

menzies school of health research **The critical early years**

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discovery for a healthier tomorrow

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Table 2.3 Life expectancy at birth, females, Northern Territory, five-year periods

Years	NT Indigenous	NT non-Indigenous	Australia
1981-1985	63.5	80.2	79.7
1986-1990	63.2	84.4	80.9
1991-1995	64.4	81.8	82.3
1996-2000	65.0	84.0	83.5

Table 2.2 Life expectancy at birth, males, Northern Territory, five-year periods

Years	NT Indigenous	NT non-Indigenous	Australia
1981-1985	57.9	70.4	72.3
1986-1990	56.2	71.8	73.8
1991-1995	58.6	72.7	75.6
1996-2000	59.4	76.1	77.3

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9.5 AGE-SPECIFIC DEATH RATES (a), by sex and Indigenous status—1999–2003

Age (years)	MALES			FEMALES		
	Indigenous rate(b)	Non-Indigenous rate(b)	Rate ratio(c)	Indigenous rate(b)	Non-Indigenous rate(b)	Rate ratio(c)
Less than 1(d)	15	5	3.0	12	4	3.0
1-4	66	31	2.1	64	20	3.2
5-14	31	14	2.2	25	11	2.3
15-24	239	87	2.7	103	31	3.3
25-34	432	115	3.8	195	44	4.4
35-44	791	146	5.4	436	82	5.3
45-54	1 443	288	5.0	907	179	5.1
55-64	2 667	760	3.5	1 784	438	4.1
65 or over	6 273	4 534	1.4	5 093	3 763	1.4

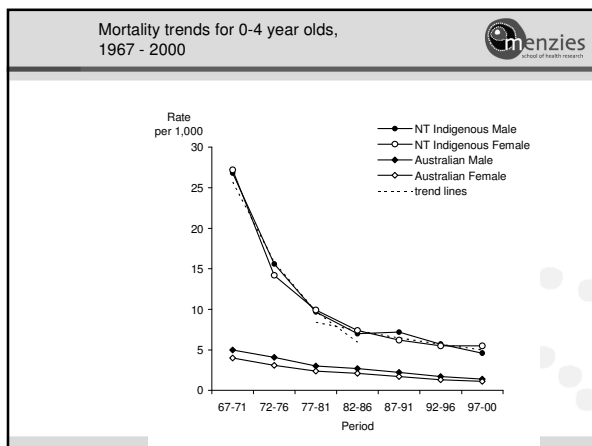
AIHW: The health and welfare of Australia's Aboriginal and Torres Strait Islander People, 2005

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9.9 MAIN CAUSES OF DEATHS (a), by Indigenous status—1999–2003

	NUMBER OF DEATHS (no.)		PROPORTION OF TOTAL DEATHS (%)	
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous
Diseases of the circulatory system	2 016	85 339	27.3	38.2
External causes of mortality	1 198	14 480	16.2	6.5
Neoplasms	1 094	65 354	14.8	29.3
Respiratory diseases	637	19 011	8.6	8.5
Diabetes	603	5 012	8.2	2.2
Chronic kidney disease	277	3 729	3.7	1.7
Subtotal(b)	5 707	192 044	77.3	86.0
Total	7 387	223 384	100.0	100.0

AIHW: The health and welfare of Australia's Aboriginal and Torres Strait Islander People, 2005



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Prof Alan Walker, 1931-2007

Estimated decrease** in NT Indig mortality rates: 1967 - 2000

Age group	Male % decrease (95% CI)	Female % decrease (95% CI)
0 - 4	85 (80-89)	84 (78-89)
5 - 24	22 (-4 -42)	46 (20-64)
25 - 44	12 (-5 -26)	27 (10-41)
45 - 64	14 (-2 -27)	25 (12-37)
65+	31 (17-43)	29 (15-41)
5+	31 (17-43)	30 (22-38)

▪ **Estimated decrease over 33 years, calculated from average annual rate of decrease as estimated by negative regression model

Mortality data

- Most Aboriginal deaths occur in adulthood, from circulatory, respiratory and neoplastic diseases, and accidents.
- Therefore, it makes sense to focus most resources on prevention and treatment of adult diseases
 - Doesn't it?

Tackling adult Aboriginal mortality

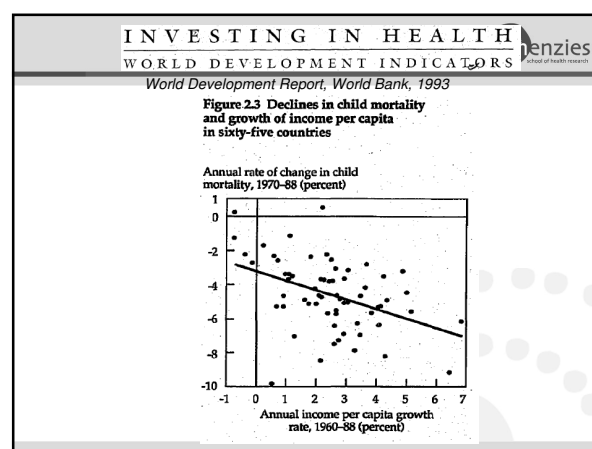
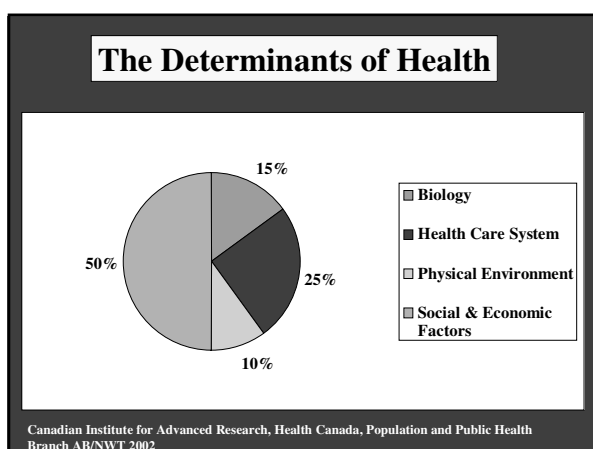
1 Estimated change in Northern Territory Indigenous mortality rates, 1977-2001*

Disease	Deaths	Per cent average annual change (95% CI)	Per cent total change
Ischaemic heart disease	918	+ 2.5 (1.6 to 3.5)	+ 81.3
Chronic obstructive pulmonary disease	639	- 1.2 (- 2.2 to - 0.1)	- 25
Cerebrovascular disease	441	- 0.6 (- 1.9 to 0.6)	ns
Diabetes mellitus	369	+ 6.4 (4.7 to 8.0)	+ 338
Rheumatic heart disease	201	- 1.1 (- 3.0 to 0.8)	ns
Renal failure	179		
Age < 50 years†		- 6.5 (- 10.7 to - 2.0)	- 79.8
Age ≥ 50 years		+ 3.3 (0.8 to 5.7)	+ 117.2

ns = Not statistically significant (P ≥ 0.05).
 * Estimated by Poisson regression models. † There were only 35 NT Indigenous deaths from renal failure among those aged < 50 years from 1977 to 2001, so estimated average annual changes for this age group should be interpreted with caution.

Tackling adult Aboriginal mortality

- Difficult
 - Co-morbidities
 - Culture
 - Language
 - Remoteness
 - Resources
- Even if do make a difference, not tackling root problems of health inequalities
 - Poverty, unemployment, education, housing



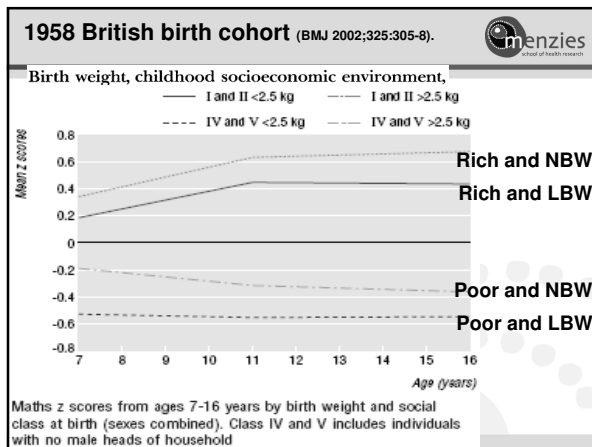
7.4 SOCIOECONOMIC CHARACTERISTICS, Indigenous persons aged 18 years or over—2002

	PROPORTION WITH FAIR/POOR HEALTH			RATE RATIO(a)		
	Males	Females	Persons	Males	Females	Persons
	%	%	%	rate	rate	rate
Equivalised gross household income(b)						
Lowest quintile	31.4	32.9	32.3	1.0	1.3	1.2
Second quintile	26.1	24.6	25.3	1.4	1.5	1.5
Third quintile	12.4	22.7	17.7	1.4	2.7	2.1
Fourth quintile	*15.1	10.0	12.8	2.1	1.6	1.9
Fifth quintile	*9.9	*15.9	*13.1	1.8	3.3	2.5
Highest year of school completed(c)						
Year 9 or below(d)	35.7	37.3	36.5	1.3	1.4	1.3
Year 10 or 11	17.4	20.3	19.0	1.3	1.7	1.5
Year 12 or equivalent	14.5	13.7	14.1	2.0	1.8	1.9

AIHW: The health and welfare of Australia's Aboriginal and Torres Strait Islander People, 2005

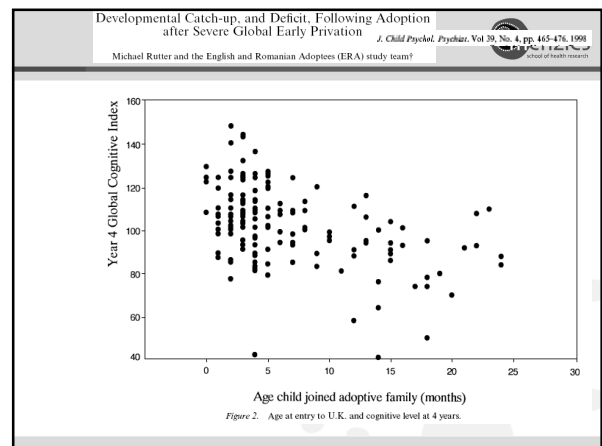
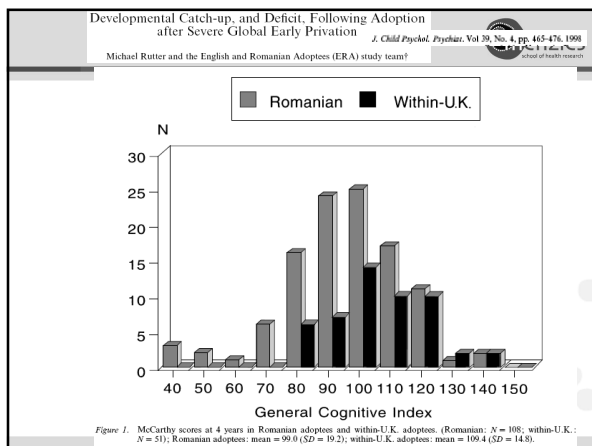
So why focus on children?

- Because the majority of causes of premature death in Aboriginal adults are rooted in early life.
- Because the intricate and complex link between health and poverty, unemployment, housing and education (the socioeconomic gradient) is most likely to be solved by giving a "fresh start" to the new generation



Latent effects

- Biological factors (e.g. LBW / Barker) or developmental opportunities (e.g. language exposure) at critical periods have lifelong impact regardless of subsequent experience
 - 1st 5 yrs critical for:
 - Emotional control
 - Peer social skills
 - Language
 - Understanding relative quantity



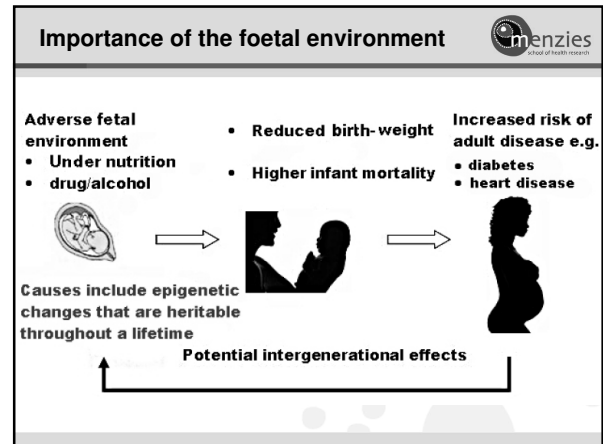
1958 British Birth Cohort Study - Outcomes at 33 years of age

1582 *C. Hertzman et al. / Social Science & Medicine 53 (2001) 1575-1585*

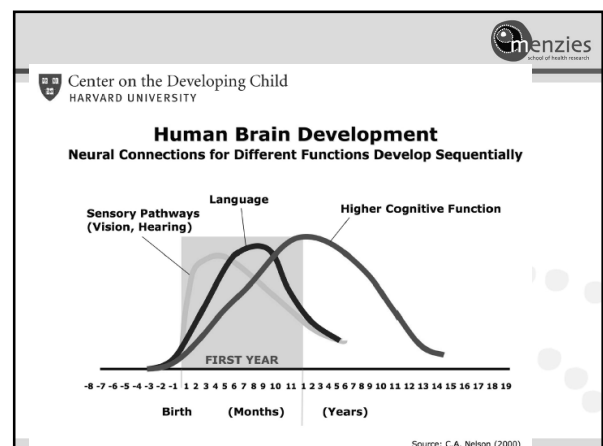
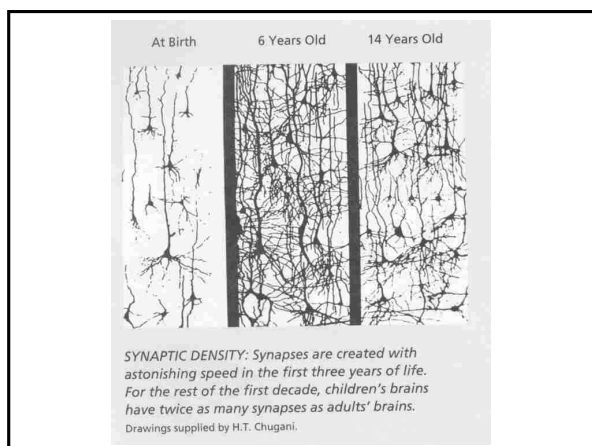
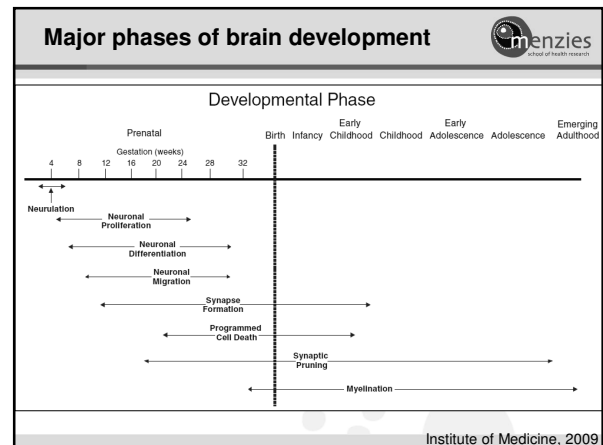
Table 5
Final model for explaining self-rated health at age 33 (*n* = 6,464)^a

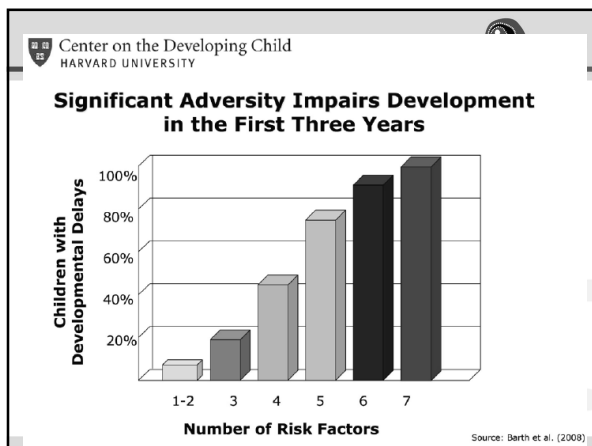
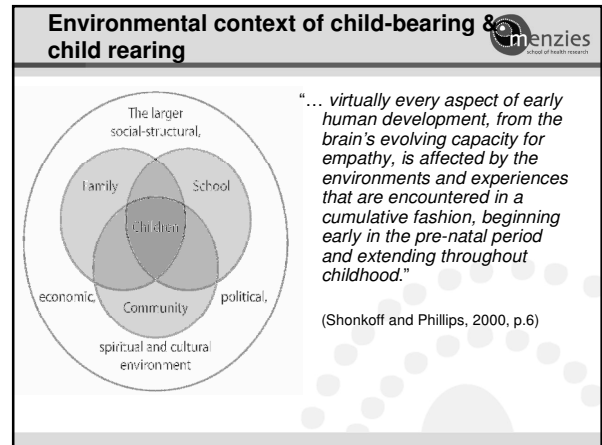
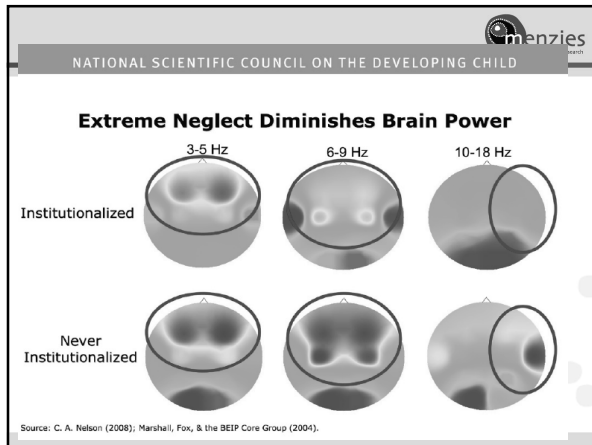
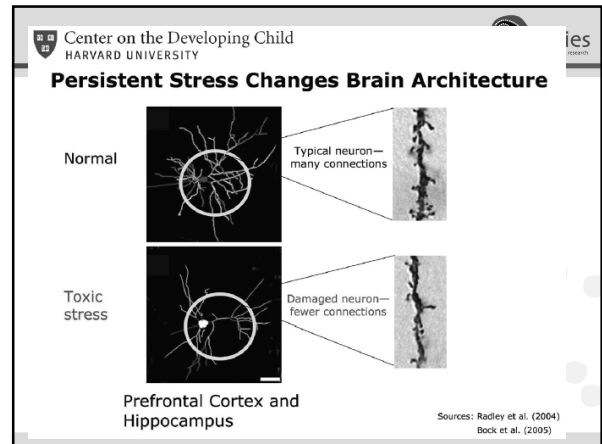
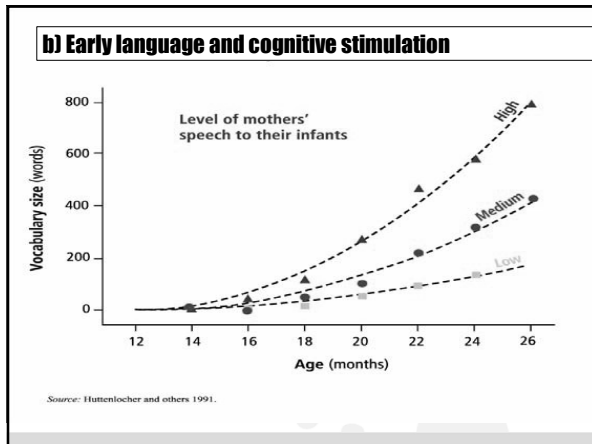
Item	Std β	β	Se
<i>Early life (ages 0-7)</i>			
Socio-emotional status, at age 7	0.031	0.016	(0.007)*
Parents read to child at age 7	0.043	0.022	(0.006)***
% of adult height at age 7	0.031	0.006	(0.002)*
<i>Cumulative</i>			
Socio-economic circumstances at birth, 7, 11, 16 years	0.057	0.011	(0.003)***
Socio-emotional status, at ages 11 and 16 end of school qualifications	0.041	0.013	(0.004)**
End of school qualifications	0.065	0.042	(0.009)***
<i>Macro: socioeconomic</i>			
Current material circumstances at age 33	0.070	0.065	(0.012)***
<i>Meso: civil society</i>			
Social trust	0.036	0.054	(0.018)**
Psychosocial job strain	0.035	0.026	(0.009)**
<i>Intersection factors</i>			
Job insecurity at age 33	0.056	0.034	(0.008)***
Life control	0.139	0.127	(0.012)***

^a r^2 (adjusted) = 0.20 (0.09).
p* < 0.05; **0.01; **p* < 0.001.



- ### Biological embedding
- Systematic differences in early environments (stimulation, emotional and physical support) affect the neurochemistry of the brain
 - Animal studies
 - Early life experiences → permanent changes to cortisol excretion
 - Similar findings in observational studies in humans
 - Poorly-attached toddlers
 - Romanian orphans
 - Social class in school children
 - Swedish v Lithuanian men
 - Biological plausibility to the link between early life experiences and socio-economic gradient in health, manifest mainly through adult disease





14 item family life stress scale used in WAACHS*

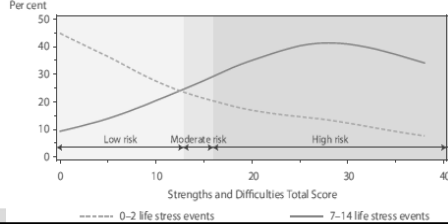
A close family member had a serious medical problem (illness or accident) and was in hospital?	A close family member has a physical handicap?
A close family member was badly hurt or sick?	An important family member passed away?
A close family member was arrested or in gaol/prison?	A parent(s) or carer(s) left because of a family split-up?
Your child/children were involved in or upset by family arguments?	You have felt too crowded where you lived?
A parent/caregiver lost his/her job or became unemployed?	Your child/children had to take care of others in the family?
A close family member had an alcohol or drug problem?	Your child/children have been in a foster home?
Your family didn't have enough money to buy food, for bus fares or to pay bills?	Your child/children were badly scared by other people's behaviour?

* Western Australian Aboriginal Child Health Survey (Silburn et al, 2006)

Family life stress and child mental health

- 22% of children in the WAACHS lived in families with 7+ life stress events over last 12 m (vs <0.5% non-Aboriginal QA children).
 - These children were **5.5 times** as likely to score in the clinical range of the SDQ (i.e. behavioural or emotional problems) as children in families with 2 or less life stress events.

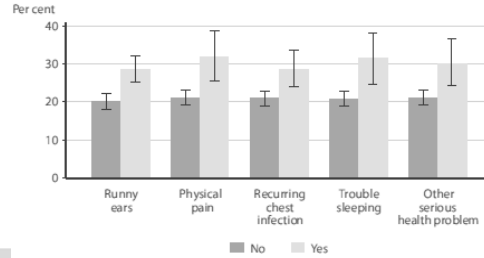
Family Life Stress by child's SDQ score



Family life stress and child physical health

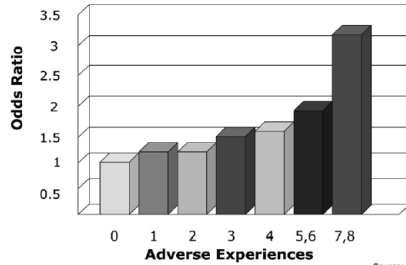
Children in families with high life stress events had higher rates of chronic physical disorders than those in families with fewer life stress events.

Family Life Stress by child's physical condition



Center on the Developing Child HARVARD UNIVERSITY

Risk Factors for Adult Heart Disease are Embedded in Adverse Childhood Experiences



Source: Dong et al., 2004

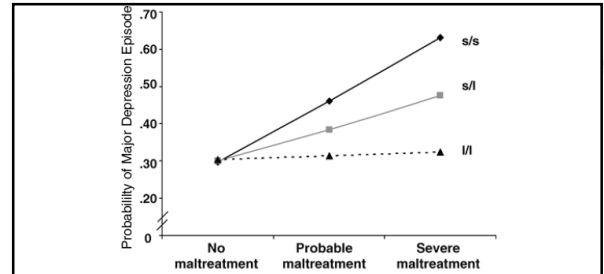
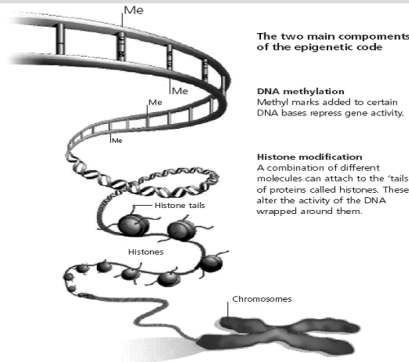


FIGURE 5-1 Gene-environment interaction between effects of prior maltreatment and genotype for the 5-HTTLPR allele on developing depression later in life. Maltreatment has the biggest effect for two copies of the short (s/s) allele and the smallest effect for two copies of the long (l/l) allele. There is an intermediate effect for one copy of each allele (s/l). (Caspi et al., 2003)

Institute of Medicine, 2009

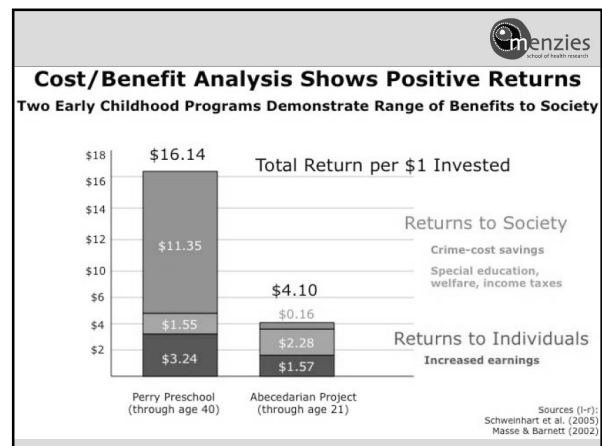
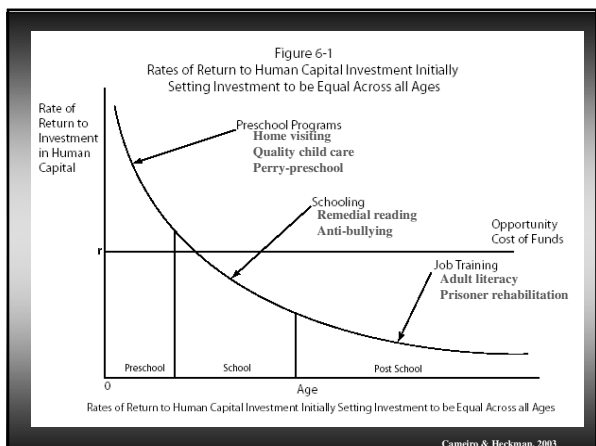
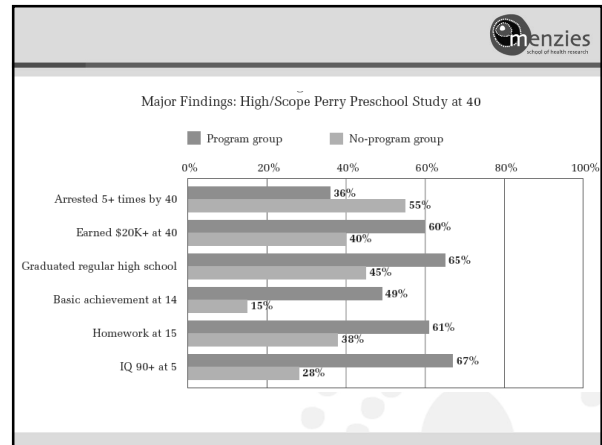
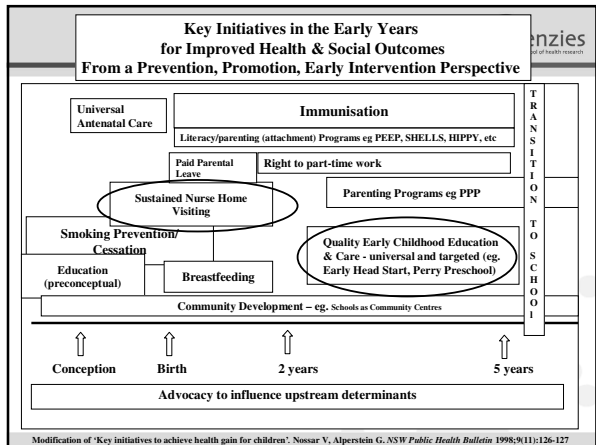
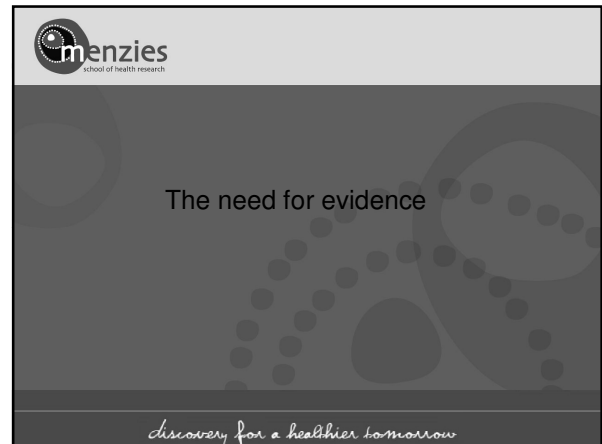
Epigenetics



Source: Ouy L (2009) Epigenetics: unfinished symphony. Nature 461: 143-5

Maternal	Aboriginal and Torres Strait Islander	Non-Indigenous	Source *
Fertility rates ^a	2.1/1,000	1.8/1,000	National 2005
% Teenage pregnancy ^a	23	4	National 2003
% Smoking during pregnancy ^a	51	17	Five jurisdictions 2006
% with first antenatal visit after 20 weeks ^a	22	13	NSW 2000
% receiving intervention at birth ^a	29	41	National 2005
Maternal Mortality ^a	46/100,000	9/100,000	National 2000-2002
Infant	Aboriginal and Torres Strait Islander	Non-Indigenous	Source *
Mean birth-weight (grams) ^b	3,162	3,381	National (excluding Tasmania)
% Low birth-weight ^b	13	6	National (excluding Tasmania) 2001-2003
% Fetal growth restriction ^b	27	10	NT 1987-1990
% Preterm ^b	12.3	5.8	National 2001-2003
Perinatal mortality ^c	13.4/1,000	8.2/1,000	Four jurisdictions 2002-2004
Infant mortality ^c	12.2/1,000	4.4/1,000	Four jurisdictions 2000-2004
Sudden Infant Death Syndrome (SIDS) mortality ^c	1.3/1,000	0.3/1,000	Four jurisdictions 2000-2004

World regions	% of infants with low birth-weight (less than 2,500g)
Non-Indigenous Australians	6.1
Industrialised countries	7
Aboriginal and Torres Strait Islanders	13
Developing Countries	16
Least developed countries	19
World	15



Importance of good evidence: Home visiting

- Good evidence base elsewhere
- Needs good evidence base in indigenous populations
 - Particularly rural and remote communities

Long-term Effects of Home Visitation on Maternal Life Course and Child Abuse and Neglect: Fifteen-Year Follow-up of a Randomized Trial

Olds et al. JAMA 1997;278:637-43

Treatment 1 and 2: No home visits
Treatment 3: Home visits in pregnancy
Treatment 4: Home visits in pregnancy and until child 2 yo

Dependent Variables	Whole Sample			Estimate† (95% CI), Treatments 1 and 2 vs Treatment 4	Low-SES Unmarried Sample			Estimate‡ (95% CI), Treatments 1 and 2 vs Treatment 4
	Mean No. Treatments 1 and 2	Treatment 3	Treatment 4		Mean No. Treatments 1 and 2	Treatment 3	Treatment 4	
Subsequent pregnancies	2.1	1.9	1.7	0.4 (-0.1 to 0.8)	2.2	2.0	1.5	0.7‡ (0.1 to 1.3)
Subsequent births	1.6	1.4	1.3	0.3 (-0.0 to 0.6)	1.6	1.4	1.1	0.5‡ (0.1 to 1.0)
Births between birth of first and second child	37.3	39.6	41.7	-4.4 (-14.9 to 6.1)	37.3	46.6	64.6	-27.5§ (-44.1 to -10.9)
Births receiving AFDC	65.9	70.2	52.6	13.1 (-0.9 to 27.0)	60.3	81.8	60.4	29.9§ (9.0 to 50.7)
Births employed	88.7	87.5	96.4	-6.7 (-20.4 to 7.0)	80.0	74.9	85.9	-15.9 (-36.0 to 4.6)
Births receiving food stamps	56.4	62.0	47.9	8.5 (-8.3 to 23.3)	63.5	84.0	46.7	36.9§ (14.6 to 59.0)
Births receiving Medicaid	70.0	71.1	61.6	8.2 (-7.6 to 24.0)	95.4	92.4	72.3	23.1 (-0.6 to 46.8)

† Adjusted for socioeconomic status (SES), marital status, maternal age, education, locus of control, support from husband or boyfriend, work status, and husband or boyfriend use of public assistance at registration. See first footnote to Table 1 for explanation of treatment groups. AFDC indicates Aid to Families With Dependent Children; CI, confidence interval.
‡ Estimate = (treatments 1 and 2 mean) - (treatment 4 mean).
§ P < .05.
¶ P < .01.

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Dependent Variables	Whole Sample			Estimate† (95% CI), Treatments 1 and 2 vs Treatment 4	Low-SES Unmarried Sample			Estimate‡ (95% CI), Treatments 1 and 2 vs Treatment 4
	Incidence (Log Incidence)††	Treatment 3	Treatment 4		Incidence (Log Incidence)††	Treatment 3	Treatment 4	
Substance use impairments§	0.43 (-1.05)	0.45 (-0.82)	0.34 (-1.33)	0.24 (-0.39 to 0.87)	0.73 (-0.31)	0.61 (-0.49)	0.41 (-0.88)	0.58 (0.04 to 1.11)
Arrests	0.22 (-2.02)	0.16 (-2.17)	0.08 (-5.21)	3.19 (-89.66 to 106.04)	0.58 (-0.55)	0.36 (-1.01)	0.19 (-1.74)	1.19 (0.49 to 1.89)
Convictions	0.13 (-2.29)	0.05 (-9.48)	0.03 (-9.62)	7.33 (-408.24 to 422.91)	0.28 (-1.28)	0.11 (-2.22)	0.06 (-2.74)	1.46 (0.38 to 2.54)
Days in jail	0.65 (-4.36)	0.13 (-9.25)	0.01 (-13.36)	9.30 (-481.52 to 469.52)	1.11 (0.15)	0.47 (-0.76)	0.04 (-3.22)	3.32 (2.16 to 4.48)
YRS arrests	0.36 (-1.57)	0.34 (-1.15)	0.12 (-6.03)	3.46 (-126.59 to 119.26)	0.90 (-0.11)	0.39 (-0.95)	0.16 (-1.86)	1.74 (0.84 to 2.54)
YRS convictions	0.27 (-4.92)	0.28 (-1.32)	0.12 (-5.30)	0.36 (-226.81 to 227.57)	0.69 (-0.37)	0.29 (-1.25)	0.13 (-2.02)	1.65 (0.79 to 2.52)
Substantiated reports of child abuse and neglect	0.54 (-0.63)	0.35 (-1.26)	0.29 (-1.40)	0.77 (0.34 to 1.19)	0.53 (-0.64)	0.63 (-0.47)	0.11 (-2.25)	1.61 (0.67 to 2.35)

† Adjusted for socioeconomic status (SES), marital status, maternal age, education, locus of control, support from husband or boyfriend, work status, and husband or boyfriend use of public assistance at registration. See first footnote to Table 1 for explanation of treatment groups. NYS indicates New York State; CI, confidence interval.
‡ Estimate represents the mean number of infrequently occurring events within stated period. Individual cases may have values greater than 1 though the range is small.
§ Estimate = (treatments 1 and 2 log incidence) - (treatment 4 log incidence).
¶ Scale summarizes the counts of behavioral impairments (eg, missing work, motor vehicle crash) reported by women resulting from their use of alcohol and illegal drugs.
†† P < .01.

The big four

- Poverty
- Education
- Unemployment
- Housing

Education and developmental health

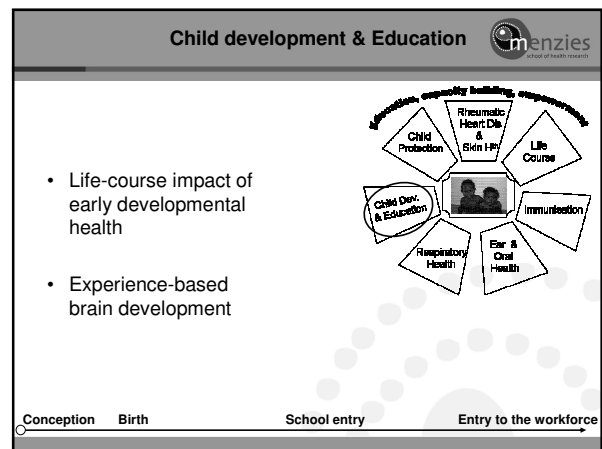
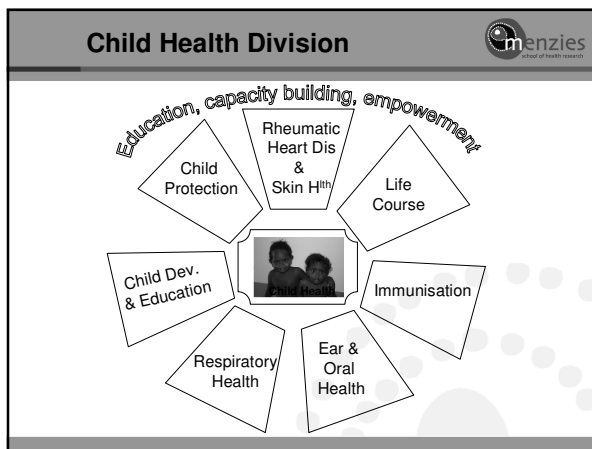
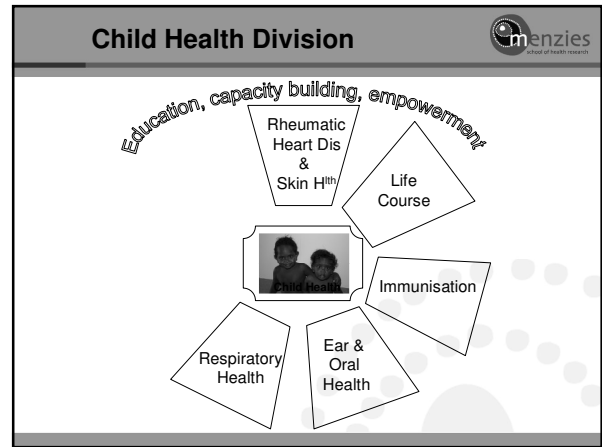
Performance Measures	2003	2004	2005	2006
Non-Indigenous students achieving national reading benchmark				
Year 3	85%	87%	84%	85%
Year 5	92%	91%	89%	83%
Year 7	91%	89%	88%	89%
Indigenous students achieving national reading benchmark				
Year 3	36%	45%	40%	39%
Year 5	49%	45%	39%	39%
Year 7	44%	38%	36%	38%
Non-Indigenous students achieving national numeracy benchmark				
Year 3	96%	97%	96%	96%
Year 5	92%	89%	88%	89%
Year 7	85%	84%	84%	86%
Indigenous students achieving national numeracy benchmark				
Year 3	66%	69%	68%	32%
Year 5	43%	38%	35%	32%
Year 7	30%	27%	24%	30%

TABLE 13-1 Examples of Potential Components of A Prevention System That Supports Developmental Phases

Developmental Stage	In the Absence of Interventions	Illustrative Intervention Opportunities
Conception, pregnancy, postpartum	High risk of postpartum depression	Pregnant women screened routinely for risk factors and provided needed interventions, such as mood management training, home visitation, and nutritional counseling to prevent maternal depression during child's critical developmental stages
	Baby at risk for problems of attachment, later preschool or school problems, or later depression if mother is depressed	Well-baby visits to screen and intervene for developmental problems, abnormal feeding patterns, interactions with mother or other caretaker
Infancy	Infant at risk for abnormal development	Screening is offered for age-appropriate behaviors and evidence of normal brain development
	Early behavioral difficulties increase risk for later bonding problems, negative patterns of parent-child interactions	On-time remedial interventions are offered, such as parent training and referral to a developmental specialist

Developmental Stage	In the Absence of Interventions	Illustrative Intervention Opportunities
Preschool years	Child does not receive early cognitive stimulation	Caregivers are encouraged to read to their children
	Child does not learn self-efficacy, prosocial skills, or appropriate school behaviors	In-home and out-of-home enrichment experiences such as early childhood education are offered for the child to build skills needed for school and social success
Primary school	Child has difficulty establishing positive relationships with peers, caregivers, or teachers	Families receive needed parenting support to foster nurturing relationships
	Child does not experience early successes	Families and schools increase nurturance and decrease punitive experiences Children learn skills to enhance school performance and manage problem behaviors

Developmental Stage	In the Absence of Interventions	Illustrative Intervention Opportunities
Middle school	Early adolescent engages in risky behaviors, such as smoking, using alcohol or other drugs, delinquency, or risky sexual behavior	Families and schools provide high-level reinforcement for prosocial behavior
	Early adolescent experiences few academic successes and bonds with deviant peers	Young people at risk due to academic or peer interaction problems are identified and provided with individual or family intervention options
High school	Adolescent lacks self-esteem, has limited academic success, engages in antisocial behaviors, and does not develop positive health habits	Family and school-focused programs shape attitudes and behaviors around substance abuse, delinquency, and sexual behaviors and provide self-identity and coping skills
	Depression, conduct disorder, and substance abuse increase	Adolescents are routinely screened for early signs of depression and other MEB disorders, with appropriate interventions provided



School Readiness for Australian Indigenous Children: Setting an Agenda




- Workshop in Darwin, Oct 2007


Models & Measures of Intervention

Contents

- 1) Health Model: Home Visiting (Associate Professor Victor Nossar)..... 2-3
- 2) Family Model: Let's Start (Associate Professor Gary Robinson)..... 4-5
- 3) Education Model: 10 Mobile Pre-Schools (Professor Lyn Faux)..... 6-8
- 4) Integrated Model: Integrated Early Childcare Centres 2004-06 (Nareen Carter & FHACSA)..... 9-10
- 5) Background Paper on the Australian Early Development Index (Professor Sven Silburn)
- 6) Stephanie Bell - Early Childhood Services, Central Australian Aboriginal Congress Inc.




Some of the priorities:



- Hearing loss – its importance and how to reduce its impact
- Understanding what Aboriginal people value and expect from education
- Understanding what Aboriginal parents and carers see as their role in children's education
- Potential role of Aboriginal English as an instructional medium
- Role of structured program of early educational child care
- How to empower communities to achieve educational outcomes.


Some more priorities



- Role of structured programs for transition to school
- Role of focused attention on literacy for adolescent females in improving child school readiness
- Development of tools for measuring endpoints and interim progress
- Role of family members within learning environments


Existing Projects	Methods & Basic Science	Descriptive epidemiology & Burden of disease	Causal pathways & Mechanisms	Research translation & Evaluation	Collaborators and funders
Menzies - DET Partnership (Eval of TIE in 20 Towns schools)				***	DET
Mobile Preschool Project (Georgie Nutten)			***	***	DET/NMRC
Australian Early Development Index (AEDI & I-AEDI)	***	***	***	***	DET, DHF, DEEW, DHA
Indigenous developmental screening methods (Aelia D'Agrano's PhD)	***	***			ARC, UNICEF & WHO
Longitudinal Study of Australian Children (LSAC)		***	***		FHACSA, AIFS, TICHR
Longitudinal Study of Indigenous Children (LSIC)		***	***		FHACSA, AIFS, TICHR
Abacadabra RCT (Tess Lea, CDU)				***	CDU, DET, ARC, Telstra Fnd
Planned new initiatives					
'Let's Start' – Indigenous Parenting – (Wider roll-out via AMSS in 2010)				***	FHACSA, Beyond Blue, WETT
'Care for Development & Nutrition' (NHMRC, CRE application Sept 09)	***			***	CCCH, Hollows, WHO, UNICEF, DATSH, NHMRC
Indigenous Family Literacy Program (ARC Linkage application Nov 09)				***	CDU, Batchelor College, DET, NIPCX, Smith Family, DEEW, FHACSA
Indig Healthy for Life K-12 Curriculum (Partnership with HFS & DET?)				***	DATSH, DEEW, DET, RioTinto, BHP, Forrest etc
Establishment of Centre of Excellence in Education & Developmental Health				***	CDU (Education & SSPR)

Summary



- Early years set a template for the rest of life (and indeed for subsequent generations) that is difficult to alter
- There is evidence that interventions in those early years can make a life long difference
 - Development, education, parenting, social environment
- Investing in the early years is net cost-saving for our society

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