



University of
New Haven

POMPEA
COLLEGE OF BUSINESS

Guatemala Project

Past, Present, Future

Meet The Team



Mildred Espinoza
Team Mentor



Susan Groenwald
Team Mentor



Brian Hamilton
Team Mentor



Gil B. de Góes
MBA - Business Analytics



Khaled Alshaikh
Business Analytics Major



Rebeca Serrano
BS – Legal Studies



Shabab Anwar
MBA – Business Analytics



University of
New Haven

POMPEA
COLLEGE OF BUSINESS



History and Overview of the Healthcare System of Guatemala



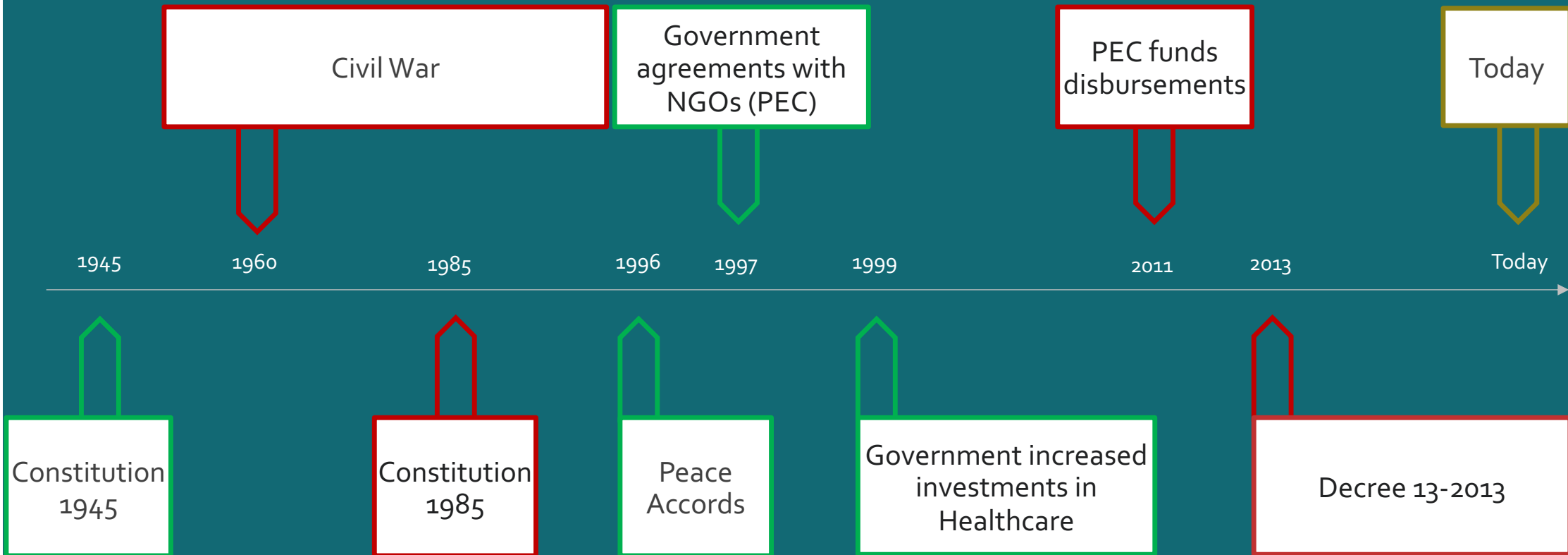
University of
New Haven

POMPEA
COLLEGE OF BUSINESS

Guatemala's Location in the World



Historical context of the Healthcare System of Guatemala



Demographic Aspects of Guatemala

- **Guatemala is the most populous country in Central America** (16.9 million inhabitants).
- **> than 50% lives in rural areas** and is of **Mayan descent**.
- **> than 20 different languages** and only 40% have Spanish as their native language.
- The **poverty rate is 53%**, and **13% are extreme poor**.
- 78% of the population has access to safe water
- 12% has improved sanitation.



University of
New Haven

POMPEA
COLLEGE OF BUSINESS

Education in Guatemala

Education in Guatemala

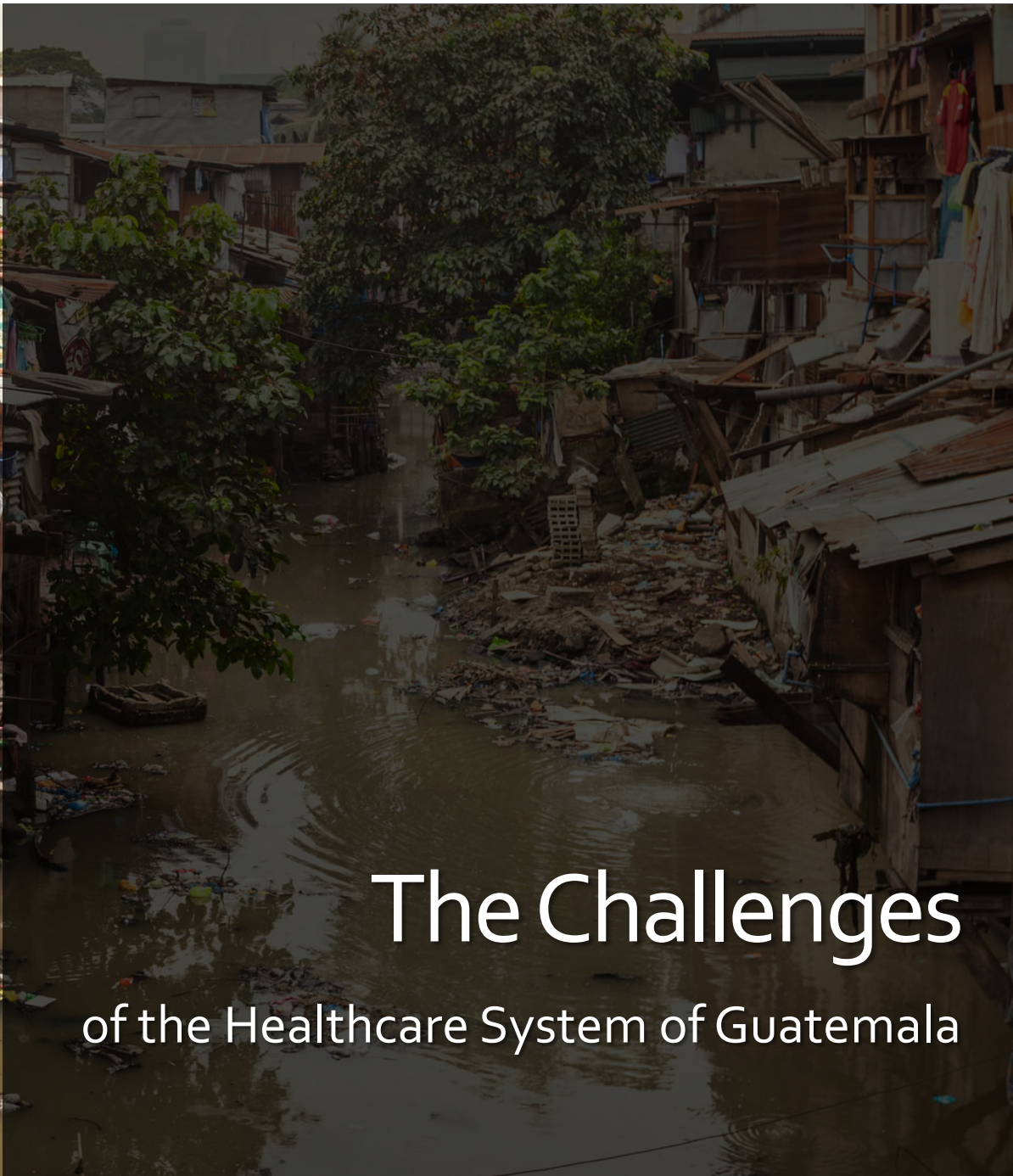
- Six years of elementary education are mandatory
- Majority of Guatemalans do not reach high school; 41% of all 13-18 year olds are out of school; 61% of those are indigenous
- Literacy rate is 78% and lowest in Central America. Females aged 15-24 are twice as likely as males to be illiterate – mostly in rural areas.
- Education dollars spent is the lowest in Central America
- Universities require entrance exams, but there exist no formal educational program standards or accreditation process for education institutions
- The oldest university in Guatemala (and the only state university) is the *Universidad de San Carlos de Guatemala*. It was founded in 1652 by a catholic priest
- Higher education is provided by one state and four private universities. There are also institutes and schools. In some universities, a Baccalaureate degree is offered in Arts and Science after four years of study. In Medicine, the course leading to medical licensure lasts for seven years (three years at university, followed by four years' professional experience). A professional qualification for engineering is awarded after five or six years. Short-term studies lead to the diploma of Técnico after three years. University teachers must hold at least a "Licenciatura".
- The Minister of Health and Social Affairs dictates criteria for education programs and there is a national nursing organization. What regulations, if any, would we be required to comply with if we deliver any nursing education to Guatemalan residents?

(Susan Groenwald report)



University of
New Haven

POMPEA
COLLEGE OF BUSINESS



The Challenges of the Healthcare System of Guatemala



University of
New Haven

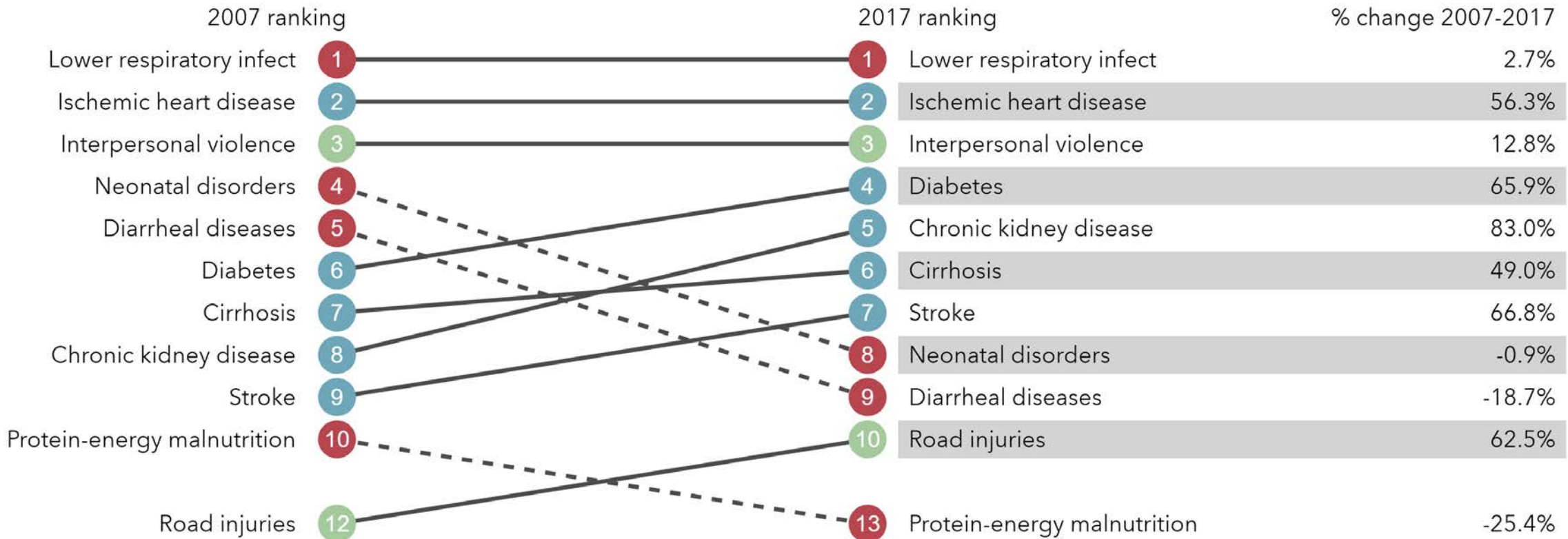
POMPEA
COLLEGE OF BUSINESS

The Challenges

- Guatemala's health system shows inequality, fragmentation, and inefficiency
- **Health professional density** differences in **urban** and **rural** areas are **dramatically different** (25.7 versus 3.0 health professionals per 10,000 population)
- **Disparities between Mayan and non-Mayan women's access to a delivery facility and by a trained provider (36% vs 73%).**
 - **Infant mortality** (34 per 1,000 live births) rates higher than the Central American averages (18 per 1,000 live births)
 - **Maternal mortality** ratio 19% higher than the average for Central America
- **Children younger than 5 years** of age with **chronic malnutrition 55% higher** than the Central American average

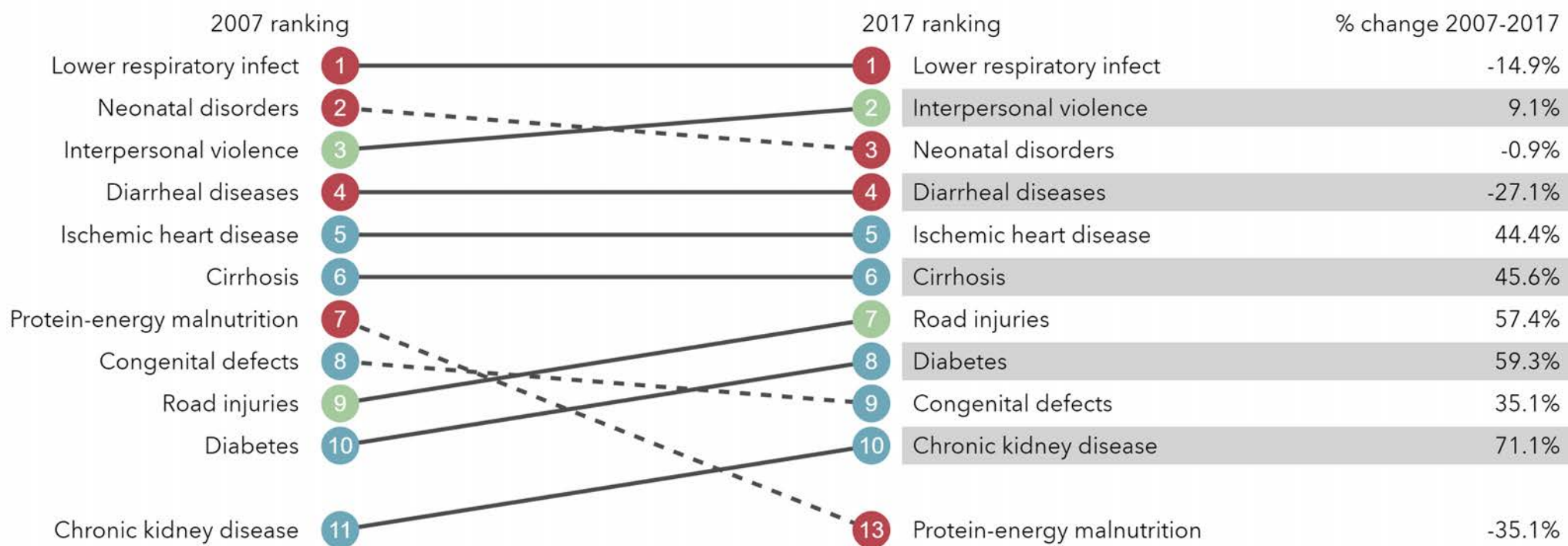


What causes more deaths (2007 – 2017)



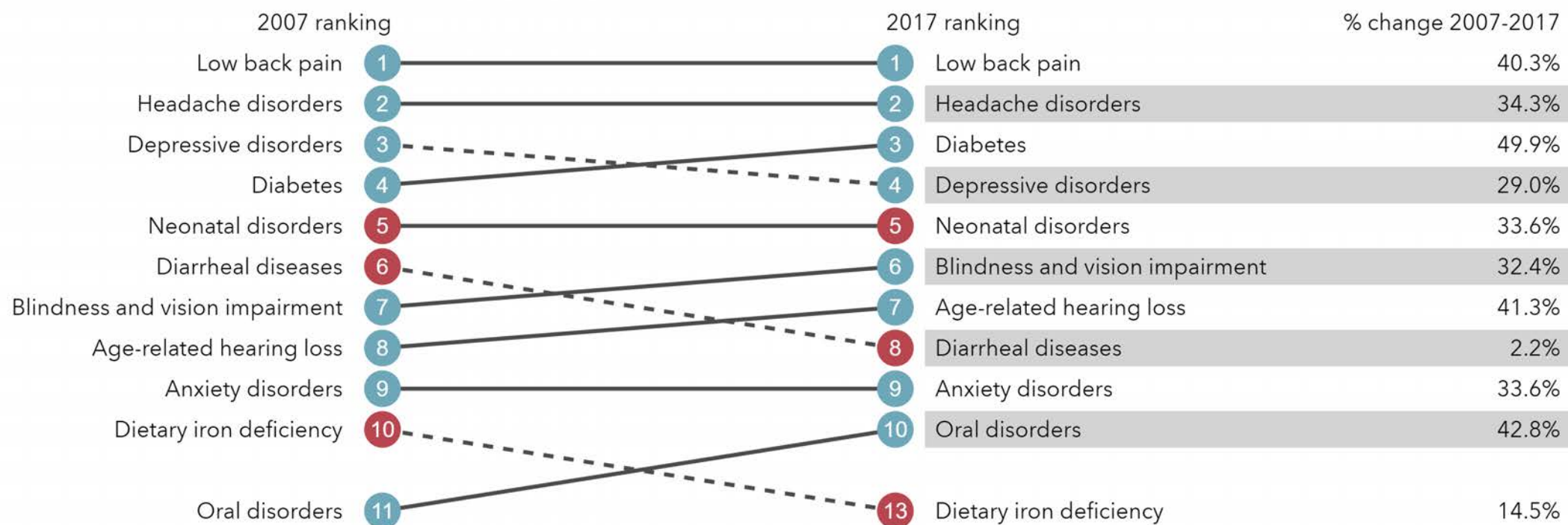
Top 10 causes of premature death for all ages 2007-2017

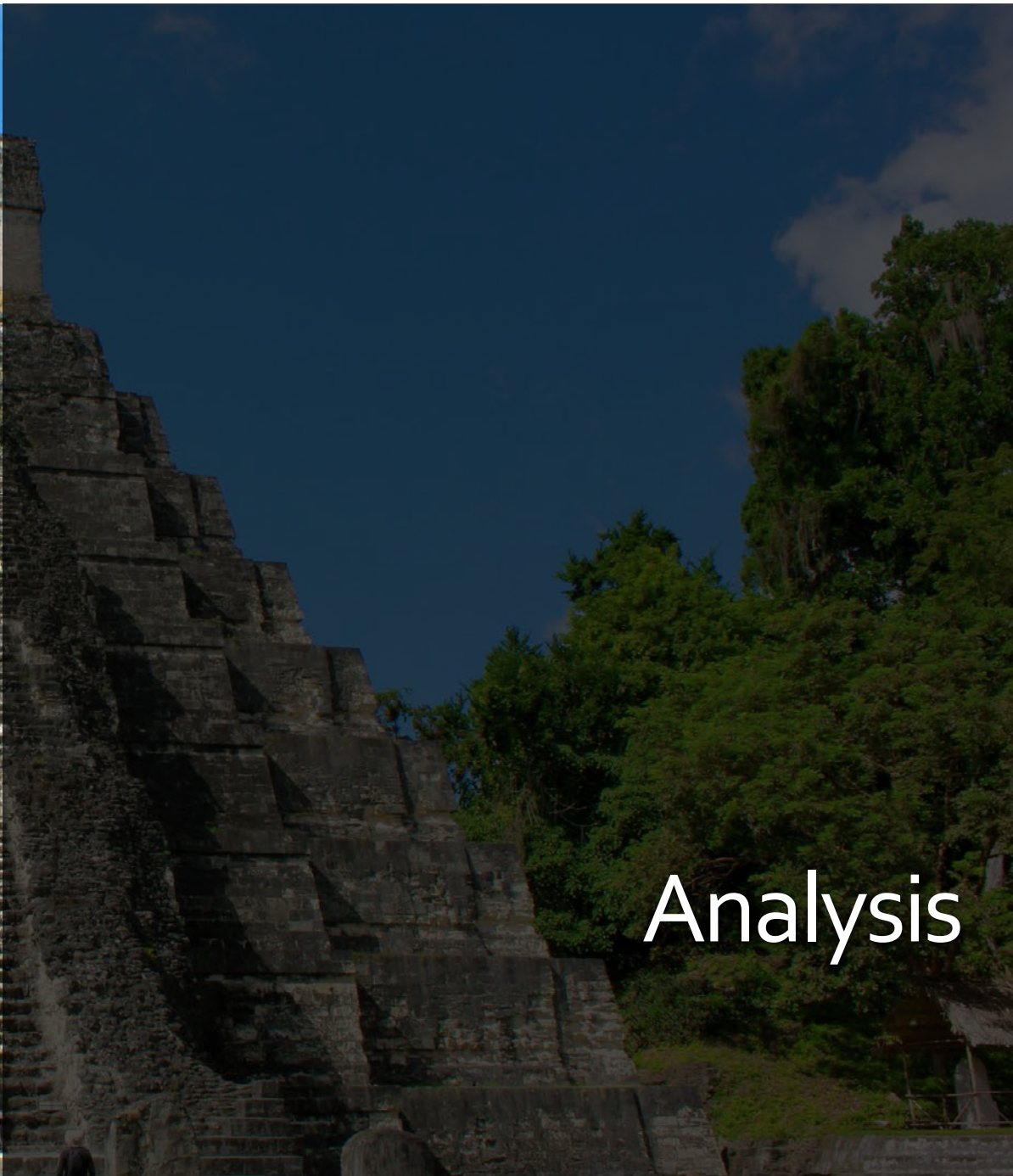
- Communicable, maternal, neonatal, and nutritional diseases
- Non-communicable diseases
- Injuries



Top 10 causes of disability 2007-2017

- Communicable, maternal, neonatal, and nutritional diseases
- Non-communicable diseases
- Injuries





Analysis



University of
New Haven

POMPEA
COLLEGE OF BUSINESS

Community Health Workers

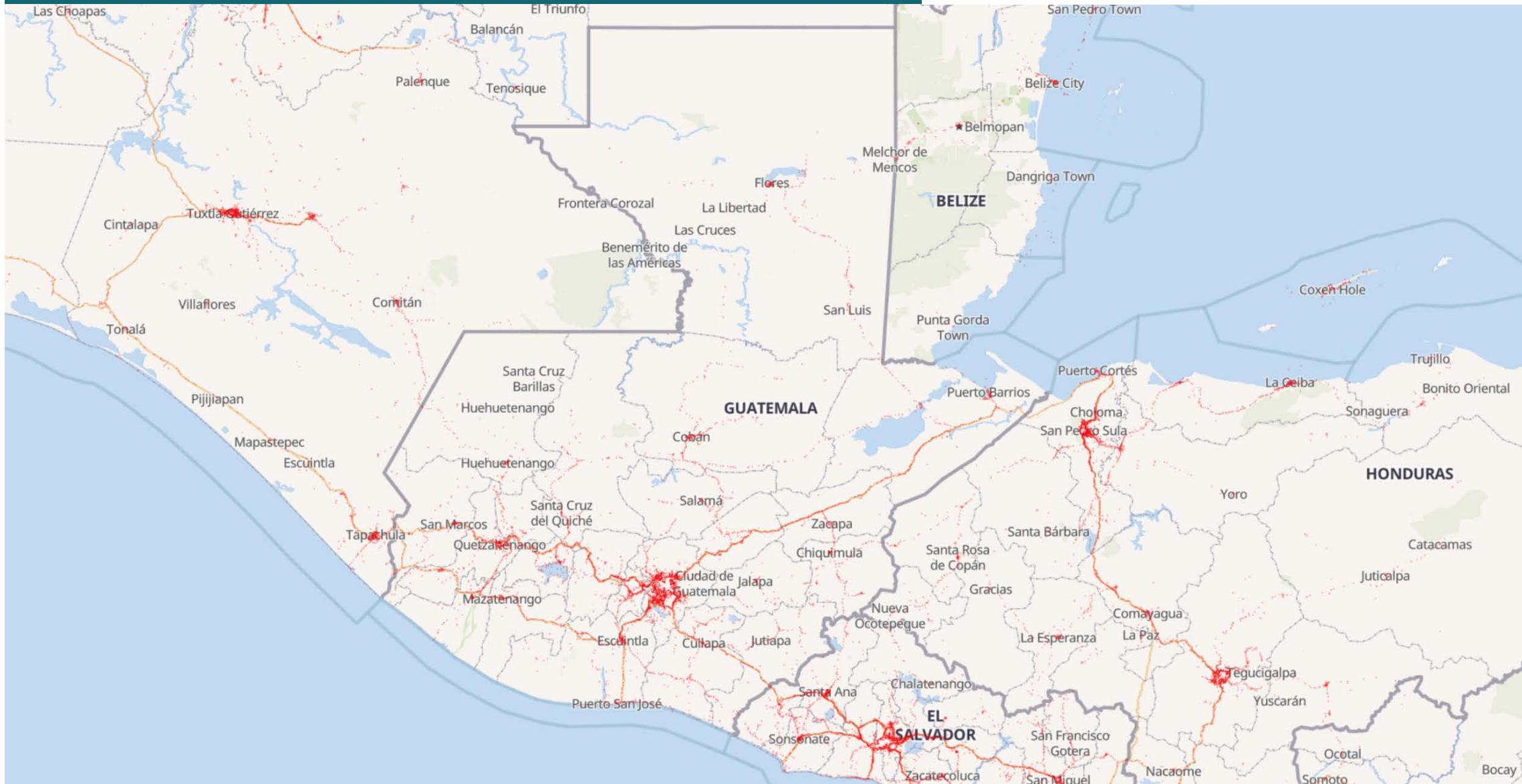
- History
- Guatemala is one of the first countries in the Americas to establish community health worker (CHW) programs, and CHWs have served a central role in both large-scale national programs and small-scale nongovernmental organization (NGO) projects.
- The government approved the decree 13-2013 which prohibits the association of state institutions with NGOs, that created a big negative impact in the program in 2013.
- The reason for the decree 13-2013 was the high levels of between the govern and the NGOs
- Incentives
- The main incentives for CHWs were community recognition, family support and a government stipend of US\$ 50 per month.
- Impact
- The main impact of the SIAS program was the improvement in access to basic health services and a reduction in health inequities among the rural indigenous Mayan population of Guatemala. The effects of closure of the SIAS program are not yet documented.
- HIVE
- The proximity with the government could make feasible experiments to test new relations between the government and NGOs.



University of
New Haven

POMPEA
COLLEGE OF BUSINESS

Cell Phone Service



University of
New Haven

POMPEA
COLLEGE OF BUSINESS



Recommendations

to improve the health in Guatemala



University of
New Haven

POMPEA
COLLEGE OF BUSINESS

Recommendation 1/3

- Extensive use of **Community Health Workers (CWH)**
 - They create a bridge between health care providers and communities that may have difficulty in accessing them.
 - provide health education and referrals for a wide range of services
 - provide support and assistance to communities, families and individuals with preventive health measures
 - access to appropriate curative health and social services.



University of
New Haven

POMPEA
COLLEGE OF BUSINESS

Recommendation 2/3

- Diffusion of Health Care Innovations
 - Use of Influencers in the communities and virtual spaces (e.g. youtubers, bloggers, artists)
 - Use of Social Medias (e.g. Facebook, Pinterest, YouTube, Instagram, Twitter, Tumblr, reddit, etc.)
 - Publicity (Public Transportation, Churches, Schools, Universities)
 - Training of Community Health Workers



University of
New Haven

POMPEA
COLLEGE OF BUSINESS

Recommendation 3/3

- Use of AI (specially ANN) software (improve the performance of health systems while reducing costs)
 - Optimizing CHW scheduling in communities
 - Support CWH decision making
 - Monitor in real-time the progression of epidemics
 - Track population health behavior and habits.
 - Improving treatment protocols.
 - Adapting to local cultures and languages



University of
New Haven

POMPEA
COLLEGE OF BUSINESS

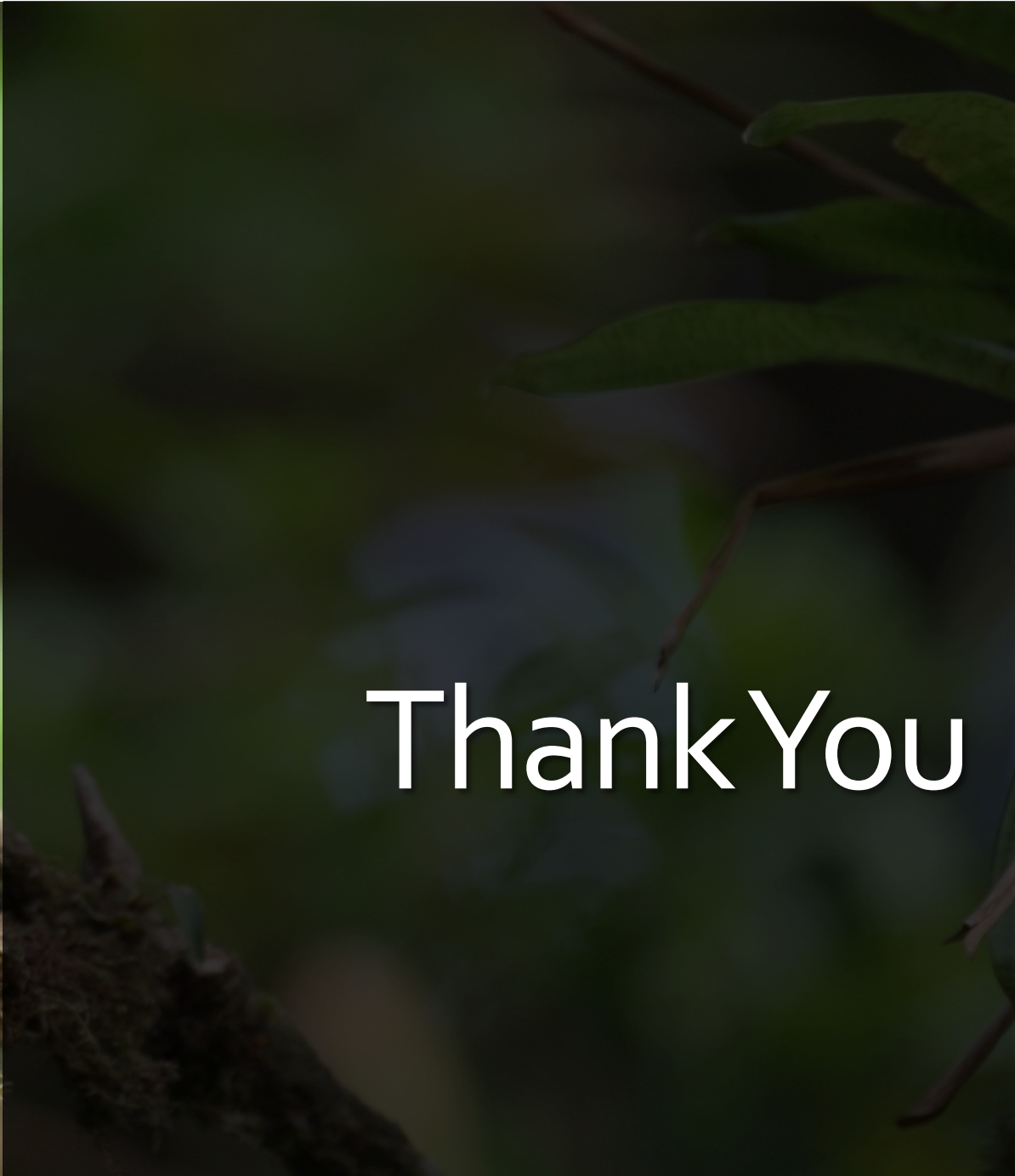
References

- Alami, H., Alami, H., Rivard, L., Rivard, L., Lehoux, P., Lehoux, P., Hoffman, S. J., Hoffman, S. J., Cadeddu, S. B. M., Cadeddu, S. B. M., Savoldelli, M., Samri, M. A., Ag Ahmed, M. A., Fleet, R., Fleet, R., Fleet, R., Fortin, J. P., & Fortin, J. P. (2020). **Artificial intelligence in health care: Laying the Foundation for Responsible, sustainable, and inclusive innovation in low- And middle-income countries**. *Globalization and Health*, 16(1), 1–6. <https://doi.org/10.1186/s12992-020-00584-1>
- Accenture. (2017). **Artificial Intelligence: Healthcare’s New Nervous System. Accenture Report**, 1–8. <https://www.accenture.com/us-en/insight-artificial-intelligence-future-growth>
- Shahid, N., Rappon, T., & Berta, W. (2019). **Applications of artificial neural networks in health care organizational decision-making: A scoping review**. *PLoS ONE*, 14(2), 1–22. <https://doi.org/10.1371/journal.pone.0212356>
- Cossy-Gantner, A., Germann, S., Schwalbe, N. R., & Wahl, B. (2018). **Artificial intelligence (AI) and global health: How can AI contribute to health in resource-poor settings?** *BMJ Global Health*, 3(4), 1–7. <https://doi.org/10.1136/bmjgh-2018-000798>
- ROGERS, E. M. E. M. (2003). **Diffusion of Innovations** (5th ed.). The Free Press.
- Avila, C., Bright, R., Gutierrez, J. C., Hoadley, K., Manuel, C., Romero, N., & Rodriguez, M. P. (2015). **GUATEMALA HEALTH SYSTEM ASSESSMENT 2015** (Issue August).
- Musoke, D., Ndejjo, R., & Kiracho, E. E. (2020). **Health for the People : National Community Health Worker Programs from Afghanistan to Zimbabwe**. May, 405–414.



University of
New Haven

POMPEA
COLLEGE OF BUSINESS



Thank You



University of
New Haven

POMPEA
COLLEGE OF BUSINESS