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Editorial

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The 2016 provincial health research day theme reflects the importance given to 'the first 1000 days' as one of five key priorities for 2016-17. The day and this newsletter explore aspects related to 'the first 1000 days' as one of five key priorities for 2016-17. The day and this newsletter explore aspects related to the 'first 1000 days' using the 'Survive, Thrive and Transform' framework/ approach, articulated in the Global Strategy for Women's Children's and Adolescent's Health.

The 'first 1000 days' – the time from conception to a child's 2nd birthday – is widely recognised as a critical window of opportunity to secure the optimal development of children. It is the focus of the Lancet series launched online on 4 October 2016: "Advancing Early Childhood Development: from Science to Scale". The edition features articles by South African lead researchers on scalable evidence based models, Linda Richter, and models for determining research priorities, Mark Tomlinson. It calls for engagement by the health sector as a key entry point, which is also articulated in the National Integrated Early Childhood Development Policy.

In the Western Cape, the provincial government's 'first 1000 days' initiative, launched in February 2016, adopted an 'all-of-government' and 'whole-of-society' approach. This initiative focuses on three key areas: nutrition and health (nutrients = yellow bowl); nurture, care and support (relationships = red heart); and safety, protection and stimulation (environment = blue blocks).

www.westerncape.gov.za/first-1000-days/

This newsletter articles are grouped under the sub-themes of 'survive', 'thrive' and 'transform', and demonstrate the interdisciplinary science of early childhood development and the significance of supportive relationships.

In the 'survive' sub-theme, a senior obstetrician, John Anthony, focuses on key aspects of maternal deaths, calls for a wider understanding of the definition and emphasizes the need for psychosocial support for pregnant women. Shanaaz Matthews, a social worker and researcher, reflects on the high rates of homicide in infants and accidents in young children and calls for strengthening of community based mental health services and protective child care measures, as well as prevention of adolescent male-on-male violence.

A paediatric infectious diseases specialist, Mark Cotton, provides a detailed update on HIV prevention, highlights the need to strengthen adherence support and calls for sustained vigilance and integrated care. Baljit Cheema, a paediatric emergency medicine specialist, creatively asks pertinent questions to challenge thoughts on what can be done to improve emergency child health services, emphasizing the critical importance of good communication at each link in the care pathway. In the 'thrive' sub-theme, a paediatric intellectual disability consultant, Colleen Adnams, focuses on alcohol in pregnancy and fetal alcohol spectrum disorder (FASD). She calls for a coordinated response and for health services to be aware of community resources that support women at risk. Other researchers in this field have emphasised the need to focus on fathers' and men's groups, as well as teacher training in collaboration with Department of Education. In her article on breastfeeding and food security, Catherine Pereira, a nutritionist emphasizes improved collaboration, in keeping with the Western Cape Provincial 'Better Together' slogan. However, "more than food is needed" as Astrid Berg, a child and infant psychiatrist, so eloquently articulates in her article on parent-infant attachment. She calls for creating opportunities – space and time, within health services for parents to express and share their concerns and improve parent-child relationships.

In the 'transform' sub-theme, two neurodevelopmental specialists, Kirsty Donald and Jo Wilmhurst, bring together multidisciplinary aspects. They summarize the advances in neuroscience, specifically highlighting the effects of substance abuse in pregnancy, and hypoxic ischaemic

encephalopathy on morbidity and stunting. They call for health worker skills-training to make effective interventions more readily available. Karen Fieggen, a geneticist, focuses on epigenetics and highlights the heightened sensitivity to environmental influences – the parent-child relationship, during periods of rapid brain development in the first two years of life. Finally, David Harrison, the CEO of DG Murray Trust, highlights the scientific evidence for brain synapse formation which peaks in the first year of life, the effects of psychosocial stress during pregnancy and early childhood, and makes the economic case for early childhood development as the most powerful investment in human capital that a country can make.

Ultimately, the authors collectively articulate that the currency to invest in the 'first 1000 days' lies in understanding the value of relationships, including relationships in the context of services: point-of-care services; collaborative inter-sectoral partnerships; psychosocial supportive relationships; family and community relationships; and/or parent/care-giver-infant relationships. Their contributions illustrate the concept of 'relationships matter most', being the core premise for developing a 'theory of change' for the 'first 1000 days'.

*With input by Barak Morgan, Global Risk Governance, UCT

FIRST 1000 days
Right Start. Bright Future

The confidential enquiry on maternal deaths, update and progress

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Since the inception of the statutory process of maternal death notification, a sustained and well-characterized pattern of disease causing maternal mortality in South Africa as a result of pregnancy and childbirth has emerged. Targeted interventions have been put in place and measurable outcomes assessed. There are many findings and recommendations. Two findings have greatest consequence and a third consideration is conspicuously absent.

The country-wide burden of pathology related to HIV infection (especially when associated with co-morbidity caused by tuberculosis) is very clearly the greatest problem faced by the country accounting for up to 40 percent of maternal deaths. It is also the area within which successful intervention has occurred. In the latest triennial report mortality rates attributable to non-pregnancy related infection fell. This is attributable to the successful role-out of the antiretroviral programme country-wide.

The second pertinent observation is the considerable variation in provincial mortality rates and patterns of mortality attributable to specific conditions. In this respect, the Western Cape has a maternal mortality ratio of less than half the national average despite working with a similar health-care budget to other provinces. The consistent pattern of lower mortality rates in the Western Cape is unexplained but likely attributable to more effective organisation of referral services and infrastructure.This is important as managerial influence is an important component of the health care system and has the potential to influence mortality rates.

The third pertinent observation regarding the confidential enquiries is what they fail to disclose: the definition of maternal death is arbitrary. For the purposes of the South African enquiry it is limited to deaths during pregnancy and for 42 days thereafter. There is data available to suggest that late maternal deaths, both direct and indirectly related to pregnancy, account for a substantial loss of life under circumstances where the underlying condition may have been detectable and amenable to intervention during pregnancy.[1] Consequently certain countries and the World Health Organization have suggested that maternal mortality be defined as any death occurring up to a year after delivery. The cited causes for death within this extended definition are those due to cardiovascular disease (cardiomyopathy and thromboembolism), cancers and psychiatric illness. This remains an unmet challenge globally and within our society.

The preventable death of a mother is both the loss of a human life and also casts a broad shadow over the future wellbeing of surviving children who suffer the consequences of diminished nurture with less adequate access to feeding, healthcare and education.

The challenge yet to be faced is one of improving the organization of health care, seeking and redressing reversible medical causes for maternal mortality and taking advantage of pregnancy care as an opportunity for screening and preventing diseases and psychiatric illness that lead to postnatal mortality, both within the 42 day window period and for up to a year after childbirth.

References

1. Sliwa K, Anthony J. Late maternal deaths: a neglected responsibility. The Lancet. 2016;387(10033):2072-3.

Deaths from injuries in children under 18 years of age in Metro West, Cape Town: Data from the Child Death Review 2014 and 2015

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Many countries use a standardised child death review (CDR) process to investigate unnatural and natural unexpected deaths in children under 18 years of age, in order to improve child health and protection systems. CDR teams have identified modifiable causes of natural unexpected deaths as well as child abuse and neglect, infanticide and deaths due to other forms of injury. By law all unnatural and natural unexpected deaths should be referred for autopsy in South Africa.

This pilot was established at Salt River mortuary in Cape Town from January till December 2014. Salt River mortuary is an M6 mortuary (>2 000 bodies per annum) that serves the Western Metro, a large catchment area extending from Atlantis to Kommetjie, and from Camps Bay to Mitchell's Plain. Following the success of the pilot, the CDR process is being extended to all mortuaries in the Western Cape, with the aim of having complete coverage by early 2017.

The pilot was initiated by the Children's Institute and the Division of Forensic Medicine and Toxicology, University of Cape Town. A multidisciplinary team including the police service, social services, health, forensic pathology and prosecution services, aimed to identify modifiable or remediable factors. A standardized approach was used to understand the context in which each death occurred, including biological and psychological, family, social and cultural factors as well access to and response of the health and social welfare system. Although important information was collected on natural deaths, this article reports on deaths due to injuries from 2014 and 2015 and includes deaths during the 'first 1000 days'.

There were 201 and 204 deaths due to injuries in children under-18 years of age in 2014 and 2015 respectively. The age distribution by broad cause is shown in Table 1. The sex distribution was similar for all categories except for homicide which was 2.5 times greater in boys (23 vs 57) in 2014 and 3 times greater (21 vs 66) in 2015.

Homicide includes deaths due to neglect and abuse and infanticide (the killing of a baby shortly after birth). Other includes mostly burns and drownings, but also includes electrocutions and poisonings.

Table 1: Causes of mortality due to injuries by age category in Metro West in 2014 and 2015

Age group	< 1 year of age		1 to 4 years of age		5 to 9 years of age		10 to 14 years of age		15 to 17 years of age		Total
	2014	2015	2014	2015	2014	2015	2014	2015	2014	2015	
	n=32 %	n=38 %	n=40 %	n=48 %	n=28 %	n=25 %	n=38 %	n=30 %	n=63 %	n=63 %	n=405%
Homi-cide	56.3	50.0.	7.5	14.6	36.0	0.0	34.2	33.3	69.8	81.0	41.0
Other	43.8	44.7	57.5	52.1	42.9	48.0	23.7	26.7	12.7	7.9	32.9
Road traffic	0.0	5.3	35.0	33.3	53.6	52.0	34.2	30.0	12.7	7.9	23.5
Suicide	0.0	0.0	0.0	0.0	0.0	0.0	7.9	10.0	4.8	3.2	2.7

SURVIVE

Homicide was the commonest cause of death due to injuries and accounted for 41% of all deaths in 2014 and 2015. It spanned all age groups, with the highest burden in infants and the 10 to 17 year age group. Road traffic injuries accounted for almost 25% of all deaths and peaked in the 5 to 9 year old age group. Suicide accounted for 2.7% of deaths and occurred in children 10 to 17 years of age.

The cause specific death rate stratified by age is given in Table 2. As there are no denominators available for the age group 15 to 17 years it was not possible to work out rates for this group.

Deaths due to injuries are common in children. Homicide was the leading cause of injury death and had a bimodal pattern. It peaks in the <1 year age group and this is related to the killing and abandonment of babies shortly after birth. Given the liberal abortion legislation in SA, identifying mothers in need of social support through community based mental health services is critical. The second peak is in 10 to 17 year olds and this is due to interpersonal violence and mainly affected young men but also occurred in boys as young as 10 years. Preventing male-on-male violence is critical and a multipronged evidence-based approach is required.

Road traffic injuries are another important cause of death and were highest in children 1 to 4 years of age. They tend to occur in residential areas and action needs to be taken to reduce speed limits and provide safer living areas.

The CDR process identifies important information on the epidemiology of child deaths and provides additional data that compliments facility-based data from the Child Healthcare Problem Identification Programme (Child PIP).

Table 2: Mortuary-specific rates of mortality from injuries by age category in Metro West in 2014 and 2015

Age group	< 1 year of age		1 to 4 years of age		5 to 9 years of age		10 to 14 years of age	
	2014	2015	2014	2015	2014	2015	2014	2015
	Per 1000 live births		Per 100 000 population		Per 100 000 population		Per 100 000 population	
Homicide	0.47	0.49	2.3	5.4	0.6	0.0	8.2	6.3
Other	0.36	0.42	17.7	19.2	7.2	7.2	5.7	5.0
Road traffic	0.0	0.18	10.7	12.3	9.0	7.8	8.2	5.7
Suicide	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.9
Overall injury rate	0.83	0.62	30.7	36.1	16.8	15.0	23.9	18.9

Vertical Transmission Prevention and the HIV-exposed infant: Progress and challenges

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There has been considerable progress in preventing vertical transmission of HIV since the landmark 076 study published in 1994. Using zidovudine alone, the transmission rate was reduced from 25% to 8% in a randomised trial of formula-fed infants. There have been many improvements since then. These include more potent antiretroviral (ARV) regimens, rapid initiation ante-natally and promoting breast-feeding while using ARVs to prevent post-natal transmission.

Since 2006, ARV therapy has been recommended for women with World Health Organisation (WHO) stage 3 or 4 disease or a CD4 count below 350 cells per µl. In 2009, the WHO issued a rapid advice statement, simplifying its approach. 'Option A', an equivalent of maternal ART, was put forward for well mothers and CD4 counts above the 350 threshold. It consisted of combinations of ziduvudine and single dose nevirapine for mother and infant. The alternative, 'Option B' included ART for the mother during pregnancy and postnatally until the infant was fully weaned from breastfeeding. South Africa adopted 'Option B' in 2013. Its more innovative counterpart, Option B+, was implemented in Malawi in 2011, and recommended lifelong ART regardless of CD4 count. This removed a logistic barrier to implementation and simplified the policy. Evidence for initiating ART at high CD4 counts came from the START and TEMPRANO randomized trials which showed benefit from initiating ART at high CD4 counts, starting when in good health rather than deferring until disease progression has begun.

'Option B+' was adopted in the Western Cape in 2014 and nationally in 2016, following World Health Organization (WHO) endorsement. In 2015, early findings were released from an international study in high burden settings where breast feeding is common, which included women attending Michael Mpongwana Midwife Obstetric Unit. ''Option B' (transmission rate 0.5-0.6%) showed a 44% reduction in transmission at Day 14 compared to Option A (transmission rate 1.8%).[1]

In July 2015, Cuba became the first country to receive WHO validation for 'elimination' of vertical transmission, transmission using criteria in Table 1. In 2016, Armenia, Bellarus, Moldovia and Thailand followed.

An evaluation of 'Option B' in a sample of South African public sector clinics showed transmission rates of 2.6% at 3 months, increasing to 4.4% by 18 months of age.[2] Over half of post-natal transmission occurred 6 months, but accumulated thereafter.

The universal introduction of a birth PCR, a useful innovation, assists earlier identification of HIV status, enabling prompt ART commencement and linkage to care.

Emerging risks

The need to start ART early is now accepted to prevent HIV dissemination and to restrict the HIV reservoir as much as possible. However, new information suggests that even with suppressive ART, active replication continues. Even after early ART commencement (8 weeks) there is evidence of brain abnormalities.

Missed antenatal diagnosis in the mother

Maternal acquisition of HIV infection ante-natally or during breastfeeding is a major contributor to vertical transmission. A large South African study found that while maternal HIV infection occurred in 2.2% of mothers giving birth, this seroconversion contributed to 26% early infant HIV infections (n = 25 061).[3] Sexual activity without condom use in pregnancy is a big risk for acquiring HIV, and may not be detected early enough to prevent vertical transmission. These infants are at high risk for severe disease and are still seen in our hospitals. The introduction of pre-exposure prophylaxis in pregnancy could protect women unable to use condoms. Consistent application of the rapid antibody (Ab) test at booking, 32 weeks gestation, at delivery and during breastfeeding is essential. The 'window period' of up to 12 weeks post infection for the antibody rapid test to show up is a concern. Accessible, inexpensive Point of Care viral testing may have

an important place.

With 'Option B+' ARV exposure begins at conception. Although studies have not identified major problems, vigilance and long-term follow-up are essential to detect risk. The introduction of unique patient identifiers and routine electronic capturing of medical data and will facilitate this.

Non-adherence and women on 2nd line ART

A 2012 cohort review showed approximately 10% of adults had failed first line ART. When adherence is supported, response to 2nd line ART is excellent. A concern is transmitted HIV resistance, and in Washington DC, where 2% of the adult population has HIV 22.5% of new infections were resistant.[4] This could have bad implications for infants in the future, as there are very few options for post-exposure prophylaxis for babies born to mothers failing first line therapy. There is adequate data only for nevirapine and zidovudine on dosage for newborn infants, but lopinavir l-ritonavir has been used successfully for post exposure prophylaxis from a week of age in breastfed infants.[5] Toxicity is a risk and paediatric specialist support should be sought where this drug is contemplated.

HIV diagnosis in the infant and child

The interpretation of sensitive diagnostic tests has become more difficult in an era of declining MTC transmission. The positive predictive value of a positive PCR test has declined from 98% with a 30% transmission to 65% with a 1% transmission rate.

Indeterminate infant PCR results pose a problem. Although these rates have declined, the relevance has changed. Indeterminate results were 2.4% for women beginning ART for low CD4 counts with 7% positive on follow-up. More recently, indeterminate rates of 0.4-0.5 are found but almost 50% are positive on follow-up.[6] ARV exposure in-utero and post-partum, may reduce the number but not eliminate HIV from the infant.

Work in Lesotho has shown that standard PCR tests become negative and HIV antibodies disappear in HIV-infected infants after early ART, but HIV rebounds after discontinuing therapy. The 'Mississippi baby', who received ART at 30 hours of age, had detected viral load for the first few weeks, which became undetectable both on and off ART before relapse. This demonstrates that we still have much to learn about HIV infection and must be vigilant for similar scenarios in South Africa.

Infant diagnosis has become more complex and the requirement on time and testing has increased for a small number of infants. The rapid Ab test at 9 and 18 months, an important component of our vertical transmission prevention program, is a final measure to ensure that HIV-exposed infants remain HIV-free.

Increased risks in HIV-exposed uninfected children

In South Africa, the numbers of HIV-exposed uninfected (HEU) is rising, and this translates into 3 million HEU children over the past decade. Fortunately, with more access to ART, parents are much healthier, which translates into improved health for their children. TB co-morbidity, however, translates into increased household risk for TB.

In addition, severe pneumonia is associated with HIV exposure.[7] While ARV protection is safe and has many benefits for HEU infants, recent Western Cape data suggests poor adherence to ARVs of 1.9 months (median) in HEU and HIV unexposed infants.8Guidance to manage the complexities of HEU and HIV unexposed infants were recently formulated (Table 2).9

Conclusion

With adoption and support of scalable public health programs, the possibility of eliminating HIV vertical transmission is real. While there are many obstacles, commitment, vigilance and care are key components to success.

References

1. Fowler M, Qin M, Fiscus S, Currier J. PROMISE: Efficacy and Safety of 2 Strategies to Prevent Perinatal HIV Transmission. CROI; Seattle2015.
2. Goga A, Jackson D, Lombard CJ, Dinh T, Ramokolo V, Ngandu N, et al. Highest risk of mother-to-child transmission of HIV or death in the first 6 months post-partum: Results from 18 month follow-up of an HIV-exposed national cohort, South Africa 21st International AID Conference 11; Durban, South Africa 2016.
3. Dinh TH, Delaney KP, Goga A, Jackson D, Lombard C, Woldesenbet S, et al. Impact of Maternal HIV Seroconversion during Pregnancy on Early Mother to Child Transmission of HIV (MTCT) Measured at 4-8 Weeks Postpartum in South Africa 2011-2012: A National Population-Based Evaluation. PLoS One. 2015;10(5):e0125525.
4. Kassaye SG, Grossman Z, Balamane M, Johston-White B, Liu C, Kumar P, et al. Transmitted HIV Drug Resistance Is High and Longstanding in Metropolitan Washington, DC. Clin Infect Dis. 2016.
5. Nagot N, Kankasa C, Tumwine JK, Meda N, Hofmeyr GJ, Vallo R, et al. Extended pre-eposure prophylax-

is with lopinavir-ritonavir versus lamivudine to prevent HIV-1 transmissio through breastfeeding up to 50 weeks in infants in Africa (ANRS 12174): a randomised controlled trial. The Lancet. 2016;387(10018):566-73.
6. Maharaj J, Preiser W, Maritz J. Intensified PMTCT influences the rate and eventual outcome of indeterminate infant HIV-1 PCR results. SA HIV Clinicians Society Conference 2016; 13-16 April 2016; Sandton, Johannesburg 2016.
7. le Roux DM, Myer L, Nicol MP, Zar HJ. Incidence and severity of childhood pneumonia in the first year of life in a South African birth cohort: the Drakenstein Child Health Study. The Lancet Global Health. 2015;3(2):e95-e103.
8. Zunza M, Mercer GD, Thabane L, Esser M, Cotton MF. Effects of postnatal interventions for the reduction of vertical HIV transmission on infant growth and non-HIV infections: a systematic review. J Int AIDS Soc. 2013;16:18865.
9. Slogrove A, Cotton M, F. Special issues and management of HIV exposed uninfected infants and children. Pediatric on call. 2016;13(2).

Table 1. Criteria to eliminate HIV vertical transmission

Impact Indicators – must be met for at least 1 year
- Below 50 cases per 100 000 live births
- Transmission <5% in breastfed and <2% in non-breastfed infants

Process Indicators – must be met for at least 2 years
- 95% of pregnant women, both who know and do not know their HIV status, received at least one antenatal visit
- 95% of pregnant women know their HIV status
- 95% of HIV-positive pregnant women receive ARVs

(The same criteria apply to Syphilis elimination)

Table 2. 10-point care package for HEU infants [9]

Optimal routine child health management:
1. Manage & treat acute problems
2. Provide feeding counselling & support
3. Monitor growth & development
4. Provide vaccinations, vitamin A, anti-helminthics (deworming)
5. Screen for TB contacts and actively manage
6. Ask about mother's health, family planning
7. Provide social support and consider parental HIV disclosure

Optimal routine HIV-exposed infant management:
8. Provide vertical transmission prevention prophylaxis as appropriate (according to national guidelines)
9. Exclude HIV infection & perform HIV testing as appropriate (according to national guidelines) and maintain awareness of possibility of infection based on emerging information

Additional HEU infant management:
10. Identify high-risk HEU infants (poor birth outcomes, symptoms of anemia, impaired growth or neurodevelopment, history of hospitalization) & ensure more regular follow-up and monitoring

How can paediatric emergency care be improved in the first 1000 days?

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The risks involved in the appropriate emergency care of infants are best illustrated using a patient vignette:

Thembisa is a healthy newborn baby girl and it's hard to imagine her ever requiring emergency care.

What can be done to avoid an emergency care during this time?

The period from conception to 1000 days of age is a highly vulnerable time of life and emergency care plays a vital role in reducing morbidity and mortality.[1]

Primary Health Care Level

At 3 weeks of age Thembisa becomes ill with fever, vomiting and poor feeding, so her mother takes her to the local clinic. There is a special immunisation campaign at the clinic on that day and there is a long queue. Thembisa's mother joins the queue and waits anxiously.

What can be done to improve this situation?

There needs to be a system for separating out babies brought with a 'new' illness from those coming for routine services. Triage is the sorting out of patients based on clinical presentation into urgency categories which guides who needs to be seen first. Nurses at PHC level must be able to do basic triage.

There are a number of different paediatric triage tools [2] – but note: Integrated Management of Childhood Illnesses (IMCI) is NOT one of them. IMCI is a clinical decision making tool but children are seen in order of arrival – not by urgency. Tools for triage in developing world settings include WHO's Emergency Triage Assessment and Treatment (ETAT)[3] which has been adapted for use in SA (ETAT-SA).[4] The triage portion of ETAT-SA has been fully incorporated into the WC triage tool: the revised Paediatric South African Triage Scale (P-SATS).[5] If formal triage is not feasible then simplified 'at a glance' tools such as the Patient Assessment Triangle (PAT)[6] can be used.

Referral Phase

The clinic nurse who eventually sees Thembisa decides to refer her to hospital and she gets a student nurse to call for an ambulance.

What can be done to improve this situation?

Routine data collected on childhood deaths (ChildPIP)[7]and local research[8] on pathways to care for critically ill children show that time and communication are the major issues. Incorrect or incomplete information, receiving centres failing to give timely advice, not checking essential facts all lead to misunderstandings, delays and preventable errors.

SURVIVE

The four areas requiringrequiring attention are communication between the all providers in the care pathway:[9]

1. Referring & receiving facility
2. Referring/receiving facility & METRO Control Centre (MCC)
3. MCC & Specialised Paediatric Retrieval Including Neonatal Transfer Team (SPRINTT)
4. SPRINTT & receiving facility

Transport Phase

Inadequate communication can play out as follows:

The ambulance crew sent to transfer Thembisa does not have the skills or equipment to transfer a small sick baby. They request a Paramedic ambulance with incubator and there is a delay till that team arrives.

What can be done to improve this situation?

IIn the WC Metro, the solution partly lies in having specialised paediatric paramedics who have undergone additional newborn and paediatric critical-care training.[9] This team has dedicated vehicles kitted out with the appropriate equipment.

Hospital Phase

Inadequate communication can play out as follows:

When the paramedics arrive with Thembisa, they wait for 15 minutes before being able to get the attention of a junior doctor. The doctor cuts them short during the handover, signs the forms and tells them to take Thembisa to the paediatric corner. The nurse is on a break so they leave Thembisa in the paediatric cot with her paperwork.

What can be done to improve this situation?

Research shows that transitions in care (handovers) are points of vulnerability. Handover should be standardised with checks that information has been correctly received. If done this helps to flag children at risk of deterioration, and prevent infant death.

References

1. Duke T, Cheema B. Paediatric emergency and acute care in resource poor settings. J Paediatr Child Health. 2016;52(2):221-6.
2. Cheema B, Stephen C, Westwood A. Paediatric triage in South Africa. South African Journal of Child Health. 2013;7(2):43-5.
3. World Health Organisation. Updated guideline: paediatric emergency triage, assessment and treatment2016. Available from: www.who.int.
4. Cheema B, & Stephen, C. Emergency Triage Assessment and Treatment South Africa (ETAT-SA) Manual for Participants. In: Cheema B, & Stephen, C. , editor. 2014.
5. Twomey M, Cheema B, Buys H, Cohen K, de Sá A, Louw P, et al. Vital signs for children at triage: A multicentre validation of the revised South African Triage Scale (SATS) for children. SAMJ: South African Medical Journal. 2013;103(5):304-8.
6. Dieckmann RA, Brownstein D, Gausche-Hill M. The pediatric assessment triangle: a novel approach for the rapid evaluation of children. Pediatr Emerg Care. 2010;26(4):312-5.
7. Stephen C. Saving Children 2012-2013 An eighth survey of child healthcare in South Africa. C S, editor. Pretoria: MRC Unit for Maternal and Infant Health Care Strategies; 2016.
8. Hodkinson P, Argent A, Wallis L, Reid S, Perera R, Harrison S, et al. Pathways to care for critically ill or injured children: a cohort study from first presentation to healthcare services through to admission to intensive care or death. PLoS One. 2016;11(1):e0145473.
9. Cheema B WA. Standards for Paediatric Emergency Care: Expert Consensus Report for the Western Cape. 2015.
10. Ratnavel N. Evaluating and improving neonatal transport services. Early Hum Dev. 2013;89(11):851-3.

Alcohol in pregnancy and the developing child: What can be done?

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Women who drink excessive amounts of alcohol during pregnancy are at high risk for giving birth to children with developmental disorders. The disability resulting from prenatal exposure to alcohol is termed fetal alcohol spectrum disorder (FASD), the most common preventable cause of intellectual disability worldwide.
In South Africa, FASD is a major public health problem and the risk for FASD is extremely high. In high risk communities in the Western Cape, the prevalence of FASD is nearly one in four school entry aged children.
The term FASD describes the wide range of mild to severe physical, cognitive, behavioural and social effects in a person resulting from prenatal exposure to alcohol. Fetal alcohol syndrome (FAS) is the diagnostic term used to describe the most severe effects on this spectrum. If a child with a FASD has few, or no physical features of the spectrum, but has characteristic behaviour and/or learning problems, the term alcohol-related neurodevelopmental disorder (ARND) may be used to describe the child's FASD condition.
This condition is especially important because the cause of the person's disabilities is frequently not identified and they do not receive the supports and interventions they require. Prenatal alcohol exposure is more harmful to the developing child than other substances of abuse in pregnancy.

Effects of alcohol exposure on the child

The extent of alcohol injury to the developing child depends on how much, how often and when in the pregnancy the mother consumes alcohol. The most vulnerable period for alcohol injury to the baby is the first three months of pregnancy. The cognitive and behavioural effects are the most commonly noticeable and have the greatest negative impact on the affected person's quality of life. These typically manifest in infancy, but are especially apparent when the child enters formal schooling where they manifest as learning and behaviour problems. These include inattention and hyperactivity, difficulty with memory, problem solving, reasoning and planning and social judgement as well as broader scholastic problems involving speech and language, reading and arithmetic. The majority of children and adults with FASD have borderline or mild intellectual disability, but also may function in a more severe intellectual disability range. The effects of FASD are life long, resulting in many unmet social, educational, health needs in children, adolescents and adults.

Social and environmental risk factors for FASD in South Africa

The cause of alcohol misuse in populations is complex, but in the South African context, is particularly linked to poverty, deprivation and low social status and education, especially of women. This is a consequence of the country's history of political, racial and gender oppression. FASD remains especially common in rural, farming communities. However, all women who drink in pregnancy are at risk.

FASD affects families and communities, not just the individual. A higher rate of foster care and adoption exists amongst children with FASD. There is also a high rate of inter-generational alcohol misuse and many parents of children with FASD are themselves exposed to alcohol before birth. Parental alcohol abuse and FASD affect ability to parent children effectively since these parents have the same intellectual and social skill difficulties as their children.

Interventions to address alcohol use in pregnancy in South Africa

Good models of identification, prevention and intervention practice need to be identified and implemented in communities through policies and practices across all sectors. Primary prevention includes education of women and men, their partners and communities on the relationship between alcohol and FASD. No known amount of alcohol is safe to drink in pregnancy and education about harms of drinking in pregnancy should take place in all settings, including health, educational, social services and community settings. Secondary prevention includes screening, early intervention and support services for pregnant women and women of childbearing potential who are at risk for having a child with FASD. Health and care workers should be aware of the community resources that support women at risk. Screening programmes have been developed but are not routinely implemented in South Africa.

Further prevention includes identifying women who have a child with FASD and are at risk for future pregnancies and providing counselling, support and services. FASD is arguably the most stigmatized cause of intellectual disability and it is especially important to address issues of stigma around FASD.

Alcohol misuse in pregnancy and FASD need to be seen in the context of the global problem of substance abuse and the historical, socio-political, economic and cultural factors that influence present day South Africa. Broader prevention includes addressing these environmental factors that increase the risk for FASD. Strategies should include a coordinated response between all community role players and sectors, including the liquor industry sector.

Breastfeeding and Food Security

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Breastfeeding is an excellent example of an important action during the first 1000 days that can improve food and nutrition security, as well as the health status of infants and young children (IYC).

Optimal infant and young child feeding (IYCF) is defined by the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF) as:

- Early initiation of breastfeeding within one hour of birth;
- Exclusive breastfeeding for the first six months of life; and
- Introduction of nutritionally-adequate and safe complementary (solid) foods at six months together with continued breastfeeding up to two years of age or beyond.[1]

Breastfeeding confers many proven benefits to the mother and baby. The nutritional composition of breast milk is perfectly constituted to support appropriate growth and development during infancy. Breast milk is nutritionally superior to any available substitute and therefore, if we ensure that breastfeeding takes place, we can assist to improve the nutritional status of IYC. Optimal nutrition is essential for adequate growth and development to take place in during the vulnerable first 1000 days of life, from conception until a child's second birthday. Poor nutrition during the first 1000 days can have irreversible and long-term effects throughout the lifecycle.

Food and nutrition security is defined as "when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life".2 Breastfeeding fulfils each of the criteria (appropriateness, availability, accessibility, affordability, utilization and stability of supply) required to achieve food and nutrition security.[2,3] Breastfeeding provides total food and nutrition security in the first six months and therefore, if breastfeeding rates were improved, food and nutrition security of IYC would improve.

The food security and nutritional status of mothers, families and communities are also improved by breastfeeding. While there is not opportunity in this article to go into the detail about how breastfeeding can improve food security for all these groups, there are comprehensive explanations and analyses of this available.[3, 4]

Breastfeeding can be considered as a practice that contributes to the fulfilment of children's and women's human rights. The right to adequate food is realized when "every man, woman and child, alone or in community with others, has the physical and economic access at all times to adequate food or means for its procurement".[5] The Convention on the Rights of the Child and the South African Constitution both state that all children have the right to basic nutrition. It is clear that improved breastfeeding rates would contribute to the fulfilment of additional children's and women's rights.

The current proposed South African food-based dietary guideline (FBDG) on breastfeeding is: "Give only breast-milk, and no other foods or liquids, to your baby for the first six months of life" and there are four supporting messages to accompany this. The technical support paper for this FBDG demonstrates commitment and capacity in South Africa to protect promote and support breastfeeding.[6] Examples of initiatives to support breastfeeding in the Western Cape include: provision of breastfeeding information on the Western Cape government website,[7] efforts to ensure that health facilities achieve 'baby-friendly' status; implementation of breastfeeding support programmes; and, efforts to support working mothers to breastfeed.[8, 9]

All this information is known to many. Yet we still have unacceptably low breastfeeding rates in South Africa, combined with suboptimal nutrition status of IYC, evident in the co-existence of stunting, underweight, micronutrient malnutrition and overweight/ obesity. It is also known that food insecurity is a big challenge, with households in some areas experiencing very high rates.

There are many advocates for breastfeeding in South Africa. What is now needed is improved collaboration, the use of research to inform practices and better use of existing resources. Recent research done in the Western Cape province has recommended "urgent and appropriate interventions focusing on the first 1000 days of life". Salmon[2] has suggested that "the application of food security concepts to infant and young child feeding may foster a sense of the urgency, political will and the broader frameworks required to review, coordinate and implement effective infant feeding policies."

The Western Cape Government slogan of "Better Together" is appropriate - improving breastfeeding to influence the lives of generations to come requires collaboration. Let us use our resources and networks to work together towards improving breastfeeding rates, and contribute to increased food and nutrition security. This will have a huge impact on improving the health of our infants and young children and give us hope for a brighter future in South Africa.

"Alone we can do so little, together we can do so much" – Helen Keller

References

1. Wüstefeld M. Food and Nutrition Security. Meeting of the minds: Nutrition impact of food systems: United Nations Standing Committee on Nutrition 2013.
2. Salmon L. Food security for infants and young children: an opportunity for breastfeeding policy? International breastfeeding Journal. 2015;10(7).
3. World Alliance for Breastfeeding Action. Activity sheet 10: Breastfeeding and Food Security. Available from: http://www.waba. org.my/resources/activitysheet/acsh10.htm
4. Committee on Economic Social and Cultural Rights. The right to adequate food. 12/1999/5. Available from:http://www.fao.org/fileadmin/templates/righttofood/documents/RTF_ publications/EN/General_Comment_12_EN.pdf
5. Du Plessis L. Commitment and capacity for the support of breastfeeding in South Africa: A paediatric food-based dietary guideline. South Afr J Clin Nutr. 2013;26(3):S120-S8.
6. Western Cape Government: Health website Exclusive Breastfeeding. Available from: https://www.westerncape.gov.za/general-publication/exclusive-breastfeeding
7. Western Cape Government: Health. Breastfeeding policy. Circular H144/2012. Directorate: Human Resource Management, Cape Town 2012.
8. Association of Dietetics in South Africa, Breastfeeding and Work –Let's Make it Work! Nutrition Confidence 2015. 31 July 2015.
9. du Plessis L, Herselman MG, McLachlan MH, Nel JH. Selected facets of nutrition during the first 1 000 days of life in vulnerable South African communities. S Afr J Child Health. 2016:10(1):37- 42.

Parent-Infant Attachment

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Young children's intellectual, emotional and physical growth depends on the environment in which they are raised. Thanks to increasingly sophisticated technologies, the past three decades have seen an explosion of new insights into brain development in humans, which show us that the foundations for later mental health are laid very early.

Infants come into this world 'pre-wired' to interact with other human beings. The near term fetus and new-born is continuously open to sensory experience, so that taste, smell and sound are already functioning before birth and become associated with the mother.[1] The relationship that starts during pregnancy rapidly develops after birth and includes the father and those persons who take care of the child. The fact that the baby is absolutely dependent on its caregivers for physical survival, makes these first relationships crucial, not only physically, but also from an emotional point of view.

An infant needs the adult to provide him/her with relief from strong feelings and urges which lessens the pain of hunger, cold or other pains. When the parent is able to soothe the child, then the fear that the child experiences during such episodes will decrease and, in time, these will become manageable and less frightening. It is within this dependent relationship that the brain develops and matures, making the reliable and consistent connection with the parent the most vital part of emotional and physical development.

It, therefore, comes as no surprise that when a child feels secure in the relationship with its caregivers he/she is better equipped to engage with the world than a child whose early experiences were marked by frequent changes in caregivers or unpredictable and violent behaviour from the adults in the home. A secure attachment in infancy predicts positive parent-child relationships later on, better peer relationships, positive child-teacher relationships, higher self-esteem and greater resilience. It provides a foundation for empathic concern and caregiving. Behaviour disorders develop when compassion and feeling for others is missing,[2] can be the case where infants and young children have experienced traumatic early relationships. These can go onto serious disturbances in adult life which can significantly impact on larger society.
Life is not without its stressors – these may come from hardships on many levels, physical trauma, natural disasters – the list of possibilities is endless. However, similar stressors will affect children in different ways. Research has found that the child that has experienced a secure attachment will be better equipped to deal with such stressors. The stable, responsive relationships the child had in her or her early years offer a buffering protection to later adversity.[3]

In our communities parents and infants are often faced with considerable life challenges, leaving parents despondent and with a depressed mood. This in turn may affect the way in which their infants are cared for. More than food is needed to enable an infant to thrive. Research shows that offering parents a confidential space where they can express and share their concerns, improves the parent child relationship and enables the children to thrive.[4]

These findings are compelling and they leave us with no choice – take them seriously and take action because "….the preservation of the mental health of infants is the key to the prevention of mental disorder throughout the lifespan.".[5] However, not only is prevention at an early level the morally 'right' thing to do, but it is cost effective. There is substantial benefit from investing early in the life cycle[6] as it enables the developmental process to be set on the right track while the brain is still 'plastic' and thus able to form new connections.

It is on this basis that the "First 1000 Days Campaign" of the Government of the Western Cape rests. It is hoped that through this Campaign community resources can be optimized – to focus on the early phase of life, of which the attachment relationship between the baby and his/her carers is the most important.

References

1. Lecanuet J-P, Schaal B. Fetal sensory competencies. Eur J Obstet Gynecol Reprod Biol.1996;68:1-23.
2. Zeanah CH, Keyes A, Settles L. Attachment relationship experiences and childhood psychopathology. Ann N Y Acad Sci. 2003;1008(1): 22-30.
3. Garner AS, Shonkoff JP, Siegel BS, Dobbins MI, Earls MF, McGuinn L, et al. Early childhood adversity, toxic stress, and the role of the pediatrician: translating developmental science into lifelong health. Pediatrics.2012;129(1):e224-e31.
4. Berg A. Infant-parent psychotherapy at primary care level: Establishment of a service. S Afr Med J. 012;102(6):582-4.
5. Fonagy P. Prevention, the appropriate target of infant psychotherapy. Infant Ment Health J. 1998;19(2):124-50.
6. Conti G, Heckman JJ. The developmental approach to child and adult health. Pediatrics. 2013;131(Supplement 2):S133-S41.

Advances in neuroscience – The First 1000 Days

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Over the first thousand days, from the time of conception, a child is at risk of many acquired and hereditary threats. Maternal health has a major influence on immediate and long-term infant health.

The prenatal period is a critical time in human brain development. Development and maturation occur rapidly in the early months of life and require a carefully patterned sequence of events and processes. The brain is particularly vulnerable during this developmental window to prenatal influences which may have long-term effects on the brain's structure and function.[1]

Major risk factors for the loss of developmental potential in the young South African child include malnutrition, HIV infection and exposure, and alcohol and methamphetamine exposure. These prenatal influences have long-term adverse effects on a child's neurodevelopment. Advances in neuroimaging methods over the last decade have allowed researchers to study structural, metabolic, and functional abnormalities of the brain and investigate the effects of these prenatal exposures on the developing brain.[1]

Research findings indicate that early stunting, resulting from malnutrition, remains a reliable indicator of poor development as it indicates multiple biological and psychosocial risk factors. This is a robust predictor of poor school achievement and cognition in young South African children.[2] In addition, iron deficiency anaemia is independently associated with delayed brain maturation in infants.[1]

Children infected with HIV have significantly poorer performance on measures of both early motor and cognitive development. The greatest proportions of children who are HIV-infected in South Africa acquire HIV infection vertically, that is, through mother-to-child-transmission. Early invasion of the central nervous system (CNS) by the virus, affects the developing fetal and infant brain, and results in the most common primary HIV-related CNS complication – HIV Encephalopathy (HIVE). This is classified as a stage 4 AIDS-defining illness. Antiretroviral therapy (ART) prolongs survival rates of children suffering from HIV/AIDS, but may not reverse all the early HIV effects on the brain. Mother-to-child transmission has hugely reduced but there is little data on the longitudinal effects of HIV-exposure (without infection) on the developing brain structure and function.[1, 3, 4]

Maternal drug and alcohol abuse affect the fetus directly and indirectly. Direct effects include interference with primary structural development of the developing brain in utero. This may involve brain growth, maturation, neurotransmitter concentration and dynamics as well as neural pathway development. Studies have shown that children with prenatal alcohol exposure have differences in the structure and metabolism of many brain regions and circuits resulting in a wide range of neurobehavioral deficits including visual-spatial functioning, verbal and nonverbal learning, attention and executive functioning.[5, 6] Infants with prenatal exposure to methamphetamines have functional and behavioural deficits,[7] which include poor quality movement, decreased arousal, increased physiological stress and are more likely to externalise behaviour and aggression.[8]

Low socio-economic status, and the environmental circumstances characterising poverty, is associated with smaller brain volumes in children. This maturational lag has adverse implications for children's scholastic success.[9] Economically disadvantaged communities are high-risk populations for a number of these adverse prenatal exposures. Consequently, a significant proportion of young children in South Africa face a number of insults that contribute to the loss of developmental potential and to disabilities that are preventable.[1]

In the field of neonatal care, interventions for infants at risk of hypoxic- ischaemic encephalopathy, such as therapeutic hypothermia, are becoming widely used in the South African setting.[10] Innovative and low cost models can be accessed and introduced into clinical care settings.[11] The previously commonly used, prophylactic intervention phenobarbitone for neonates with hypoxic insults is no longer recommended.[12] Monitoring and intervention for established seizures are

advised. There is evidence to support that untreated clinical and subclinical seizures in neonates are associated with a worse subsequent developmental outcome.[13]

During the measles pandemic in South Africa between 2009 and 2011, a high proportion of infants were infected either due to vaccine failure or before routine vaccinations could be administered. This has resulted in a legacy of South African children presenting with the catastrophic neurodegenerative disorder sub-acute sclerosing pan-encephalitis (SSPE).[14]

Without adequate training for health care professionals, optimal health care delivery cannot be implemented or even contemplated in this critical area. South African training programs such as the African Paediatric Fellowship Program develop skills that can be utilized in health settings across Africa in all paediatric disciplines including neurology, child development, infectious diseases, neonatology, psychiatry as well as ancillary services.[15]

References

1. Donald KA. Biological risks to child development in the first 1000 days. Policy Learning Brief. D G Murray Trust. Cape Town 2014.
2. Grantham-McGregor S, Cheung YB, Cueto S, Glewwe P, Richter L, Strupp B, et al. Developmental potential in the first 5 years for children in developing countries. The Lancet. 2007;369(9555):60-70.
3. Walker SP, Wachs TD, Grantham-McGregor S, Black MM, Nelson CA, Huffman SL, et al. Inequality in early childhood: risk and protective factors for early child development. The Lancet.2011;378(9799):1325-38.
4. Tran LT, Roos A, Fouche J-P, Koen N, Woods RP, Zar HJ, et al. White Matter Microstructural Integrity and Neurobehavioral Outcome of HIV-Exposed Uninfected Neonates. Medicine. 2016;95(4):e2577.
5. Donald KA, Eastman E, Howells FM, Adnams C, Riley EP, Woods RP, et al. Neuroimaging effects of prenatal alcohol exposure on the developing human brain: a magnetic resonance imaging review. Acta Neuropsychiatrica. 2015;27(05):251-69.
6. Mattson SN, Crocker N, Nguyen TT. Fetal alcohol spectrum disorders: neuropsychological and behavioral features. Neuropsychol Rev. 2011;21(2):81-101.
7. Roos A, Kwiatkowski MA, Fouche J-P, Narr KL, Thomas KG, Stein DJ, et al. White matter integrity and cognitive performance in children with prenatal methamphetamine exposure. Behav Brain Res. 2015;279:62-7.
8. LaGasse LL, Derauf C, Smith LM, Newman E, Shah R, Neal C, et al. Prenatal methamphetamine exposure and childhood behavior problems at 3 and 5 years of age. Pediatrics. 2012: 2011-209.
9. Hair NL, Hanson JL, Wolfe BL, Pollak SD. Association of child poverty, brain development, and academic achievement. JAMA pediatrics. 2015; 169(9):822-9.
10. Rossouw G, Irlam J, Horn AR. Therapeutic hypothermia for hypoxic ischaemic encephalopathy using low technology methods: a systematic review and meta analysis. Acta Paediatr. 2015;104(12):1217- 28.
11. Horn A, Harrison M, Linley L. Evaluating a simple method of neuroprotective hypothermia for newborn infants. J Trop Pediatr. 2010;56(3):172-7.
12. World Health Organisation. Guidelines on Neonatal Seizures. Geneva: World Health Organisation; 2011.
13. van Rooij LG, Toet MC, van Huffelen AC, Groenendaal F, Laan W, Zecic A, et al. Effect of treatment of subclinical neonatal seizures detected with aEEG: randomized, controlled trial. Pediatrics. 2010;125(2):e358-e66.
14. Kija E, Ndondo A, Spittal G, Hardie DR, Eley B, Wilmshurst JM. Subacute sclerosing panencephalitis in South African children following the measles outbreak between 2009 and 2011. S Afr Med J. 2015;105(9):713-8.

Epigenetics and Child Health

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The notion that early life experiences shape future function in both physical and mental health and disease is not a new concept but the true nature of how and why this happens is just beginning to be understood. The science of epigenetics is at the forefront of making biological sense of how our environment influences function not in only in our own lifetime but in that of the generations that succeed us. Epigenetics may be defined as 'heritable but modifiable changes in gene expression that do not involve changes to the underlying DNA sequence' and is an important mechanism of creating diversity and modifying function.

Studies on the Developmental Determinants of Health have confirmed that the first 1000 days of life are a crucial period of neuronal and physiological plasticity and a time in which epigenetic modifications may set up pathways that will influence of future health.[1] Seminal work studying adults prenatally exposed to the Dutch famine of 1944-45 led the field in understanding how epigenetic responses to nutritional status in utero could have an impact on adult health. The adults studied who had been born during the famine were shown to have a higher incidence of obesity, type 2 diabetes and abnormal lipid profiles as well as a higher prevalence of mental illness such as schizophrenia when compared to their siblings and control born once the famine had ended.[2] Altered methylation "marks" in genes, important in growth and reaction to stress, confirm the epigenetic origins of these outcomes.[3] Along similar metabolic "conservation" lines, studies have confirmed the increased risk of diabetes and cardiovascular disease in adults who experienced intrauterine growth restriction.[4] The 'hungry' fetus epigenetically modifies gene expression to conserve energy and maximise nutrient access and does not necessarily "re-programme" when resources are plentiful.

Early deprivation and micronutrient deficiency has a well-documented impact on concentration, learning and behaviour. Although some of these effects are the result of a direct effect on brain function, many are the result of epigenetic modification of gene expression crucial to neuronal growth and differentiation.[5] There is heightened sensitivity to such environmental influences during periods of rapid brain development such as that which occurs in the first 2 years of life. Although potentially reversible, these epigenetic changes are heritable and may account for the intergenerational effect seen following early stress in parents despite later improvement in their circumstances. The genes that help regulate stress response are an important epigenetic target for environmental modification. Increasing evidence is emerging to show that psychosocial stress events in a mother during pregnancy and in her response to her infant can epigenetically alter expression of genes in the stress response pathways to create a "high alert" state in the child. This not only influences behaviour but also physiological pathways such as immune function. Children exposed to "toxic stress" such as sexual abuse can have similar epigenetic alteration of stress response pathways. Abused children have higher incidences not only of emotional and behavioural difficulties but also of diabetes and immune dysfunction as adults that can be accounted for by epigenetic effects. Mechanistic pathways confirming this have been well documented in animal models.[6]

The importance of wellbeing at a social, physical, nutritional and emotional level particularly in the first 1000 days of life cannot be overestimated. The role of epigenetic modulation in effecting the results of environmental influences needs ongoing study, both to understand the mechanisms and targets of positive and negative interactions, and to consider how the epigenome may be modified to ameliorate or minimise adverse outcomes following early environmental insults.

References

1. Wallack L, Thornburg K. Developmental origins, epigenetics, and equity: moving upstream. Matern Child Health J. 2016;20(5):935-40.
2. Roseboom TJ, Painter RC, van Abeelen AF, Veenendaal MV, de Rooij SR. Hungry in the in adulthood. J Pediatr Endocrinol Metab. 2010;23(3):215-24. womb: what are the consequences? Lessons from the Dutch famine. Maturitas. 2011;70(2):141-5.
3. Tobi EW, Goeman JJ, Monajemi R, Gu H, Putter H, Zhang Y, et al. DNA methylation signatures link prenatal famine exposure to growth and metabolism. Naturcommunications. 2014;5.
4. Varvarigou AA. Intrauterine growth restriction as a potential risk factor for disease onset
5. Johnson SB, Riis JL, Noble KG. State of the art review: poverty and the developing brain. Pediatrics. 2016;137(4):peds. 2015-3075.
6. Gershon NB, High PC, editors. Epigenetics and child abuse: Modern□day darwinism— The miraculous ability of the human genome to adapt, and then adapt again. American Journal of Medical Genetics Part C: Seminars in Medical Genetics; 2015: Wiley Online Library.

Why invest in the first 1000 days of life?

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CEO DG Murray Trust

The importance of the first 1000 days is obvious to health practitioners. Research over the past two decades has shown that many life-long patterns of illness and health are calibrated in the first years of life. Children who experience malnutrition and other toxic stress are at higher risk for adolescent delinquency, drug and alcohol use and risky sexual behaviour. As adults, they experience higher rates of cardiovascular, metabolic, neuro-endocrine disorders, neuro-psychological problems and obesity. Major health differentials are established early and are sustained through life.[1]

We must, however, make the economic case to secure the required public investment in pregnant women and young children. Early childhood development is the most powerful investment in human capital that a country can make. It sets the rate of return to subsequent investment in health and education. This article makes that case.[2]

A country's development depends on economice growth, generating theincome that creates wealth. It also reduces inequality. In his magnum opus, Capital in the Twenty-First Century, the French economist Thomas Picketty shows that in the long-run, economic growth reduces inequality by expanding employment and increasing real wages. However, the 'equalizing impact' of higher growth is not automatic. It only occurs when the 'political economy' of a society – the way the economy is structured – ensures a broad distribution of benefits.[3]

Let us focus on the profound (and ideologically unsettling) assertion that economic growth is the central mechanism for both economic development and greater equality – and unpackunpack it like a 'matryoshka doll'. If Picketty is correct, then reducing inequality in South Africa primarily depends on greater economic productivity. Since 1994, labour productivity has increased. However, sectoral trends in productivity have not changed much: sectors that performed poorly have continued to do so, while those that fared better in 1994 have grown. These differences probably reflect underlying inequalities in skills that have not significantly changed in the past twenty years. According to Statistics South Africa, the proportion of black African workers classified as 'skilled' increased by only 2.8% between 1994 and 2014. Less than one in five black African workers is skilled, while minority population groups have become more skilled over the past twenty years.[4] Over half the adult workforce is either unemployed (35% – expanded definition) or employed in unskilled categories of work (18%).[5] Only 15% of workers are skilled and this indicates a failing educational system.

While fingers are usually pointed at the poor quality of schooling and the vocational training system, research has demonstrated that much damage to learners is incurred by Grade 4. Children in the poorer school quintiles (1 and 2) enter school scoring about 20% less for maths and home language than quintiles 4 and 5. Scores continue to diverge until Grade 4, where after the deficit gap remains constant.[6] Grade 5 results show that there will be insufficient educational throughput to sustain South Africa's growth as a knowledge economy.[7]

The most significant constraint that impedes growth and employment in South Africa's economy is our failure to develop and protect the source of human capital. There is insufficient level of investment in the 'first 1000 days of life'.[8]

Young children's potential economic power comes from their normal physical, emotional and cognitive development, which in turn are founded on basic inputs of love, food, safety and stimulation. The Harvard Center on the Developing Child has shown that brain function (synapse formation) for sensory pathways, language and cognitive development peak within the first year of life. The brain is most sensitive in first three years of life for the development of language, self-regulation and executive function. These inputs are simple and should be a non-negotiable for every child.

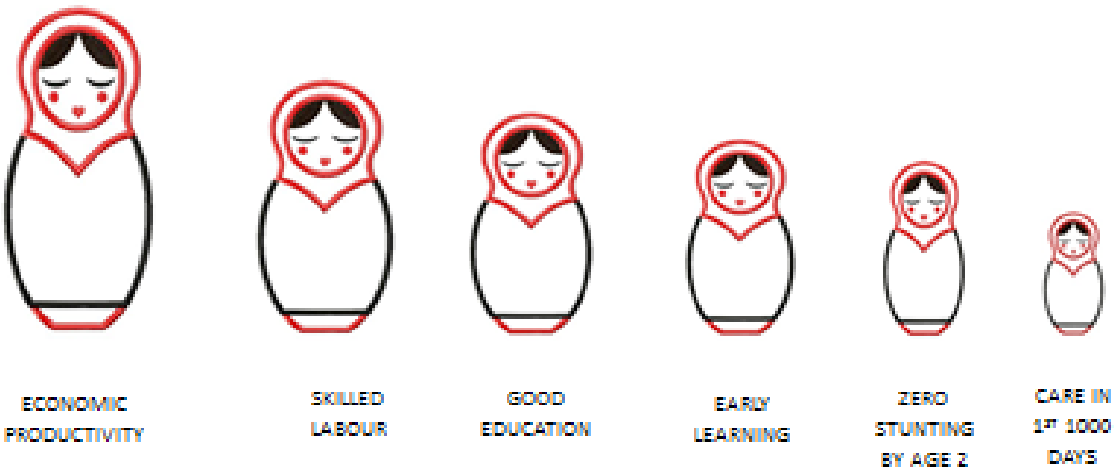
The economist Robert Fogel coined the phrase 'physiological capital' to describe the 'stock' of stored energy and metabolic health that is needed to thrive and to work.[9]

As a country, we have made huge strides in antenatal and obstetric care. There is still room for improvement. This needs to belf this was addressed as a matter of national priority and

urgency. Addressing the, addressing current loss of 'physiological capital' – reflected in high rates of low-birth weight and nutritional stunting – is a major opportunity to grow our economy.

References

1. Engle PL, Fernald LC, Alderman H, Behrman J, O'Gara C, Yousafzai A, et al. Strategies for reducing inequalities and improving developmental outcomes for young children in low-income and middle-income countries. The Lancet. 2011;378(9799):1339-53.
2. Heckman JJ. Skill formation and the economics of investing in disadvantaged children. Science. 2006;312(5782):1900-2.
3. Piketty T, Goldhammer A, Ganser L. Capital in the twenty-first century. 2014.
4. Statistics South Africa. Youth employment, unemployment, skills and economic growth, 1994–2014. 2014.
5. Statistics South Africa. Quarterly Labour Force Survey 2014.
6. Van der Berg S. What the Annual National Assessments can tell us about learning deficits over the education system and the school career year. 2015.
7. Gustafson M, van der Berg S, Shepherd D, Burger C. The costs of illiteracy in South Africa. Stellenbosch Economic Working paper: 2010 Available: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1727649,
8. World Economic Forum. The Africa Competitiveness Report 2015. World Economic Forum, 2015. Available: . http://reports.weforum.org/africa-competitiveness-report-2015/
9. Fogel RW. Secular trends in physiological capital: Implications for equity in health care. National Bureau of Economic Research, 2003.



FIRST 1000 days
Right Start. Bright Future

ANNOUNCEMENTS & EVENTS

ANNOUNCEMENTS

Global fund approved $17m for a novel project over 3 years focusing on young girls 10-14 as well as 15-19 in a defined sub-district. These two age groups are the only groups globally where the mortality due to HIV is increasing.
URL:http://scottfiller.info/global-fund-provides-17m-for-hiv-programs/

University of KwaZulu-Natal: Graduate Programme in Public Health 2017
The Discipline of Public Health Medicine calls for applications from prospective students for the 2017 intake for the Graduate Programme of Public Health. The training aims to produce health professionals who are change agents in the field of public health. A Postgraduate Diploma in Public Health and Master of Public Health are offered.
URL:http://publichealth.ukzn.ac.za/PostgraduateProgrammes.aspx

South African National HIV, Behaviour and Health Survey 2016, kicked off in August 2016, read more about this national research. http://www.hsrc.ac.za/en/news/view/sabssm-v

South African Field Epidemiology Training Programme: Call for applicants – 2017 intake, URL:http://africahealthnews.com/events/south-african-field-epidemiology-training-programme-call-applicants-2017-intake/?utm_campaign

Africa Health Research Institute launched, The KwaZulu-Natal Research Institute for TB-HIV (K-RITH) and Africa Centre for Population Health joined to form an exciting new interdisciplinary research institute, called the Africa Health Research Institute. URL:http://africahealthnews.com/africa-health-research-institute-launched/?utm_campaign

Public health internships, Child Family Health International (CFHI) works with public health students to design public health internships URL:http://africahealthnews.com/students/public-health-internships/?utm_campaign

Treatment Begins at Home, Julie Mac Donnell talks about drug rehabilitation facilities in Cape Town, South Africa. URL:http://africahealthnews.com/drug-rehab-treatment/#more-465

EVENTS

59th International Conference on Multidisciplinary Research
When: 9 - 10 November 2016, Venue: Cape Town, South Africa
URL: http://www.academicsera.com/Conference/SouthAfrica/2/ICMRP/

Fourth Global Symposium on Health Systems Research
When: 14 - 18 November 2016 Venue: Vancouver, Canada URL:http://www.csih.org/en/events/fourth-global-symposium-on-health- systems- research/
Conference 23-24 November 2016: Regulatory Science - The Present and Future - CORS Annual Conference, Venue: University of Copenhagen, Ceremonial Hall, Frue Plads 4, 1168 Copenhagen. URL:http://pharmacy.ku.dk/calender/events-2016/cors-annual-conference/

2016 International Leadership in Healthcare Conference
When: 27- 30 November 2016, Venue: Cape Sun International Hotel, Cape Town, South Africa. URL: www.leadership2016.co.za
7th Child health Priorities Conference.
Theme: Survive, Thrive, Transform.
When: 1-3 December 2016
Venue: Faculty of health Sciences, University of Cape Town. URL: www.childhealthpriorities.co.za

2nd World Breastfeeding Conference 2016. The International Baby Food Action Network (IBFAN) and National Department of Health are co-hosting the 2nd World Breastfeeding Conference in collaboration with WHO, UNICEF, WABA and gBICS
When: 11 - 14 December 2016, Venue: Johannesburg , URL: http://worldbreastfeedingconference.org/

3rd Building Children's Nursing for Africa Conference
When: 28 - 30 March 2017
Venue: The River Club, Cape Town URL:http://www.buildingchildrensnursing.co.za

2017 JOPPP Conference on Pharmaceutical Policy and Practice Research
When: 14 - 16 July 2017
Venue: University of Reading Malaysia Campus, Johor, Malaysia URL: https://www.reading.ac.uk

2nd World Breastfeeding Conference 2016. The International Baby Food Action Network (IBFAN) and National Department of Health are co-hosting the 2nd World Breastfeeding Conference in collaboration with WHO, UNICEF, WABA and gBICS
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2017 JOPPP Conference on Pharmaceutical Policy and Practice Research
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THE VALUES:

Innovation
To be open to new ideas and develop creative solutions to challenges in a resourceful way

Caring
To care for those we serve and work with.

Competence
The ability and capacity to do the job we were employed to do.

Accountability
We take responsibility.

Integrity
To be honest and do the right thing.

Responsiveness
To serve the needs of our citizens and employees.

Respect
To be respectful to those we serve and work with.

THE VISION:

Internal Vision
We are commited to the provision of
"Access to Person-Centred Quality Care"

External Vision
Open opportunity for all.

Better Together
The Western Cape Government has a duty to provide opportunities.
Citizens have the responsibility to make use of them.