BUILDING HEALTH THROUGH THE LIFE COURSE

8TH INTERNATIONAL CONFERENCE ON GLOBAL HEALTH
Miami, 2018

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THE LIFE COURSE APPROACH IN POLICY

SUSTAINABLE DEVELOPMENT GOAL 3:

To ensure a healthy life and promote well-being for all at all ages

OBJECTIVE 3: WHO/PAHO STRATEGIC PLAN

Determinants of health and health promotion through the life course- promoting health and well-being from preconception to old age
Effect of Health Protective Factors on Health Deficit Accumulation and Mortality Risk in Older Adults in the Beijing Longitudinal Study of Aging

Chunxiu Wang, PhD, 1,2 3,4,5,6,7,8,9  Arnold Minnicki, PhD, 1,2,4,5  Xianghua Fang, MD, 1,2,4,5  Zhe Tang, MD, 1,2,4,5  Palir

OBJECTIVES: To examine the impact of health protective factors on health deficit accumulation and mortality risk in older adults.

METHODS: A prospective cohort study including 1,000 participants aged 60 years or older from the Beijing Longitudinal Study of Aging was conducted. Participants were followed for 15 years. Health protective factors were defined as physical activity, social participation, and cognitive engagement.

RESULTS: A total of 1,000 participants were followed for an average of 15 years. Participants who engaged in physical activity, social participation, and cognitive engagement had a lower health deficit accumulation and mortality risk compared to those who did not.

CONCLUSION: Health protective factors have a significant impact on health deficit accumulation and mortality risk in older adults. These findings suggest that promoting health protective factors could be an effective strategy to improve health outcomes in older adults.

Lifetime Risks of Cardiovascular Disease

erry, MD, Alan Dyer, Ph.D., Xuan Cai, M.S., Daniel B. Garside, B.S., ngyan Ning, M.D., Avis Thomas, M.S., Philip Greenland, M.D., Linda Van Horn, R.D., Ph.D., Russell P. Tracy, Ph.D., and Donald M. Lloyd-Jones, M.D.

ABSTRACT

lifetime risks of cardiovascular disease have not been reported across the age spectrum in black adults and white adults.

We conducted a meta-analysis at the individual level using data from 18 cohort studies involving a total of 257,364 black men and women and white men and women whose risk factors for cardiovasce disease were measured at the same
time.
WHY NOW?

1. THE LONGEVITY REVOLUTION
2. THE CHRONICITY EFFECT
3. HEALTH FOR THE HUMAN DEVELOPMENT
From 23 years of age during the Roman empire to 40 years at the beginning of the XX century.

Life span has increased by 30 years in one century.

From 23 years of age during the Roman empire to 40 years at the beginning of the XX century.

Life span has increased by 30 years in one century.
Life expectancy, 1950

Shown is period life expectancy at birth. This corresponds to an estimate of the average number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

Source: Clio-Infra estimates until 1949; UN Population Division from 1950 to 2015
OurWorldInData.org/life-expectancy-how-is-it-calculated-and-how-should-it-be-interpreted/ • CC BY-SA
Life expectancy, 2015
Shown is period life expectancy at birth. This corresponds to an estimate of the average number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

Source: Clio-Infra estimates until 1949; UN Population Division from 1950 to 2015
OurWorldInData.org/life-expectancy-how-is-it-calculated-and-how-should-it-be-interpreted/ • CC BY-SA
Ageing Index

Americas

Global
Trend by age group: Change relative to 1950

Americas

Global
GENERATIONAL SHIFT

2017

1917
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Adhere to rules</td>
<td>Conformers/Conformity</td>
<td>Involvement</td>
<td>Independent</td>
<td>Avid consumer</td>
<td>Strive for a ‘balanced’ life</td>
</tr>
<tr>
<td>Conformers/Conformity</td>
<td>Personal growth</td>
<td>Question everything</td>
<td>Informality</td>
<td>Extremely tech-savvy</td>
<td>Only lived in times when everything can be done on a mobile device</td>
</tr>
<tr>
<td>Question everything</td>
<td></td>
<td></td>
<td>Lack of organizational loyalty</td>
<td>Like personal attention</td>
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<tr>
<td><strong>Needs</strong></td>
<td><strong>More and frequent patient visits</strong></td>
<td><strong>Increased patient visits</strong></td>
<td><strong>Health system that supports decisions</strong></td>
<td><strong>Personalized experience</strong></td>
<td><strong>Focus on wellness than response to illness</strong></td>
</tr>
<tr>
<td><strong>Wants</strong></td>
<td><strong>High level of service</strong></td>
<td><strong>Quality care</strong></td>
<td><strong>‘Shop’ for healthcare</strong></td>
<td><strong>Healthcare system to replicate the level of ubiquitous access technology has</strong></td>
<td><strong>Proactive participants in their health and wellbeing</strong></td>
</tr>
<tr>
<td><strong>Meaning</strong></td>
<td><strong>One way communication, patient compliant</strong></td>
<td><strong>Considers reviews and ratings</strong></td>
<td><strong>Pay attention to reputation/takes into account public perception Will switch provider frequently</strong></td>
<td><strong>Ability to connect with physicians via technology</strong></td>
<td><strong>Face-to-face visits less “normal” Expectation on convenience and available Tele-health will be ‘normal’ expectations</strong></td>
</tr>
<tr>
<td><strong>Access</strong></td>
<td><strong>Relies heavily on direct information from provider Input from children</strong></td>
<td><strong>Dependent on asking providers questions</strong></td>
<td><strong>Significant time online seeking information Search for diagnoses and treatment options via the internet</strong></td>
<td><strong>Prefer to communicate and engage through mHealth applications</strong></td>
<td><strong>Rely on peer recommendations/reviews</strong></td>
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<td></td>
<td>Expect transparency since ‘all’ Information is at their fingertips</td>
</tr>
</tbody>
</table>
WHY NOW?

1. THE LONGEVITY REVOLUTION
2. THE CHRONICITY EFFECT
3. HEALTH FOR THE HUMAN DEVELOPMENT

### Proportion of deaths by age groups and countries in LAC

<table>
<thead>
<tr>
<th>Country</th>
<th>0-59</th>
<th>60-79</th>
<th>80+</th>
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<tbody>
<tr>
<td>Barbados</td>
<td>22.0%</td>
<td>32.1%</td>
<td>45.9%</td>
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<tr>
<td>Uruguay</td>
<td>17.2%</td>
<td>37.0%</td>
<td>45.8%</td>
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<tr>
<td>Anguilla</td>
<td>20.6%</td>
<td>33.8%</td>
<td>45.6%</td>
</tr>
<tr>
<td>United States of America</td>
<td>19.8%</td>
<td>34.8%</td>
<td>45.4%</td>
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<tr>
<td>Montserrat</td>
<td>22.7%</td>
<td>34.1%</td>
<td>43.2%</td>
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<tr>
<td>Puerto Rico</td>
<td>19.6%</td>
<td>38.0%</td>
<td>42.2%</td>
</tr>
<tr>
<td>Bermuda</td>
<td>20.3%</td>
<td>38.0%</td>
<td>41.7%</td>
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<tr>
<td>Cuba</td>
<td>19.1%</td>
<td>40.7%</td>
<td>40.2%</td>
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<tr>
<td>Argentina</td>
<td>22.1%</td>
<td>38.3%</td>
<td>39.6%</td>
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<tr>
<td>Chile</td>
<td>22.6%</td>
<td>38.3%</td>
<td>39.1%</td>
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<tr>
<td>Grenada</td>
<td>30.6%</td>
<td>32.7%</td>
<td>36.7%</td>
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<tr>
<td>Dominica</td>
<td>25.0%</td>
<td>38.8%</td>
<td>36.1%</td>
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<tr>
<td>Saint Kitts and Nevis</td>
<td>37.0%</td>
<td>27.6%</td>
<td>35.5%</td>
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<td>Saint Lucia</td>
<td>52.7%</td>
<td>32.3%</td>
<td>35.0%</td>
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<td>Costa Rica</td>
<td>31.1%</td>
<td>34.1%</td>
<td>34.8%</td>
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<td>Peru</td>
<td>33.2%</td>
<td>32.9%</td>
<td>33.8%</td>
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<tr>
<td>Antigua and Barbuda</td>
<td>30.0%</td>
<td>36.0%</td>
<td>33.1%</td>
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<tr>
<td>Aruba</td>
<td>22.5%</td>
<td>44.4%</td>
<td>33.0%</td>
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<tr>
<td>Virgin Islands (US)</td>
<td>29.8%</td>
<td>37.5%</td>
<td>32.7%</td>
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<tr>
<td>Ecuador</td>
<td>36.9%</td>
<td>30.4%</td>
<td>32.7%</td>
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<td>Panama</td>
<td>37.1%</td>
<td>31.3%</td>
<td>31.6%</td>
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<tr>
<td>Saint Vincent and the Grenadines</td>
<td>35.4%</td>
<td>33.9%</td>
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<td>El Salvador</td>
<td>37.0%</td>
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<td>30.6%</td>
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<td>Colombia</td>
<td>35.7%</td>
<td>34.2%</td>
<td>30.1%</td>
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<td>Paraguay</td>
<td>37.3%</td>
<td>34.9%</td>
<td>27.9%</td>
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<td>Mexico</td>
<td>37.8%</td>
<td>34.9%</td>
<td>27.3%</td>
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<td>Brazil</td>
<td>37.2%</td>
<td>36.2%</td>
<td>26.7%</td>
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<tr>
<td>Dominican Republic</td>
<td>45.0%</td>
<td>30.9%</td>
<td>24.1%</td>
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<td>Nicaragua</td>
<td>47.3%</td>
<td>29.9%</td>
<td>22.8%</td>
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<tr>
<td>Venezuela, Bolivarian Republic of</td>
<td>46.4%</td>
<td>31.3%</td>
<td>22.3%</td>
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<td>Suriname</td>
<td>41.0%</td>
<td>37.5%</td>
<td>21.4%</td>
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<tr>
<td>Guatemala</td>
<td>51.4%</td>
<td>27.3%</td>
<td>21.3%</td>
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<tr>
<td>Bahamas</td>
<td>46.1%</td>
<td>32.7%</td>
<td>21.2%</td>
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<tr>
<td>Belize</td>
<td>52.7%</td>
<td>26.8%</td>
<td>20.5%</td>
</tr>
<tr>
<td>Honduras</td>
<td>60.7%</td>
<td>26.5%</td>
<td>12.9%</td>
</tr>
</tbody>
</table>

% Of total deaths -
Survival of HIV-positive patients starting antiretroviral therapy between 1996 and 2013: a collaborative analysis of cohort studies


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THE GREY ZONES
Midlife mortality by all causes in the U.S

Men and women ages 50-54, death by all causes

Source: “Mortality and morbidity in the 21st century” by Anne Case and Angus Deaton, Brookings Papers on Economic Activity, Spring 2017
THE GREY ZONES
White non-Hispanic midlife mortality from “deaths of despair” in the U.S. by education

Ages 50-54, deaths by drugs, alcohol, and suicide

Source: Mortality and morbidity in the 21st century
Anna Case, Angus Deaton, Princeton University.
NEW PROBLEMS

DISABILITY/DEPENDENCE

CO-MORBIDITY

FRAILTY
YEARS LIVED WITH DISABILITIES BY AGE GROUPS IN THE AMERICAS, 2015

WHY NOW?

1. THE LONGEVITY REVOLUTION
2. THE CHRONICITY EFFECT
3. HEALTH FOR THE HUMAN DEVELOPMENT
The speed of change increases with each generation.
Health in Development- NETWORK ANALYSIS

Health Highlights 2017

Life expectancy reached ~ 75 years of age (2010-2015)

32% of newborns are close to being exclusively breastfeed during the first 6 months

MMR has decreased from 68.4 deaths per 100,000 live births (2002-2005) to 58.2 deaths per 100,000 in 2010-2013 (~15% reduction)

Infant mortality rate declined from 18 deaths per 1,000 live births (2002-2005) to 13.6 (2010-2013) (24% reduction)

The Region achieved 67% reduction under 5 mortality rates from 53.8 per 1,000 live births (1990) to 17.9 per 1,000 live births (2015)

Fertility Rate among LAC adolescents declined from 70.4 births per 1,000 women (15-19 years old) in 2005-2010 to 67 in 2010-2015 (5.5% reduction)

NCDs are leading cause of death (4 out of 5 deaths annually)

- Top 4: Cardiovascular disease, cancer respiratory disease and diabetes
- Leading NCDs risk factors: unhealthy diet, physical inactivity, tobacco use and harmful use of alcohol

PERCEIVED HEALTH NEEDS....

Population with perceived health needs in LAC as percentage of total population by age clusters, gender, and income quintile, 1997-1999

HEALTH DEFINED BY WHO

“Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”

-Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946;
“…Health is a resource for everyday life, not the objective of living: it is a positive concept emphasizing social and personal resources as well as physical capacities.”

-OMS-European Region 1990
DEFINITION

“The life course approach is understood as the dynamic relationship between previous life exposures, subsequent health outcomes, and the mechanisms by which positive and negative influences shape the human life course and social development, with an impact on health outcomes throughout the life span of individuals and populations.”

PAHO-HL, 2015
LIFE COURSE APPROACH

• Inherent to the life span (before birth to the end of life; even transcends other generations)
• Health is reflected in trajectories
• There are critical and sensitive periods (life has certain moments in which protective and damaging events are more marked)
• Latent periods and cumulative effects (the action or inaction during one of the life stages will be reflected later in life: i.e. low birth weight and NDCs or the HPV vaccine)
• Intrinsic relation of social determinants and risk (risk vs. vulnerability)
THE CONCEPT

Relative importance of exposure acting across different life course time windows in terms of the natural history of lung function.

A: Normal development and decline. B: Exposure in early life reducing lung functional potential
C: Exposure acting in mind to later life accelerating age related decline

Source: Adapted from Strachan, 1997
Health Promotion and Prevention

A Scope for non communicable diseases prevention, a life course approach

- **Fetal Life**: SES; diseases; growth rate
- **Infancy and Childhood**: SES; maternal nutritional status; birth weight
- **Adolescence**: Obesity lack of physical activity; smoking
- **Mid Life**: Established adult behavioral/biological risk factors
- **Adult Life**: SES: Socioeconomic status

Accumulated risk (range)

Source: Aboderin et al. 2002; Kalache and Kickbuch, 1997
Impact of Inequality on the Future Elderly

Intrinsic and Functional Capacity Across the Life Course

DECLINES IN PHYSICAL HEALTH BY AGE AND SEX

Source: WHO SAGE Study. Dr. Somnath Chatterji. Personal communication.
DECLINES IN COGNITIVE HEALTH

Source: WHO SAGE Study. Dr. Somnath Chatterji. Personal communication.
DECLINES IN PHYSICAL HEALTH BY WEALTH

Source: WHO SAGE Study. Dr. Somnath Chatterji. Personal communication.
THE PERFORMANCE OF ATHLETES CAN GIVE US A BIOLOGICAL MODEL TO UNDERSTAND WHAT LOOKS LIKE HEALTHY AND OPTIMAL AGING

- Increased duration of health
- Compression of morbidity
- Average population
- Athletes
THE PERFORMANCE OF MASTERS ATHLETES CAN PROVIDE US WITH A BIOLOGICAL MODEL TO UNDERSTAND WHAT HEALTHY, OPTIMUM AGING LOOKS LIKE.

In July of 2016, Hiroo Tanaka, 85 years old, from Japan ran 100 meters in 15.19 seconds.

The Global Strategy for Women’s, Children’s and Adolescent’s Health

SURVIVE
To end preventable deaths

THRIVE
To ensure health and well-being

TRANSFORM
To expand enabling environments
APPLICABILITY IN PUBLIC HEALTH

- Early Life: Growth and Development
- Adult Life: Maintaining highest possible level of function
- Older Age: Maintaining Independence and Preventing Disability

- Functional Capacity
- Age

Disability Threshold: Rehabilitation and ensuring the quality of life

Range of function in individuals

Source: Kalache and Kickbuch, 1997
• When we think about breastfeeding, we relate it to the mother and her baby.
• In the Americas, less than 32% of the infants are exclusively breastfed within the first 6 months of life.
• Prolonged breastfeeding is associated with a 13% reduction in the prevalence of overweight and obesity and with a 35% reduction in the incidence of type 2 diabetes.
• Current breastfeeding rates prevent almost 20,000 maternal deaths from breast cancer every year, and other 20,000 deaths could be prevented with improved breastfeeding practices.
Periods of intrinsic capacity in older age, risks and challenges, goals, and key responses of a health system

<table>
<thead>
<tr>
<th>Period</th>
<th>High and stable capacity</th>
<th>Declining capacity</th>
<th>Significant loss of capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risks and challenges</td>
<td>Risk behaviours, emerging NCDs</td>
<td>Falling mobility, sarcopenia, frailty, cognitive impairment or dementia, sensory impairments</td>
<td>Difficulty performing basic tasks, pain and suffering caused by advanced chronic conditions</td>
</tr>
</tbody>
</table>

**Goals**

- Build and maintain capacity and resilience
- Reverse, stop or slow the loss of capacity
- Compensate for loss of capacity

**Responses**

- **Reduce risk factors and encourage healthy behaviours**
- **Early detection and management of chronic diseases**
- **Build resilience through capacity-enhancing behaviours, strengthening personal skills and building relationships**
- **Implement multicomponent programmes delivered at primary health-care level**
- **Treat the underlining causes of declines in capacity**
- **Maintain muscle mass and bone density through exercise and nutrition**
- **Interventions to recover and maintain intrinsic capacity**
- **Care and support to compensate for losses in capacity and ensure dignity**
- **Rapid access to acute care**
- **Palliative and end-of-life care**
<table>
<thead>
<tr>
<th>Definition of health</th>
<th>Absence of acute disease</th>
<th>Reduction of chronic disease</th>
<th>Creating capacities to achieve goals, satisfy needs, fortify reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal of health systems</td>
<td>Improve life expectancy</td>
<td>Reduce disability</td>
<td>Optimize health</td>
</tr>
<tr>
<td>Model of health and disease causation</td>
<td>Biomedical</td>
<td>biopsychosocial</td>
<td>Life-course health development</td>
</tr>
<tr>
<td>Primary focus on services</td>
<td>Diagnose and treat acute conditions</td>
<td>Prevent and manage chronic disease</td>
<td>Promote and optimize health of individuals and populations</td>
</tr>
<tr>
<td>Organizational operational model</td>
<td>Clinics and offices linked to hospitals</td>
<td>Accountable care organizations and medical homes</td>
<td>Community-accountable health development systems</td>
</tr>
<tr>
<td>Dominant payment mechanisms</td>
<td>Indemnity insurance; free for services</td>
<td>Prepaid health benefits, capitation</td>
<td>Health trusts and management of balanced portfolio of financing vehicles</td>
</tr>
<tr>
<td>Role of health care provider/organization</td>
<td>To protect from harm, cure the sick, and heal the ill</td>
<td>To prevent and control risk, manage chronic disease, and improve quality of care</td>
<td>To optimize health and well-being</td>
</tr>
<tr>
<td>Role of individual and community</td>
<td>Inexperience patient</td>
<td>Activated partner in care</td>
<td>Co-designers of health</td>
</tr>
</tbody>
</table>

Source: Halfon et al. (2014). Applying a 3.0 transformation framework to guide large scale health system reform.
LINES OF ACTION

- Place health in the context of development
- Intersectoral leadership
- Coherence between social determinants and risk factors
- Form a true paradigm for PHC, Family Medicine and socio-health integration
- People-centered services
- New generation of measurement of results in health
- New promotion and prevention strategies
BARRIERS

- Distal results remain complex and difficult
- Little reflection in Academia
- Need for Public Health paradigm; results are increasing but isolated
- New outcomes need new metrics
- A scaled translation of results is needed so as not to affect the Governance of Health Services
It is easy to stress the usual answers – “Intentional ignorance dates from the first few days ...”

-Noam Chomsky