Improving Birth Outcomes:
Coordinating Approaches to Care

Cost Reduction with Quality Enhancement

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Kaiser Permanente, Northern California
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Kaiser Permanente Northern California

- Membership: Approximately 3.4 million members
- Births 2012: Approximately 35,000
  - Preterm rate: 8.8%
  - C-section rate: 26% (CA & national avg 33% or higher)
- Location
  - 14 hospitals with labor and delivery units
  - 42 outpatient clinics
  - Coverage approximately 50,000 drivable sq. miles
Agenda: Kaiser Permanente NCal Programs

- Early Start
  - Early intervention to stop all use of alcohol, cigarettes and other drugs in pregnancy

- Perinatal Patient Safety Program
  - Developing teams to provide consistent high reliability care and better outcomes
Key components for success

- Medical Imperative: Doing the Right Thing
- Physician Leadership
- Data Driven
- Cost Effective
- Human Factors and Systems Support
Early Start
Within 12 months of implementation, Early Start will not only improve outcomes for the mothers and babies to whom you provide medical coverage, it will also provide a net cost benefit for you.
the effects of public advertising
.... video please ...

http://www.youtube.com/watch?v=3FtNm9CgA6U&feature=related
“Brain on Drugs” and other Anti-Drug Ad Campaigns

- Increased sales of eggs and breakfast foods
- Increased cholesterol and cardiac disease in drug-using patients
- More drug users began frying their eggs instead of hard- or soft-boiling
- *American Journal of Public Health* 2009 reported that there was an increased risk in teens trying marijuana that watched more ads as compared to their peers
Pregnant Women 2010-2011 (15 – 44 yo)

- Current alcohol usage: 9.4% (down from 10.8%)
- Binge drinking: 2.6% (down from 4.4%)
- Heavy drinking: .4% (down from 1%)
- Non-pregnant rates: 54.7, 24.6, and 5.4 percent, respectively

Ref: 2011 National Survey on Drug Use and Health: Summary of National Findings
Figure 4.5 Past Month Cigarette Use among Women Aged 15 to 44, by Pregnancy Status: Combined Years 2002-2003 to 2010-2011

* Difference between this estimate and the 2002-2011 estimate is statistically significant at the .05 level.
Pregnant use by race/ethnicity

Past Month Substance Use among Pregnant Women Aged 15 to 44, by Race/Ethnicity and Substance: 2002 to 2010

Source: The National Survey on Drug Use and Health (NSDUH) is an annual survey sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA). The survey collects data by administering questionnaires to a representative sample of the population through face-to-face interviews at their places of residence.
Early Start Mission

We believe that every woman deserves a non-punitive health care environment, such that she have access to services and support to have an alcohol, tobacco and drug free pregnancy, allowing the delivery of a healthy baby.
Early Start: Transforming the Delivery of Care

- Leads to a lower overall cost structure by markedly decreasing neonatal hospital costs more than the cost of providing the prenatal intervention: **NET COST BENEFIT**
  - Shifts cost spending from the higher in-patient costs associated mostly with preterm labor to lower outpatient costs of providing a social worker or other behaviorist to the prenatal care team

- Improves maternal and infant outcomes

- Reduces the utilization of medical and social resources

- Enhance provider satisfaction and efficacy
Early Start Innovation

- Universal Screening of ALL pregnant women
  - Screening questionnaire
  - Urine toxicology (with consent)
- Place a licensed mental health provider in the department of Ob/Gyn
  - One full time person per 1800 annual deliveries
  - Use of video technology for remote clinics
- Link the Early Start appointments with routine prenatal care appointments
- Educate all women and providers
Early Start Timeline

1990 Pilot Study

1993 Early Expansion
4 Sites

1994-2000 PSANO Study published
+16 Sites Data base

2000-2004 Awards, Business Case, Entire Region Funded

2006 ES in all NCAL clinics

2008-2012 PSANO II the PSANO II economics published
Early Start Data 2012

- **39,427 Prenatal Screening Questionnaires**
  - 11,192 (29.39%) positive for risk of use

- **10,155 Early Start Assessments (91%)**
  - Negative assessment: 5,118 (50.39%)
  - Co-Dependent: 61 (0.60%)
  - Past Smoker Only: 1,092 (10.75%)
  - Current Smoker Only: 183 (1.80%)
  - Chemical Dependency: 481 (4.74% seen; 1.2% total pop)
  - Substance Abuse: 928 (9.14% seen; 2.4% total pop)
  - “At Risk” Diagnosis: 2,292 (22.57% seen; 5.8% total pop)
Early Start Research

- **Early Start: A Cost-Beneficial Perinatal Substance Abuse Program**
  
  N Goler MD, MA Armstrong MD, V Osejo BS, YY Hung PhD, M Haimowitz LCSW, A Caughey MD;
  *Journal of Obstetrics and Gynecology* Volume 119, No 1, Jan 2012; pp 102-110

- **Substance Abuse Treatment Linked with Prenatal Visits Improve Perinatal Outcomes: A New Standard**
  
  N Goler MD, MA Armstrong MD, C Taillac LCSW, V Osejo BS
  *Journal of Perinatology* April 2008
Methods

- Net cost analysis of maternal and infant utilization
- 49,261 female KP members
- Completed ES Prenatal Substance Abuse Screening Questionnaires 01/99 - 6/03
- Urine toxicology screening test
- Birth at a KP NCal Hospital
Methods

- Definition of Study Groups
  - SAF (2,032): Screened pos, assessed pos, follow-up
  - SA (1,181): Screened pos, assessed pos, but no follow-up
  - S (149): Screened pos (including toxicology), no follow-up
  - C (45,899): Screened negative

- Maternal care - prenatal through one year post-partum
  - Inpatient and outpatient costs

- Infant care - birth costs (hospital) through one year of life
  - Inpatient and outpatient costs
DATA

- ES Screening Questionnaire
- Assessment and treatment data
- Newborn data
- Pediatric data
- Maternal outcomes

- Toxicology screen results for 9 drugs:
  - Alcohol
  - Benzodiazepines
  - Opiates
  - Amphetamines
  - Cocaine
  - PCP
  - Barbiturates
  - Methamphetamines
  - THC
Data Analysis

- Characterize the study groups

- Statistical Analyses
  - Chi-square tests: compare the 4 study groups on each outcome
  - Logistic regressions: estimate the relative risk of each neonatal outcome of interest across the four study groups controlling for potential confounders

- Controlled for maternal age, ethnicity, and amt of prenatal care
Data Patterns

- No statistical difference in any outcomes between the SAF (Early Start group) and Controls

- The S group has statistically worse outcomes and higher costs than the SAF and C groups

- The women who only has an assessment (SA group) have intermediary results
Maternal and Infant Mean Costs Comparison

- SAF
- SA
- S
- Controls

Cost Categories:
- Maternal Total Costs
- Infant Total Costs
- Maternal and Infant Costs Combined

Cost Ranges:
- $0
- $5,000
- $10,000
- $15,000
- $20,000
- $25,000
- $30,000
Rate of Preterm Delivery (<37 Weeks)

Note: The rate of Preterm Delivery is 2.1 times higher in S group than SAF (Early Start patients)
The rate of the babies needing a ventilator is 2.2 times higher in the S group that the SAF and 3.1 times higher than the controls.
Placental abruption is 7 times more likely in the S group.
Stillborns (IUFDs) were 14.2 times more likely in the S group than the SAF or C groups.
Mean Cost for Preterm Birth: 33-36 weeks (per baby)

Note: The birth rate at this gestation age is 1.6 times higher in the S than SAF group at this Gestational age. No significant cost differences between the SAF and C groups, suggesting ES reduces costs in this high-risk population to the overall baseline.
Mean Cost for Maternal Emergency Services

Note: ED costs for the S group are 1.8 times higher than the SAF group and 2.5 higher than the C group.
Note: An increased use of mental health services allows a mother to express her experience and serves to normalize feelings of frustration and helplessness which could result in an increased risk of post-partum depression.
## SELF-REPORTED SUBSTANCE USE ON SCREENING QUESTIONNAIRES

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<th>Characteristic</th>
<th>SAT</th>
<th>SA</th>
<th>S</th>
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<td>THC wkly/daily since preg</td>
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<td>Meth wkly/daily before preg</td>
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<td>THC wkly/daily before preg</td>
<td>34.1</td>
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<tr>
<td>Smoked cigarettes during preg</td>
<td>26.6</td>
<td>22.1</td>
<td>17.3</td>
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</table>
Cost-Benefit Analysis

- Compared the total cost differences between SAF and SA groups to the S group including the costs of the ES program

- The total ESS salary costs for providing care to the study cohort over 3.5 years totaled $2,347,100 or $670,600 annually

- By providing ES to this study cohort we provided an overall cost savings of $23,160,694
  - Assumes outcomes of the S group for the SAF and SA groups

- Net cost benefit was $20,813,594 over 3.5 years, or $5,946,741 annualized
Known Barriers

- Reassignment of resources
  - Hospitals are not motivated to save costs by moving funds to the outpatient setting
  - Willingness to risk new budget for greater savings
- Denial at all levels of health-care providers
  - Denial of substance abuse and dependency as a disease
  - Denial that intervention will work
  - Denial that woman want the help
- Considered a very difficult patient population
- Others
Perinatal Patient Safety Program (PPSP)
PPSP Origins and Rollout

- Embracing change to become a high reliability organizations: defined as few to no mistakes over long periods of time in high risk environments
  - Institute of Medicine Report (1999)
  - The Agency for Healthcare Reform and Quality
  - American Society for Healthcare Risk Management
    - “Teamwork: The Fundamental Building Block of High-Reliability Organizations and Patient Safety”

- 2002 to 2005: 3 Medical Centers annually, then added 2 new labor and delivery units in 2008
PPSP Essential Elements

• Leadership support
  • Physician, Nursing and Hospital Administrators

• Facility Based Multidisciplinary Committee

• Safety nurse on the unit 24/7
  • Identify issues and concerns
  • Escalate as needed
  • Communicate across shifts
PPSP Core Components

- Teamwork development
  - Safety attitudes questionnaires by employee by unit
  - Critical events training

- Human factors and communication training (SBAR and other)
  - Focus on physician and nursing communication styles
  - Common language
  - Flattening of hierarchy

- Creating safe environments for root cause analysis and debriefing of events

- Systems analysis and design changes
  - Standardized protocols and procedures with input from stakeholders
2012 SAQ - Labor and Delivery RNS, CNMs, & OBs

Teamwork

Safety

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Birth Injury Claims / 1,000 births 1995 – 2012

PPSP Implementation
4 MCs/yr x 3 yrs, 2002 through 2005, Dameron, ANT & MOD 08

40% decrease in ML Birth Injury claims from 1st mean to 2nd mean
5 min Apgar < 7 in 36+ week infant

March 2012 - Feb. 2013

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Using Dashboards for Quality Improvement
Dashboard Basics

- Physician leaders agreement on the metrics and understanding of the metrics

- Clear targeted, agreed upon measures for improvement

- Accountability

- Transparency

- Healthy competition

- Celebration
Dashboard Basics (continued)

- Levels of reporting
  - Provider
  - Clinic
  - Hospitals
  - Regions

- Time intervals
  - Monthly vs. quarterly vs. yearly
## Maternity Child Health Dashboard: Facility Comparison

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<thead>
<tr>
<th>Facility</th>
<th>Elective Delivery</th>
<th>Cesarean Section</th>
<th>Antenatal Steroids</th>
<th>Newborn</th>
<th>Health Care-Associated BSI in Newborn</th>
<th>Exclusive Breast Milk Feeding</th>
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<td></td>
<td>% Completed</td>
<td>Rate</td>
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# Maternity Child Health Dashboard: Quarter over Quarter Comparison

## Perinatal Core Measures
KPNC Region Performance

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<th>Time Period</th>
<th>PC-1 Elective Delivery</th>
<th>PC-2 Cesarean Section</th>
<th>PC-3 Antenatal Steroids</th>
<th>PC-4 Health Care-Associated BSI in Newborns</th>
<th>PC-5 Exclusive Breast Feeding</th>
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Kaiser Permanente
NCal Exclusive Breast Feeding Rates by Hospital: 2011 to 2012
One last look at Early Start
Understanding the “S” Group (149 women)

- The “S” group received the community standard of care
  - Screening for drug use
  - Provider discussion of concern for positive screen and the effects on the pregnancy and baby
  - Referral to treatment
  - But ... they did not get to Early Start
    - No specialist at their site
    - Transfer of care
    - Refusal of services

What would have happened if we had gotten them to Early Start?
Understanding the “S” Group (149 women)

If only they had also gotten to Early Start:

15 more term babies
6 more babies breathing without a ventilator
9 more women not experiencing an abruption
10 more babies alive

Can we afford to continue to provide the community standard of care when we know we have something better?