





# Objectives

- Explain how a program of research can be a blueprint to improve health outcomes.
- Explain how patterned caregiving experiences improve clinical and neurological outcomes for preterm infants.

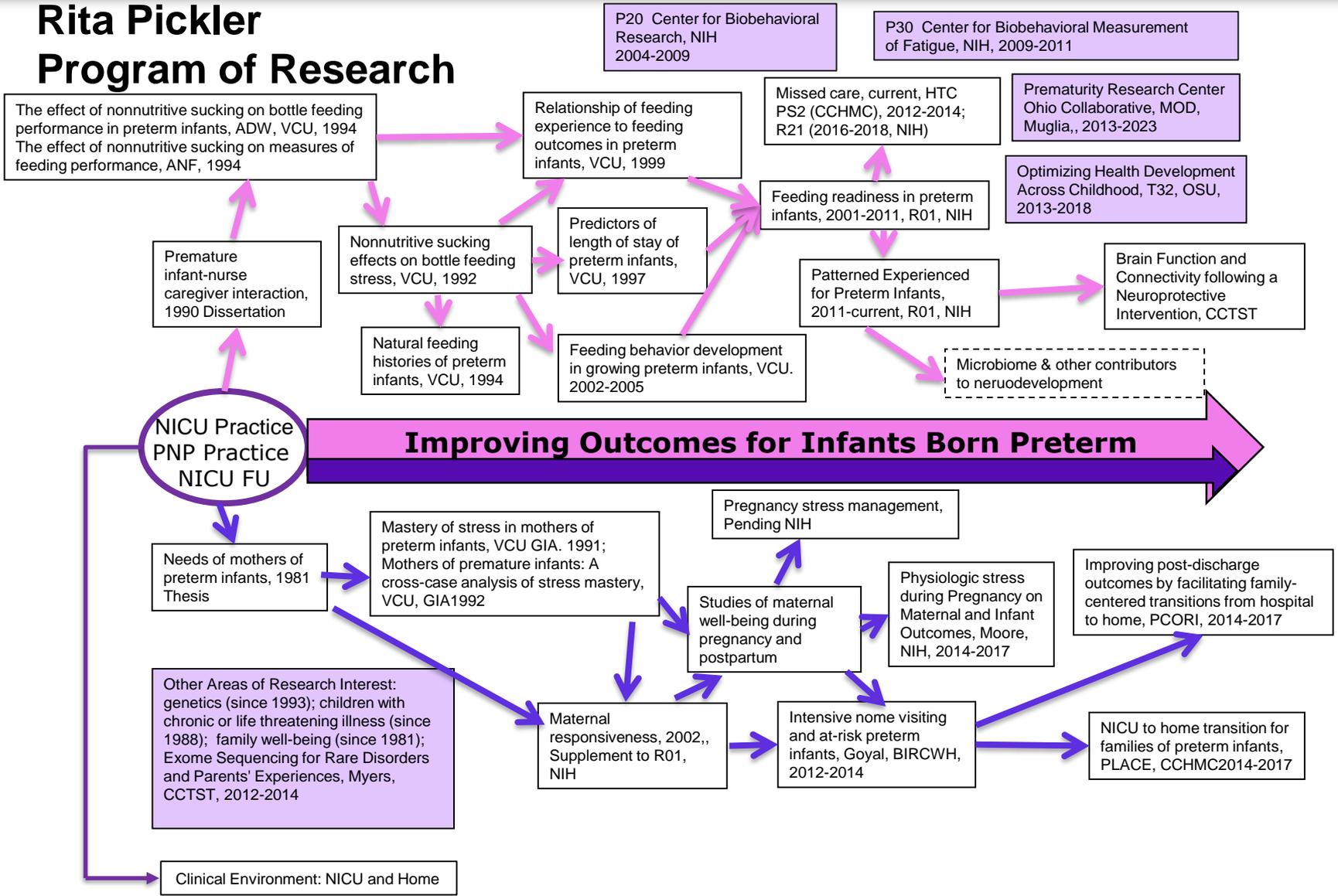


# A “Program of Research” Defined

- Term 1<sup>st</sup> used by philosopher of science Lakatos
  - Multiple programs coexist, each with theories immune to revision, surrounded by emerging theories
    - Extending a research program’s theories into new domains is theoretical progress
    - Experimentally corroborating theoretic reach is empirical progress
- Cohesive approach to sequencing a series of studies to efficiently and effectively build new knowledge
  - Broad enough to be cross cutting, narrow enough to be manageable, addresses a gap or gaps, and is fundable



# Rita Pickler Program of Research





# Benefits of a Program of Research

- Improved quality of care
- Increased chances of funding
- Increased contribution to nursing science
- Increased contribution to nursing practice
- Personal satisfaction



# Getting There

- Experience
- Motivation
- Education
- Persistence
- Humility
- Passion





Experience → Motivation



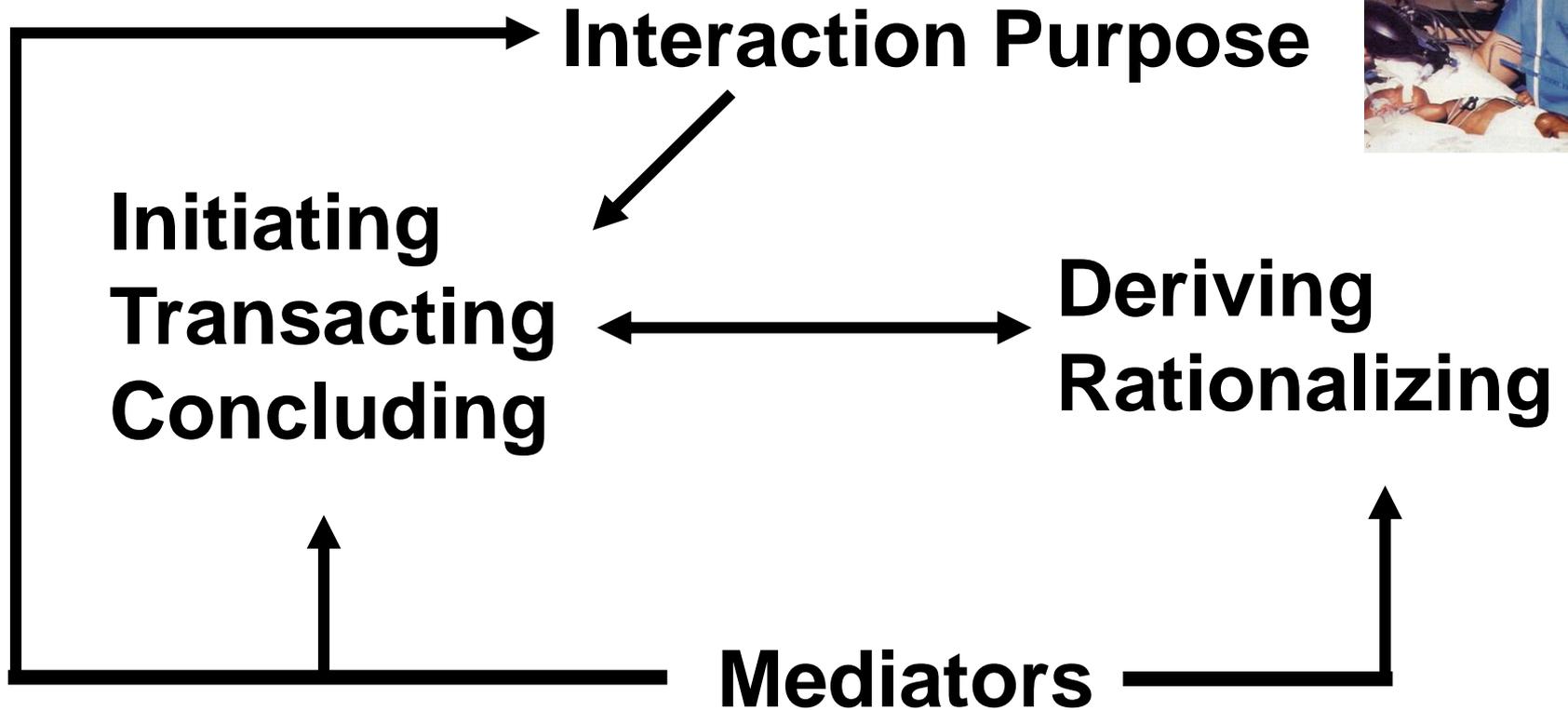


# Symbolic Interaction

- Behavior is a function of the meaning that it has for the person
- Meaning is derived from the interactions that one has with others
- Behaviors and their meanings are best understood by examination of the interactive process in which they occur and are developed
- Individuals possess unique behaviors and response that influence their interactions with others



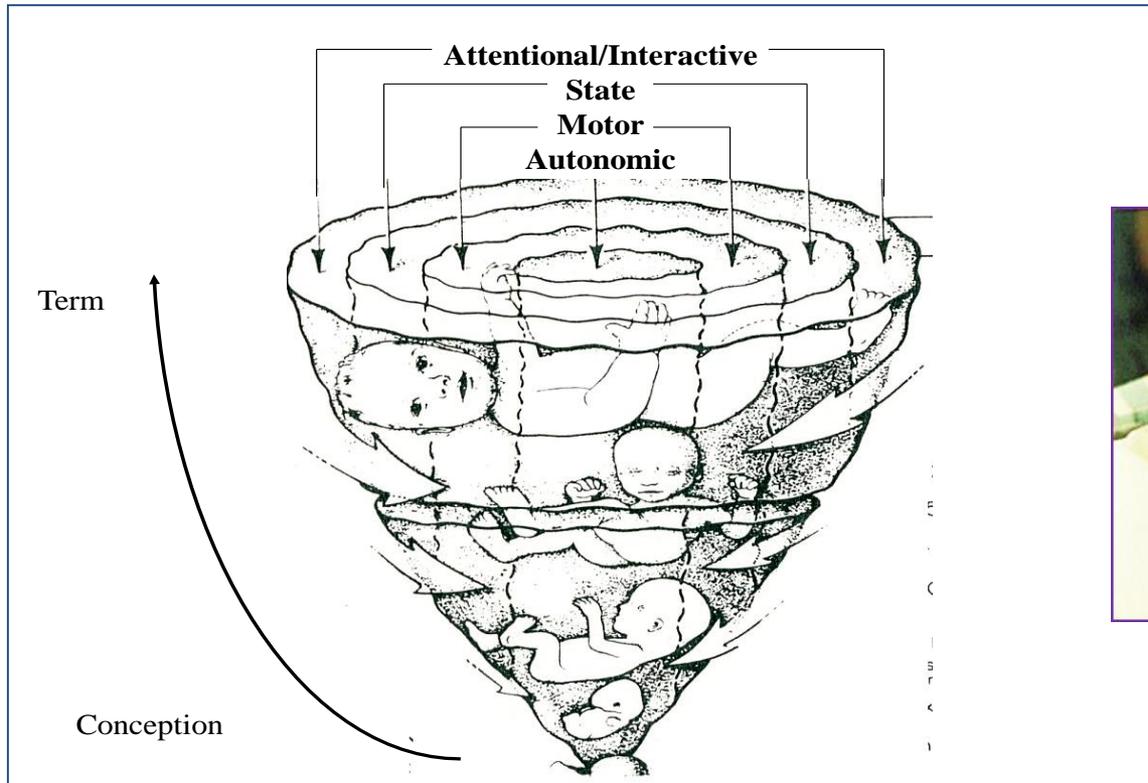
(Blumer, 1939)



# Acting and Reacting (Pickler, 1993)



# Synactive Theory of Development



(Als, 1981)



# Nonnutritive Sucking Studies

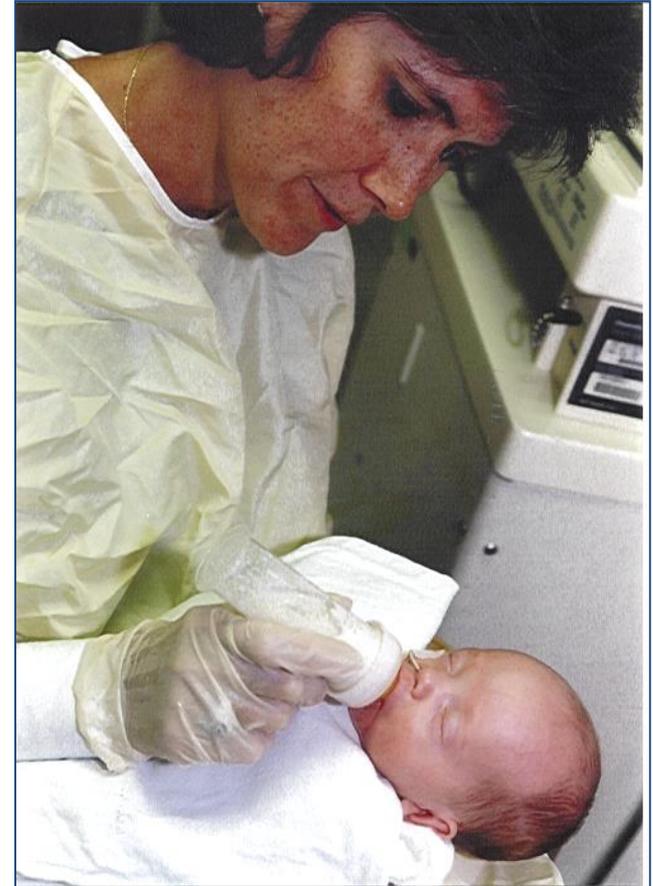
- The effect of nonnutritive sucking on premature infants' weight gain, energy expenditure and feeding readiness.
- Nonnutritive sucking effects on bottle feeding stress.
- The effect of nonnutritive sucking on bottle feeding performance in preterm infants.
- The effect of nonnutritive sucking on measures of feeding performance.
- Nutritive and non-nutritive study analysis





# Feeding Histories

- Natural feeding histories of preterm infants
- Descriptive study of feeding opportunities in preterm infants
- Recent opportunity to collaborate
  - R15 submitted to study feeding histories in infants born with congenital heart defects





# Feeding Readiness

- Transition from gavage to oral feedings is a major challenge for preterm infants
- Competence at oral feeding is a criterion for hospital discharge
- Few evidence-based protocols to guide clinicians
- Potentially short and long-term effects to trial-and-error approaches to oral feeding for preterm infants





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# Feeding Outcomes

- Maturity and feeding experience interact making the relationship of these variables to feeding outcomes more complex
- Behavior state affects outcomes in ways not entirely expected
- Predicting feeding outcomes for the most ill infants is more complex





# Clinical Outcomes

- As compared to infant receiving the least feeding experience, infants with the greatest feeding experience:
  - achieve full nipple feedings 16 days sooner and
  - are discharged home 13 days sooner.





# Feeding Skill Development

- Feeding skill development for parents and infants continues after discharge
- Large gaps exist in preparing parents for home
- Inadequate systems are in place for assessing skill development in the post-discharge period





# Persistence

***“Life is like riding a bicycle. You don't fall off unless you stop pedaling.”***

Claude Pepper



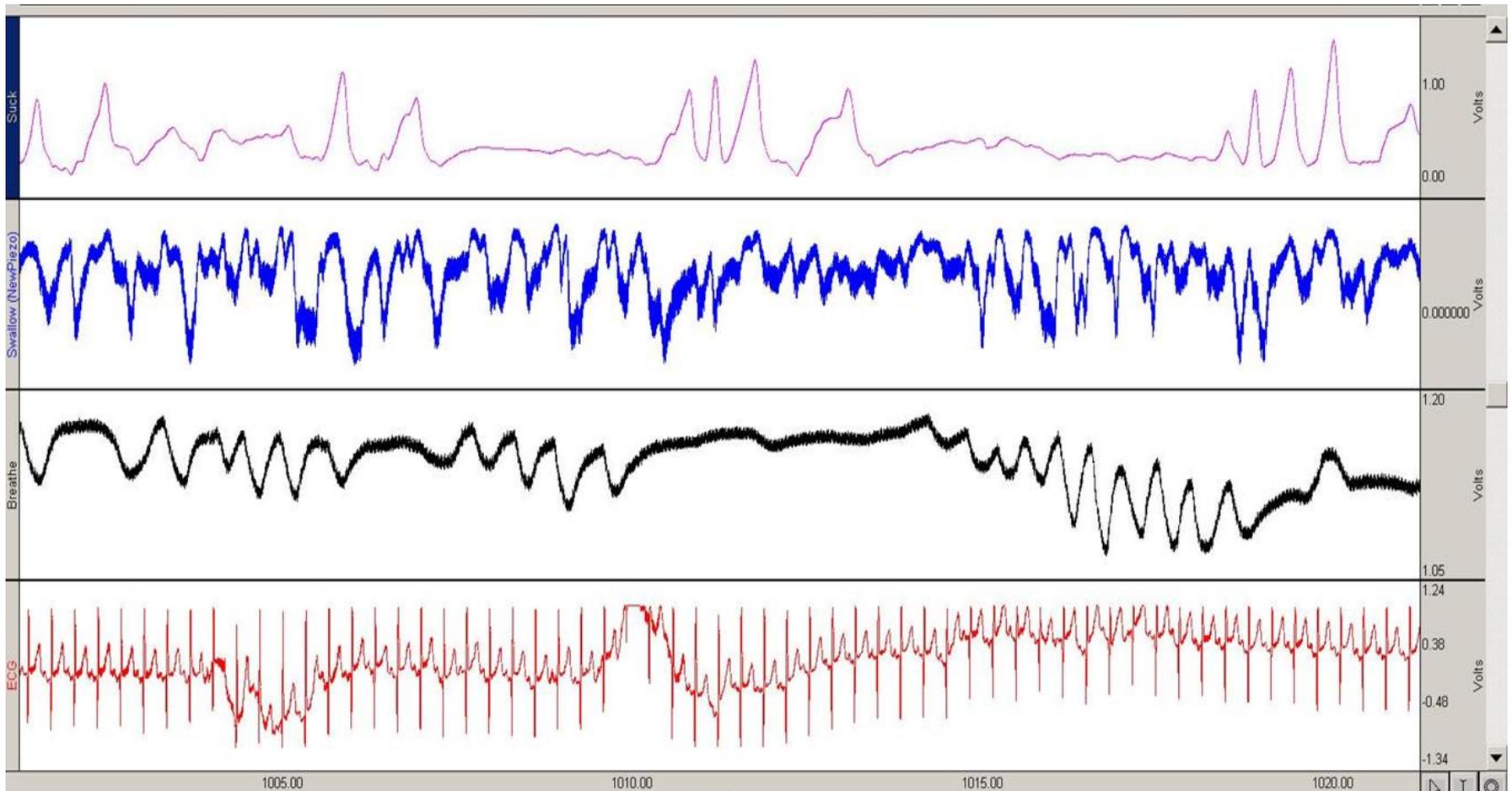


## PRO2: Major Findings

- Later starting and more opportunities to “learn” resulted in faster transitions from the start of oral feeding to full oral feeding (8-12 days versus 17 days) and earlier discharge (14-17 days versus 24-26 days)
- Later starting and more opportunities also resulted in better oral feeding skills
- Each missed oral feeding opportunity resulted in a day increase in time to achieve full feeds and a prolongation of NICU hospitalization over a day



# SSB and HR





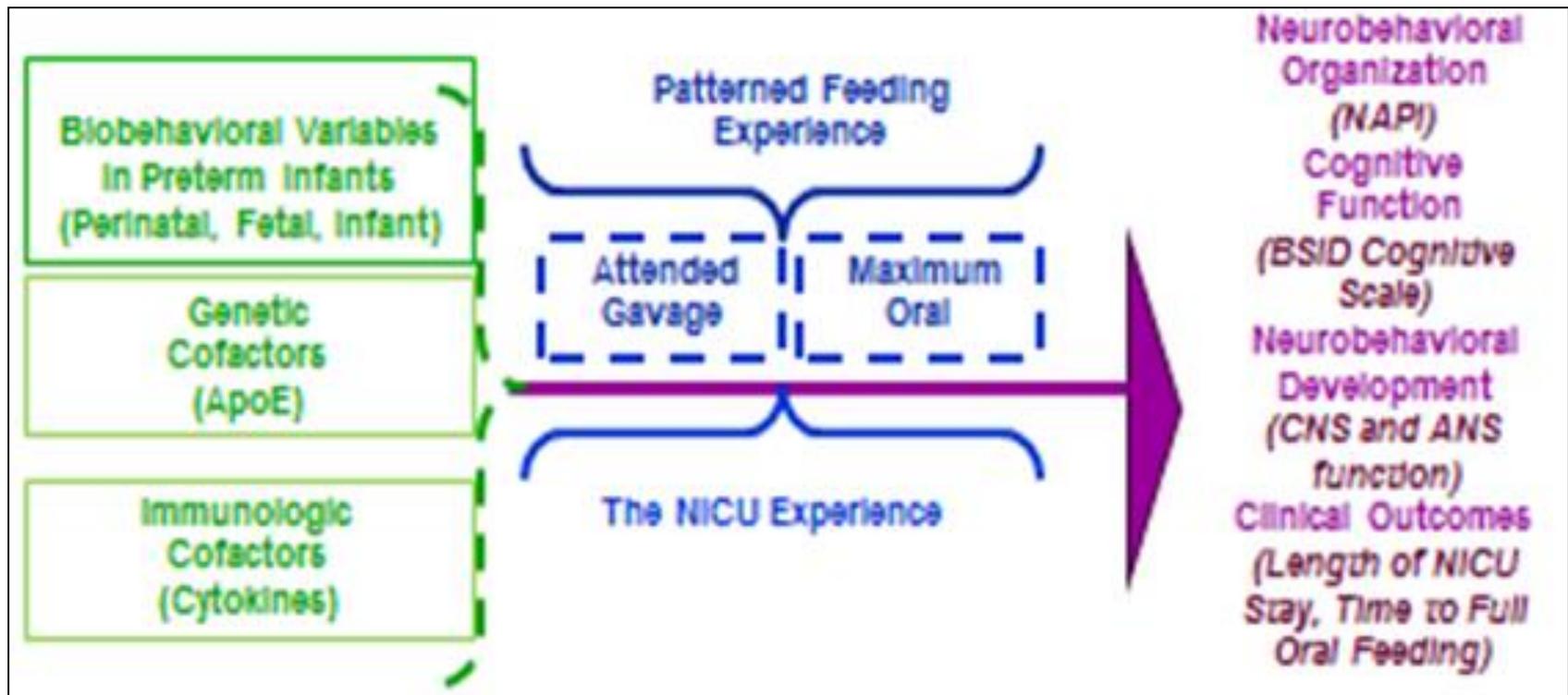
# Feeding and Neurodevelopment

- A preterm infant's experience is not predictable
- Caregiving should be patterned to neurologic expectation
- SSB parameters and coordination are neurologically driven
- ANS maturation can be seen as feeding becomes more mature





# Patterned Experience for Preterm Infants (PEPI)





# Methods

- RCT
  - Infants randomly assigned to intervention or control
  - Intervention links a tactile component to every feeding opportunity
- Serial neurobehavioral measures
  - Behavior organization (assessed by oral feeding skill development)
  - Long-term development





# Behavior Organization

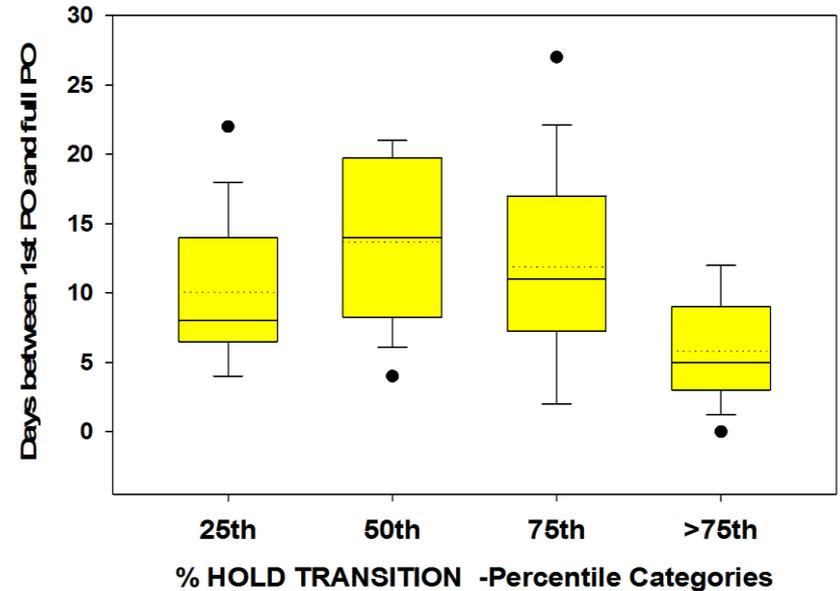
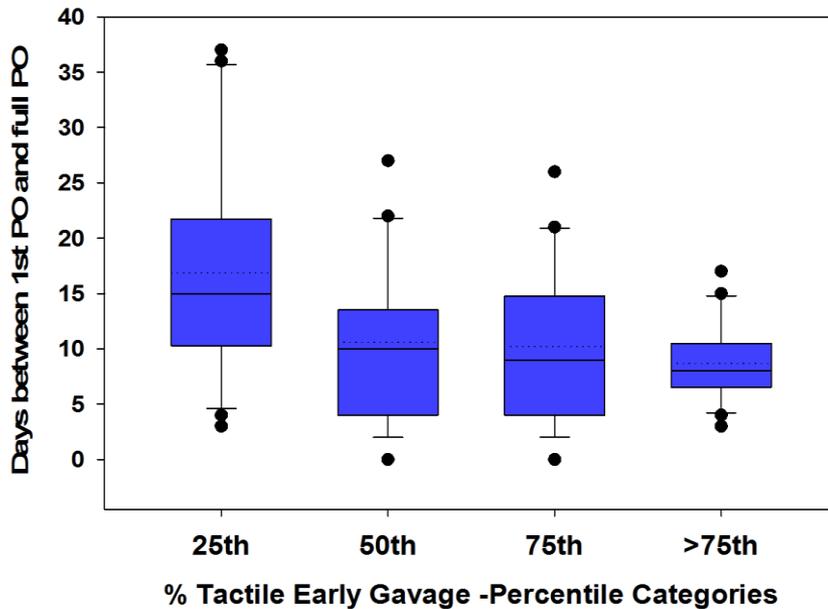


Figure. Median days between 1st and full PO by % tactile during early gavage

Figure. Median days between 1st and full PO by % hold during transition



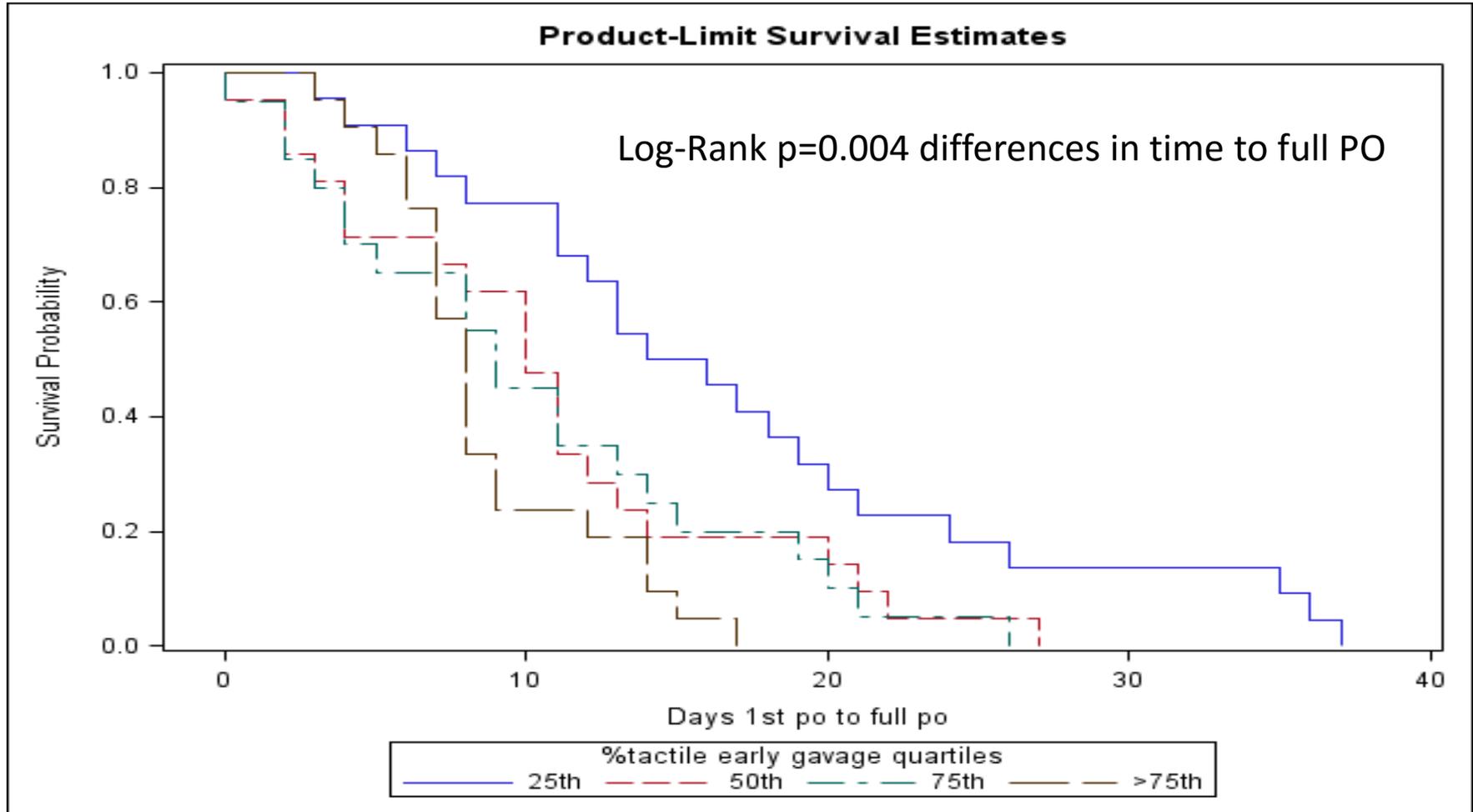
# Models: 1<sup>st</sup> PO to Full PO

Predictor: % tactile early gavage	Hazard Ratio	95% CI	p value
>75	5.5	2.1, 14.7	0.00007
50-74	4.1	1.6, 10.8	0.004
25-49	2.2	1.2, 4.2	0.016
<25	REF		
Predictor: % hold transition			
>75	REF		
50-74	0.31	0.15-0.68	0.003
25-49	0.23	0.11, 0.52	0.0004
<25	0.62	0.28, 1.37	0.23

Controlling for intervention group status, NMI at transition, sex, GA

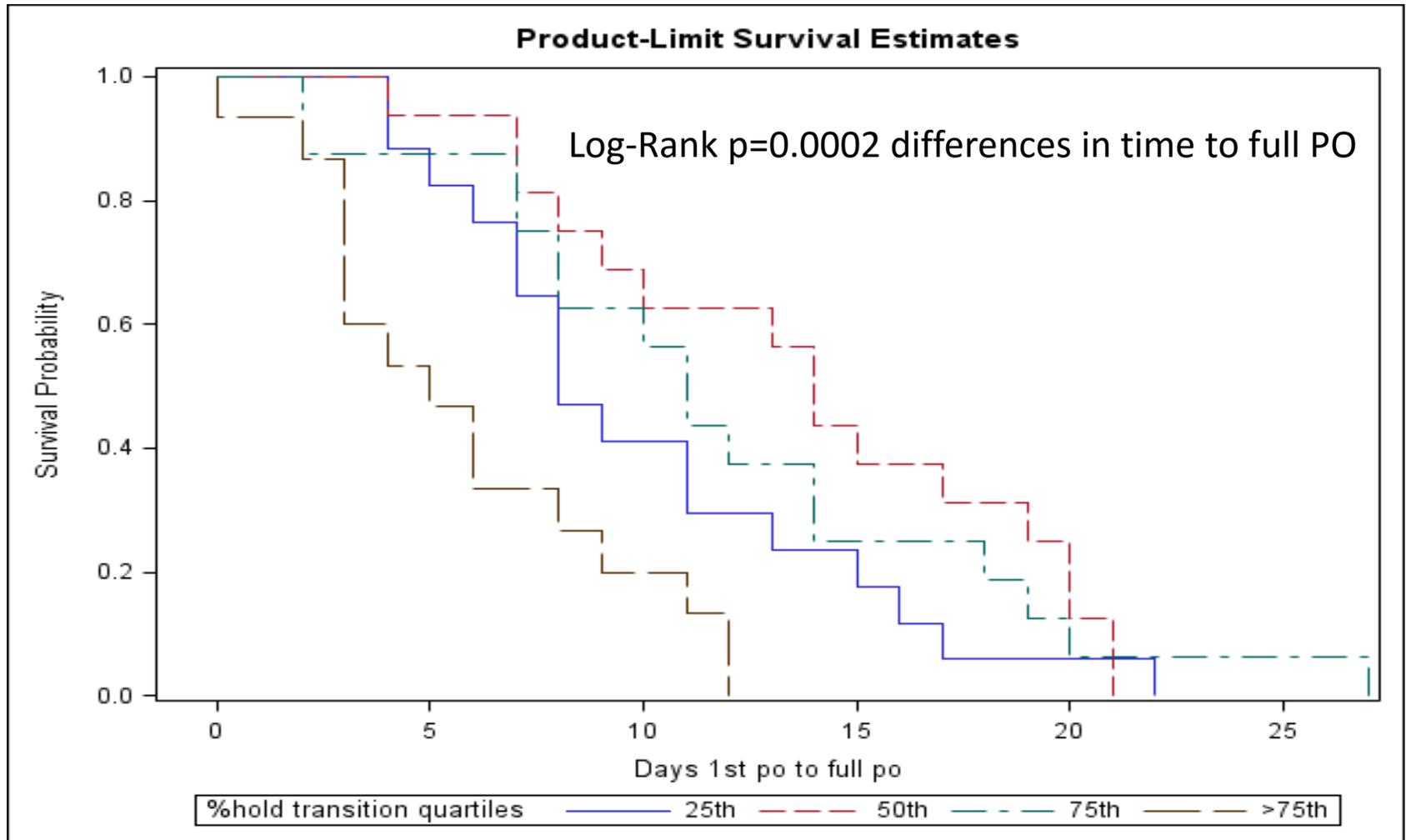


# Survival curve of days between 1<sup>st</sup> and full PO by % tactile during early gavage





## Survival curve of days between 1<sup>st</sup> and full PO by % hold during transition





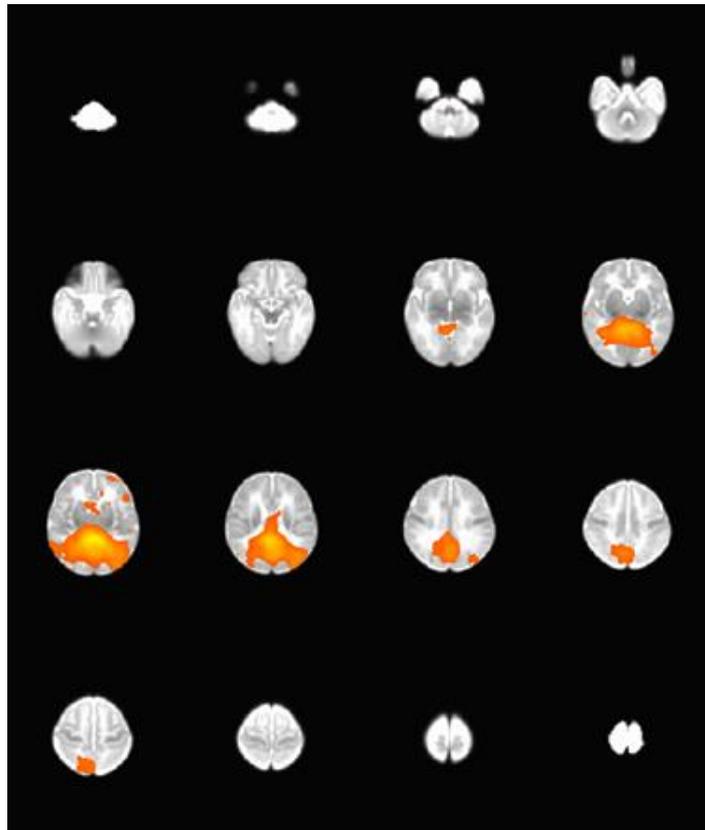
# Immunomodulation and Neurobehavior

- Subsample 57
  - IL1ra, IL6, IL8, IL10, GCSF, GMCSF, MCP-1, TNF $\alpha$ 
    - Drawn in the 1<sup>st</sup> week of life
  - Neurobehavioral Assessment of the Preterm Infant (NAPI)
    - 1<sup>st</sup> week of life, discharge, 2 months CA
  - Cytokines highly intercorrelated
    - $\uparrow$  IL8 higher baseline alert/orienting (AO) scores
    - $\downarrow$  IL1ra & IL10 lower AO scores at baseline
      - Continued lower AO scores with low IL10

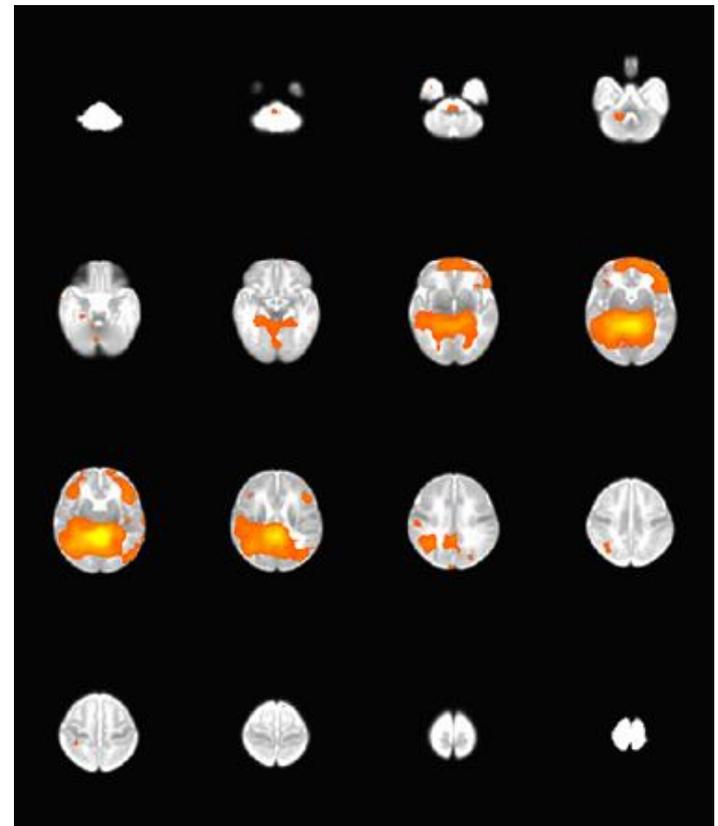


# Effects on Neural Connections

Intervention Group



Control Group



fcMRI Results: Default Mode



# Humility

*He who knows not and knows not that he knows not is a fool - shun him.*

*He who knows not and knows that he knows not is simple - teach him.*

*He who knows and knows not that he knows is asleep - wake him.*

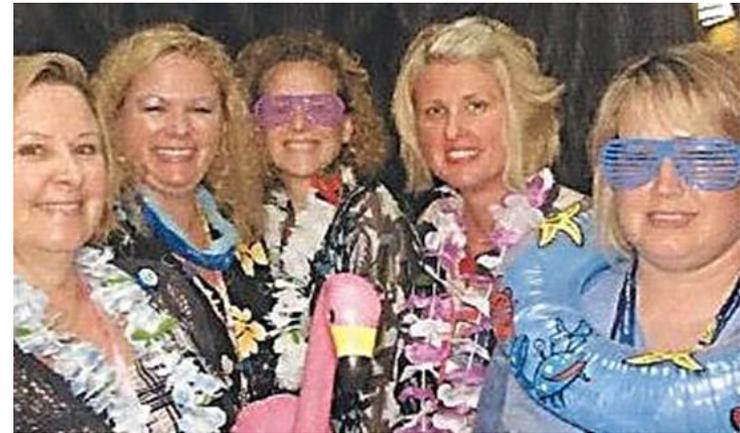
*He who knows and knows that he knows is wise - follow him.*

Ancient Proverb





# BUILD A TEAM!





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**FOLLOW YOUR PASSION!**



# REMEMBER THE GOAL!

