	November	December	January	February	March
PICU		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekdays)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekends)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CICU		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekdays)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekends)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NICU		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekdays)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekends)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PICU		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekdays)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekends)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CICU		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekdays)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekends)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NICU		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekdays)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekends)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PICU		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekdays)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekends)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CICU		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekdays)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekends)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NICU		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekdays)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(Weekends)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

These interventions, occurring simultaneously, could have an important positive impact on patient safety, improved staff response to monitor alarms, patient and family satisfaction, and decreased staff fatigue related to monitor alarms.

Future plans include the creation of a Monitor Oversight Committee that will guide the use, configuration, and ongoing staff education regarding monitors.

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Poster #5

Improving Communication with Limited English Proficiency Families

Division of Hospitalist Medicine[1], 7 East Medical Care Unit[2], Division of Pulmonary and Sleep Medicine[3], Children's National Medical Center, Washington, DC

BACKGROUND

- Over 25.6 million (8.1%) Americans have LEP, i.e. individuals whose primary language is not English, and with a limited ability to read, speak, write or understand English
- Health care access, quality, and satisfaction are lower for LEP patients and families who do not receive interpreter services
- Inadequate interpreter use is common among inpatient and outpatient healthcare settings, likely due to resources, process issues, and clinician attitudes
- Bilingual providers are the ideal solution, but they are a limited resource
- Face-to-face and telephonic interpreters are also available, but are underutilized

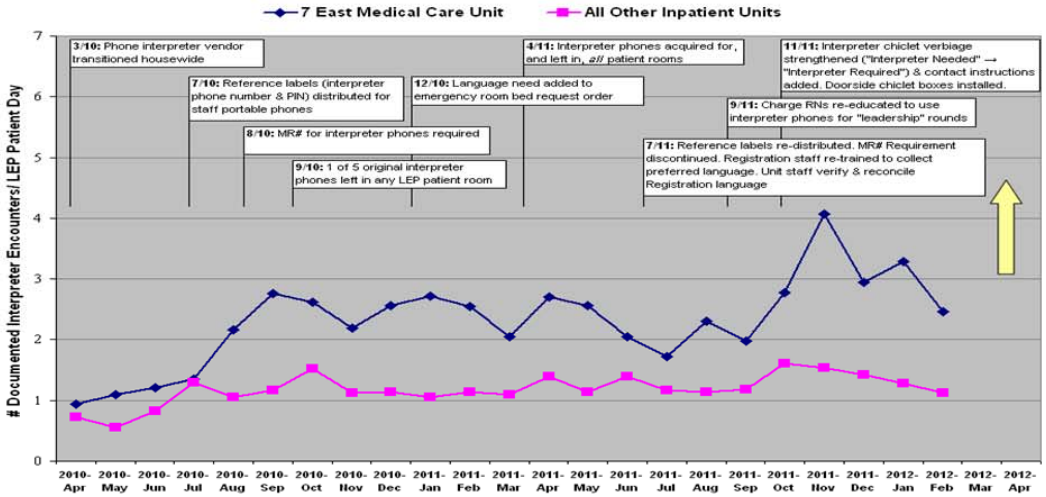
OBJECTIVES

- Global Aim: Improve overall satisfaction of families with limited English proficiency (LEP)
- Specific Aim: Increase overall interpreter usage to ≥3 documented encounters/ estimated LEP patient day

METHODS

- Population
  - Quaternary level, urban, pediatric academic medical center
  - 7 East Medical Care Unit, a 50 bed acute care, general medical unit home to multiple medical services
  - April 2010 - present
- Design
  - Multidisciplinary consensus of unit representatives
  - Key drivers, barriers, and potential solutions to consistent face-to-face and phone interpreter usage proposed
- Interventions (see Figure)
  - Awareness
  - Access
  - Accountability
- Data Collection
  - Monthly face-to-face and phone interpreter usage provided by Language Services Department
- Data Analysis
  - Process Measure: # Documented Interpreter Encounters (Face-to-Face + Phone)/ Estimated LEP Patient Day
  - Outcome Measure: Press-Ganey® satisfaction measures

FIGURE: OVERALL INTERPRETER USAGE



RESULTS

- Process Measure
  - These interventions have increased and sustained interpreter usage compared to other inpatient units (Figure)
  - Face-to-face interpreter use decreased as phone interpreter use increased
- Outcome Measure
  - Press-Ganey© data for Spanish-speaking families only became available in April 2011, and were insufficient to analyze impact on interpreter use and satisfaction with communication

LESSONS LEARNED

- Improving awareness of, access to, and accountability for interpreter usage can increase interpreter usage
- However, multiple clinical encounters still occur without interpreters
- Future efforts should explore
  - Further increasing staff compliance with interpreter use
  - Assessing family satisfaction with communication for when face-to-face interpreters are not readily available

ACKNOWLEDGEMENTS

- We would like to thank Jacqueline Cotto (Language Services Department) and Brenda Shepherd-Vernon MSW LICSW (Family Services Department) for their continued guidance, data, and support of this initiative.

Poster #6

Abstract #201216

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Carbapenem-Resistant Enterobacteriaceae in Pediatric Population: A Descriptive Analysis

[redacted]

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ABSTRACT

Background: The incidence of Carbapenem-Resistant Enterobacteriaceae organisms (CRE) in the US has been steadily rising since the first reported outbreak of carbapenem-resistant *Klebsiella pneumonia* and *Enterobacter* species in 2003. Risk factors for CRE colonization or infection in adults have been identified and published, but data is lacking in the pediatric population.

Objective: To describe epidemiologic and clinical characteristics of pediatric patients (pts) with CRE colonization or infection.

Methods: A retrospective cohort study was performed among pts hospitalized at Children's National Medical Center between 8/2009 and 8/2011 with a clinical or surveillance culture positive for CRE, confirmed by the modified Hodge test. Medical records for these pts were systematically reviewed.

Results: A total of 13 pts with CRE infection or colonization were identified during the study period. Pts were 6 months to 18 years of age, with an average of 4.2 years. The most common organism identified was *Klebsiella pneumonia* (61.5%) followed by *Escherichia coli* (15%) and *Enterobacter cloacae* (15%). The majority (77%) of pts had underlying gastrointestinal disease. In the 12 months prior to onset of CRE, all pts had prior hospitalization and 84.6% received 3 or more antibiotics. At the time of CRE, 77% had a central venous catheter, 77% had a gastrostomy tube, 62% were receiving total parenteral nutrition, and 85% had a history of infection or colonization with multi-drug resistant organisms including methicillin-resistant *Staphylococcus aureus* (MRSA) (15%), Vancomycin-resistant *Enterococcus* (VRE) (46%), or extended-spectrum beta-lactamase producing organisms (ESBL) (62%). The most common sites of infection were intra-abdominal (39%), and urinary tract (31%).

Conclusion: This is the largest study of pediatric CRE to date. This study highlights the prevalence of CRE in pts with GI diseases. Although prior antibiotic exposure and hospitalization were common in this pediatric population, further study is warranted to formally characterize these and additional risk factors.

BACKGROUND

Enterobacteriaceae are important pathogens in the setting of healthcare-associated infections. Third generation cephalosporins have traditionally been effective therapy for these pathogens. Carbapenems are reserved as an option for treatment of enterobacteriaceae with extended-spectrum beta-lactamase (ESBL) production. However, the first reported outbreak of carbapenem-resistant *Klebsiella pneumonia* and *Enterobacter* species occurred in Brooklyn, NY, USA in 2003. Subsequently, the incidence of carbapenem-resistant enterobacteriaceae (CRE) has increased. Published risk factors for CRE infection in adults include health care exposure and antimicrobials. However, data is lacking regarding the incidence of CRE in the pediatric population, as well as risk factors. Published data is limited to a few case reports, containing small numbers of clinical isolates, with minimal information regarding clinical presentation and risk factors for acquisition.

METHODS

- Retrospective cohort study conducted at Children's National Medical Center
- Study patients included those with a CRE organism isolated from specimens collected between August 2009 and August 2011
  - A CRE was confirmed by the Modified Hodge Test (Figure 1)
- Medical records were reviewed to extract the following information:
  - Demographics
  - Medical history and presentation
  - Preceding hospitalization
  - Preceding antimicrobial exposure
  - Presence of foreign bodies, intravascular or other devices
  - Use of Total Parenteral Nutrition
  - Microbiology identification and susceptibility testing
- Descriptive statistical analysis were performed

RESULTS

- 13 cases were identified and included in this study (**Table 1**)
- The most common organisms isolated were:
  - *Klebsiella pneumonia* (61%)
  - *Escherichia coli* (15%) and
  - *Enterobacter cloacae* (15%)
- Clinical features identified as potential risk factors (**Table 2**) included:
  - Underlying gastrointestinal disease (77%)
  - Prior hospitalization (100%)
  - Presence of central venous catheter (77%) and /or gastrostomy tube (77%)
  - Receipt of 3 or more antibiotics (85%)
    - Classes of antibiotics received Included: beta lactam (100%), penicillin (100%), carbapenem (69%), aminoglycoside (77%), fluoroquinolone (61%), 3rd generation cephalosporin (61%), bactrim (46%)
  - Sources of infection included intra-abdominal (38%), urinary tract (31%), wound culture (23%) and blood (8%). An additional subset of patients were presumably colonized, with an organism isolated by rectal swab (31%).
- 11/13 patients were infected or colonized with other MDRO organisms:
  - 61% with Extended Spectrum Beta-Lactamase producing orgs
  - 46% with Inducible Beta-Lactamase producing orgs
  - 46% with Vancomycin-Resistant *Enterobacter*
  - 15% with Methicillin Resistant *Staphylococcus aureus*
- 77% had resolution of symptoms without complications following appropriate therapy
- No patients died

Figure 2. CRE Resistance Pattern

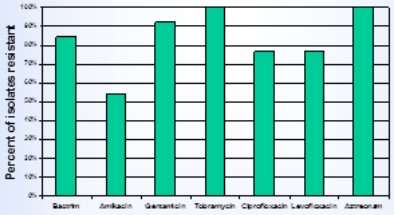


Table 1. Patient Characteristics

Patient Characteristics	N	%
Age:		
<1 year	2	15%
1-2 years	4	31%
2-5 years	4	31%
5-12 years	2	15%
12-18 years	1	8%
Ethnicity:		
Black	9	69%
White	2	15%
Hispanic	2	15%
Underlying disease:		
Gastrointestinal	10	77%
Cardiovascular	1	8%
Transplantation	1	8%

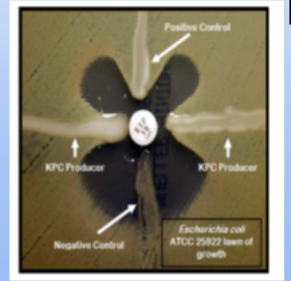
Table 2. Potential Risk Factors

Risk factors	N	%
Immunosuppression	3	23%
Prior Hospitalizations	13	100%
Residency in long term care	3	23%
Procedures:		
Gastrointestinal	11	85%
Transplant	1	8%
Central venous catheter	10	77%
Total parenteral nutrition	8	61%
Gastrostomy tube	10	77%
Number of prior antibiotics		
None	1	8%
1	1	8%
≥3	11	85%

CONCLUSIONS

- The incidence of infection and/or colonization with CRE is rising in the pediatric population
- CRE infections are concerning because of potential association with increased mortality, and high potential for transmission via mobile genetic elements.
- This descriptive study is the largest report of pediatric CRE to date.
- Similar to published risk factors in the adult population, prior hospitalization and prior exposure to multiple antibiotics seem to be common potential risk factors in the pediatric population.
- In contrast to the adult population, residency in long term care facilities or the intensive care unit were not common in this pediatric cohort of patients with CRE.
- The majority of patients in this cohort had underlying intra-abdominal disease, intravascular catheters, and/or gastrostomy tubes.
- Identification of epidemiological risk factors for CRE could assist in the identification, control and emergence of these organisms in the pediatric population.
- A case control study would allow for more formal analysis of risk factors and is in progress

Figure 1. Modified Hodge Test



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Presenting your Poster

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Know your Venue and Audience

- Different Poster Venues
  - Poster Symposia
  - Poster Platform
  - Large Exhibit hall

- Know Audience Demographics
  - Generalists vs Specialists
  - Trainee vs Junior Faculty vs Senior Faculty
  - Pediatricians vs Non-Pediatricians
  - Lay population, Media representation

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Body Language and Projection

- Good posture
- Energetic stance
- Eye contact
- Gestures

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Environment

- What do you need for setup?
  - Tape? Pins?
- What time do you setup and take down poster?

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Appearance

- Professional
- Comfortable
- Neat and well groomed

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Communicating

- Avoid “junk” language
- Listen to questions
- Practice managing Q&A
- Practice with colleagues

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What to Bring?

- Your poster!
- Tape or Pushpins
- Business cards
- Notepad for questions
- Poster reprints and/or references
- Water bottle

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And remember…

- Allow sufficient time for proofreading, editing, printing, and practicing!

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Group Activity #2 : Critiquing Videos

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- Poster Session (Megaprint)
- Make Signs
- Lighthouse International

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Questions?

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