

# Global Goal 3 on Good Health & Well Being, Using Big Data for Future Smart Cities of Libya

Dr. Waled Astiata<sup>1</sup>; Satya P. Bindra<sup>2</sup>

<sup>1</sup>Professor, Tripoli University, Libya

<sup>2</sup>UNDESA Focal Point, Libya Academy, Tripoli, Libya.

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## Abstract

This paper examines access to Global Goal 3 of the United Nations Sustainable Development Goals (SDGs)—ensuring good health and well-being—as both a fundamental human right and the foundation of human prosperity, particularly in the context of future smart cities in Libya. The objective is to promote healthy lives and well-being for all at all ages, a prerequisite for sustainable development. After presenting key facts, figures, and targets for 2030, the paper outlines the scope of Goal 3, which addresses global health challenges such as increasing life expectancy, reducing infant mortality, and ending epidemics including HIV/AIDS, hepatitis, and other communicable diseases.

Despite progress, the global picture remains uneven: more than 1.3 billion people lack access to effective and affordable health care, 93 percent of whom live in low- and middle-income countries—including Libya. These countries account for only 18 percent of global income yet represent just 11 percent of total health expenditure, highlighting a stark imbalance. Maternal mortality rates remain 14 times higher in developing countries than in developed ones, and only half of women in these regions receive the recommended health care during pregnancy. According to the UN, over 16,000 children under the age of five die daily from malnutrition, dehydration, and preventable diseases. Although the Millennium Development Goals (MDGs) of 2000 brought significant progress, major hurdles remain, particularly for women and children in vulnerable regions. Sustainable progress requires universal, affordable health systems supported by strong vaccination programs, equal access to sexual and reproductive health services, and widespread health education.

This paper further examines how global health threats were being addressed in 2018 through preparedness, prevention, and rapid response, under the WHO's "No Regrets" policy for health emergencies. It highlights how outbreaks may be inevitable, but epidemics are preventable, provided that governments and communities can keep pace with increasing social, economic, and environmental complexity. In Libya, particular attention is given to the health of internally displaced persons (IDPs) and migrants. As more than half of the world's population now resides in cities, the paper emphasizes urban health governance to address non-communicable diseases, emerging pathogens, and the human impact of natural disasters.

The study explores key components of healthy development—including the role of big data, ICT, and infographics in health services; the introduction of SMART healthcare insurance cards; the WHOQOL-BREF mental health program; specialized clinics for Tawerghan IDPs and migrants; and access to safe water and sanitation. Case studies are presented showing the feasibility of powering large hospitals and research centers with solar energy, thereby supporting universal health coverage and advancing medical research.

The paper also discusses the establishment of an autonomous National Committee for Health Sector Reform (NCHSR), emerging from the Libya Health System Strengthening Programme (LHSS) initiated with EU support, to conduct a root-level reform of Libya's health sector. Finally, it offers recommendations aimed at ensuring that suffering belongs to no one, guided by the principles of the Four Noble Truths and the Eightfold Path, as part of a vision for a shared and interdependent planet, promoting health, well-being, peace, progress, and prosperity.

**Keywords:** Sustainable Development Goal 3, Universal Health Coverage, Affordable Healthcare, Libya, Health Sector Reform.

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## I. INTRODUCTION

Currently, 260 million children worldwide are out of school. In a tribute to Kofi Annan, former British Prime Minister Gordon Brown urged delegates to work toward the first generation in history in which every child enjoys the right to education. He called on policymakers to join the global education network, emphasizing that investment in education is essential—not only for individual opportunity and social mobility but also for building prosperous and civilized societies. As he noted, “Knowledge is the way you deal with any problem or challenge.”

Across the globe, young leaders such as Yasmeen Mjiali, Irwin Iradukunda, Tamana Asey, Sheriff Satta, Ibtissam Abaâziz, and Luke Hart embody this spirit of dedication, inspiring movements to ensure that no one is left behind.

Information and Communication Technology (ICT)—including computers, the Internet, and digital delivery systems such as radio, television, and projectors—has become central to modern education. In Libya, ICT is increasingly integrated into teaching, learning, and assessment, proving to be a powerful tool for educational reform. Studies (Bindra et al., 2018) show that effective use of ICT can enhance educational quality, connect learning to real-life contexts, and support lifelong learning. Learners are moving away from traditional, passive models of education toward approaches that emphasize exploration, interactivity, and self-direction.

ICT not only broadens access to education but also makes learning flexible. Online materials are available 24/7, while teleconferencing enables real-time interaction between teachers and students. Education is no longer limited to printed materials; digital resources such as videos, audio, and interactive visuals enrich the learning process. Research further shows that ICT fosters learner-centered environments, empowering students to take responsibility for decisions and planning in their own learning. Thus, ICT plays a vital role in making education more accessible, affordable, and transformative for the future.

## II. AN APPRAISAL OF GLOBAL GOAL 3 & ICT IN HEALTH DELIVERY

An appraisal of Sustainable Development Goal 3 (SDG 3)—to ensure healthy lives and promote well-being for all at all ages—shows that health is central to achieving sustainable development. Significant strides have been made in increasing life expectancy and reducing maternal and child mortality. Progress is also evident in expanding access to clean water and sanitation, and in reducing the prevalence of malaria, tuberculosis, polio, and the spread of HIV/AIDS. However, greater efforts are needed to eradicate persistent and emerging diseases and to address new health challenges.

### ➤ *The Targets of SDG 3 for 2030 Include:*

- Reduce the global maternal mortality ratio to less than 70 per 100,000 live births.
- End preventable deaths of newborns and children under 5 years, aiming for neonatal mortality below 12 per 1,000 live births and under-5 mortality below 25 per 1,000 live births.
- End the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases, and combat hepatitis, water-borne, and other communicable diseases.
- Reduce by one third premature mortality from non-communicable diseases (NCDs) through prevention, treatment, and promotion of mental health and well-being.
- Strengthen prevention and treatment of substance abuse, including narcotic drug use and harmful alcohol consumption.
- Halve global deaths and injuries from road traffic accidents.
- Ensure universal access to sexual and reproductive healthcare services, including family planning, information, and education, and integrate reproductive health into national strategies.
- Achieve universal health coverage (UHC), including financial risk protection, access to essential healthcare services, and safe, affordable medicines and vaccines.
- Substantially reduce deaths and illnesses from hazardous chemicals and air, water, and soil pollution.
- Strengthen implementation of the WHO Framework Convention on Tobacco Control.
- Support research and development of vaccines and medicines for diseases affecting developing countries, and ensure access to affordable medicines in line with the Doha Declaration on TRIPS and Public Health.
- Increase health financing, workforce training, and retention in developing countries, particularly in least-developed and small-island states.
- Strengthen early warning, risk reduction, and management of global and national health risks.

### ➤ *ICT and Health in Libya*

In Libya, the Libyan Post Telecommunications and Information Technology Company (LPTIC)—a state-owned holding company—plays a key role in advancing ICT. Its subsidiaries (Al-Madar, Libyana, Aljeel Aljadeed, LTT, Hatif Libya, LITC, Libya Post, and Albunia) are engaged in expanding digital infrastructure. Recent initiatives include recommencing stalled projects such as the 4G rollout, fiber-optic expansion, postal modernization, Smart City projects, high-speed internet, and fostering public–private partnerships.

ICT has become an integral part of modern health delivery worldwide. Training and education in its application are essential (Council of Europe; Ertmer, 2005; Juang et al., 2008; Friedman et al., 2009; Steel, 2009; Ismail et al., 2010). Medical informatics—the interdisciplinary field combining health sciences, computer science, statistics, engineering, and

management—forms the backbone of digital health. According to the World Health Organization (WHO), it refers to applying information science, computing, networking, and communication to support health disciplines such as medicine, nursing, pharmacy, and dentistry. Shortliffe further emphasizes its role in cognitive, information-processing, and communication tools for medical practice, education, and research.

- *ICT and Health Informatics Serve a Wide Range of Stakeholders, Including:*

- ✓ Patients and the general population
- ✓ Medical professionals and healthcare providers
- ✓ Government bodies and national agencies
- ✓ Primary care providers/GPs
- ✓ Hospitals (finance, administration, facility management)
- ✓ Policy makers and regional managers
- ✓ Researchers and educators
- ✓ Taxpayers and donors

- *Core Functions of Health Informatics*

- Data Processing – Collecting, transforming, presenting, and using health data (healthcare is a data-intensive industry).
- Communication – Supporting interactions between patients, providers, and institutions.
- Knowledge-Based Services – Providing computerized bibliographic services, guidelines, pharmacopoeias, essential drug lists, decision-support systems, and reminder systems.
- Integration with Paper-Based Systems – Ensuring compatibility with existing records and workflows.

- ✓ *Popular Applications of Health Informatics Include:*

- Accurate and timely data recording
- Decision support for managers and policymakers
- Resource allocation and planning
- Risk management and quality assurance
- Patient assessment, monitoring, and scheduling
- Staff coordination and training
- Hospital resource management (supplies, stock, payroll)
- Clinical pathways and evidence-based medicine
- Research databases and donor records
- Imaging and diagnostic systems (ultrasound, X-ray, CT, MRI, nuclear imaging)
- Mobile health and telemedicine platforms

- *Telehealth*

Telehealth refers to the delivery of health-related services and information via telecommunications technologies. It ranges from simple phone consultations to advanced videoconferencing between providers in different countries, and even robotic-assisted care. Unlike telemedicine, which focuses on curative care, telehealth encompasses preventive, promotive, and curative services.

- *Non-Clinical Uses of Telehealth Include:*

- ✓ Distance and continuing medical education
- ✓ Administrative functions (meetings, supervision, presentations)
- ✓ Research collaboration
- ✓ Online information and health data management
- ✓ Healthcare system integration and remote admissions

- *Telenursing*

Telenursing applies ICT to deliver nursing services across large physical distances, supporting care delivery, monitoring, and patient education. It overlaps with teleconsultation, telemonitoring, and other telehealth applications.

- *E-Health*

E-Health (or eHealth) broadly refers to healthcare supported by electronic processes and communications. While sometimes used interchangeably with health informatics, it is often defined more narrowly as healthcare practice enabled by the Internet. Its scope includes:

- Electronic Medical Records (EMR): enabling communication between providers (GPs, specialists, pharmacies, care teams).
- Telemedicine: providing remote physical and psychological assessments without requiring patient travel.
- Evidence-Based Medicine: offering up-to-date guidance on treatment decisions.
- Consumer Health Informatics: empowering patients and citizens to access health information.
- Health Knowledge Management: supporting professionals with medical journals, guidelines, and epidemiological tracking.
- Virtual Healthcare Teams: enabling collaboration among geographically dispersed providers.

### III. CASE STUDY IN LIBYA

Access to good health and well-being is a fundamental human right and the foundation of human prosperity. While progress has been made globally since 2000 in improving public health, significant challenges remain—particularly in fragile states such as Libya after the 2011 Arab Spring crisis. Here, internally displaced persons (IDPs), women, and children remain the most vulnerable. Sustainable progress in Libya depends on universal, affordable healthcare that prevents disease, strengthens vaccination programs, and ensures equal access to sexual and reproductive health services and education.

- *Institutional Reform: The Role of NCHSR*

The Youth Sustainability Impact (YSI) Ambassador and OKYD Ambassador Team, as founding members of Environment Peace Building, work alongside the National Centre for Health System Reform (NCHSR), which was established in collaboration with the Ministry of Health

under the Libya Health System Strengthening Programme (LHSS), supported by the European Union.

- *The NCHSR's Objectives Include:*

- ✓ Restructuring the health system.
- ✓ Securing full funding for services free at the point of use.
- ✓ Encouraging private-sector participation.
- ✓ Aligning healthcare services with international standards.
- ✓ Decentralizing healthcare delivery.
- ✓ Ensuring fair pay for health workers in both public and private sectors.
- ✓ Developing a master plan for universal health coverage (UHC) in Libya.

Since its launch in October 2017 (through Decree 255 of the Government of National Accord), the NCHSR has introduced several reforms, such as:

- Health Insurance Fund (HIF): Established by Decree 854 (Sept 2017), beginning with coverage for education sector employees, with plans to expand nationwide.
- Independent Health Council: To act as a governing body for the health sector, replacing the Medical Syndicate, which previously held conflicting roles.
- Health Accreditation Council: To regulate and monitor private and public health facilities, which previously operated without oversight.
- Medical Supply Organization (MSO) Reform: Addressing inefficiencies and corruption in medicine procurement (historically with budgets of USD 300–500 million).
- Review of the Essential Medicine List: To streamline state procurement of medicines despite resistance from vested interests.
- PPP Models for Hospitals: Exploring agreements similar to the 2008 Al-Khadra Hospital partnership with Healthshare (South Africa).

- *Urban Health and ICT Innovations*

Given that over 80% of Libyans now live in cities, the YSI–OKYD team emphasizes urban health governance to combat non-communicable diseases, manage emerging pathogens, and reduce the human health toll of natural disasters. A key focus is on integrating safe water, sanitation, and ICT-driven health services into national policy.

- *A Pilot Survey in Libyan Learning Centers Highlighted Opportunities for ICT in Education and Health, Recommending:*
- ✓ Encouraging staff and students to reflect on teaching and learning practices.
- ✓ Applying learning theories and research to design effective online learning environments.
- ✓ Increasing transparency in teaching and learning.
- ✓ Promoting collaboration and teamwork among staff and students.

- *LifeCare Tripoli: Digital Health for IDPs*

At LifeCare Tripoli, the team is piloting IDPs Telfe, a digital health platform that uses AI, machine learning, cloud systems, and mobile applications to provide remote healthcare. The project aims to build telehealth clinics with distribution channels for pharmacies and diagnostics, reaching over one million IDPs, migrants, returnees, and desert communities in Libya.

The team comprises engineers and doctors from Tripoli University, Benghazi University, and the Graduate Libyan Academy, with international exposure and training. Their work focuses on delivering affordable, accessible healthcare solutions, including:

- SMART Card Insurance for citizens, with potential UN funding.
- Partnerships with the Government of Libya (e.g., Tawerghan IDPs) and potential agreements with the Central Bank of Libya and private banks for health coverage.
- A B2B2C healthcare delivery model—similar to Uber—where operators use low-cost telehealth PODs (mobile, medical kit, and printer) to serve semi-urban and desert areas.

Unlike traditional telemedicine, this model minimizes infrastructure costs by relying on distributed operators rather than owning facilities. Revenue is generated not only from consultations but also from medicine delivery, diagnostics, referrals, and sponsored Tele-OPD centers.

The team has also secured a User Agreement with WHO to integrate the WHOQOL (Quality of Life) framework into its studies. In cooperation with GEO-CRADLE (National Observatory of Athens, Greece), the initiative also explores the use of Copernicus satellite data streams to monitor climate change impacts on health, locate resources, improve food security, and expand renewable energy access.

#### IV. CONCLUDING REMARKS

This paper outlines a vision for accelerating progress toward SDG 3: Good Health and Well-Being, with a focus on Libya's post-conflict context. By leveraging ICT, AI, and satellite data (Copernicus), Libya can build innovative health solutions that extend services to marginalized communities.

- *The Research Highlights the Importance of:*

- Health system reform through institutions like the NCHSR.
- Urban health governance to address demographic shifts and non-communicable diseases.
- ICT and digital health platforms to extend affordable care to IDPs, migrants, and rural populations.
- Education and teacher training to integrate ICT into health-related learning.

A pilot case study at LifeCare Tripoli demonstrates the potential of digital health clinics in low-resource settings. These clinics, supported by cloud-based platforms and mobile technology, can deliver essential health services to over a million vulnerable people in Libya.

The findings suggest that sustainable health reform in Libya requires not only investment in ICT and health innovation but also a commitment to equity, ensuring that no one is left behind in the pursuit of health, peace, and prosperity.

## REFERENCES

- [1]. Archibong, I. A. and Effiom, D. O. (2009). ICT in University Education: Usage and Challenges among Academic Staff. *African Research Review*, 3(2): pp 404-414. Banfi, I. (1999). Hungary.
- [2]. Amsterdam: IEA. BECTA. (2001). *Emerging Findings from the Evaluation of the Impact of ICT on Pupils Attainment*. London:
- [3]. BECTA. Carlson, S. and Gadio, C. T. (2002). *Teacher Professional Development in the use of ICT*.
- [4]. Bindra Satya P. & Astiata Waled, Feb (2018) *Better Quality Social Sciences: Education: A Case Study In Libya*, Intercess 2018 Istanbul Turkey.
- [5]. *ICT Usage in Higher Education: A Case Study on Preservice Teachers and Instructors*. The Turkish online journal of educational technology- TOJET v7 n1article 3 Jan 2008.
- [6]. Jegede, P. O. (2009). Assessment of Nigerian Teacher Educators' ICT Training. *Issues in Informing Science and Information Technology*, 6: pp 415-420.
- [7]. Juwah, C. and Northcote, M. (2002) *Devising Strategies for Enhancing Quality Staff Development in Embedding ICT in Teaching and Learning*, in *Quality Conversations*, Proceedings of the 25th HERDSA Annual Conference, Perth, Western Australia, 7-10 July 2002: pp 384-392
- [8]. *Healthcare Distribution Network? Apply directly below at hr@medtel.in or check detailed opening at <https://lnkd.in/frDAwgi>*
- [9]. Pelgrum, W.J. and Anderson, R.E. (1999) (Eds.) *ICT and Emerging Paradigm for Lifelong Learning*. Amsterdam: IEA.
- [10]. Pelgrum, W.J. and Law, N. (2003). *ICT in Education Around the World: Trends, Problems and Prospects*. Paris: UNESCO. [www.ccsenet.org/cis](http://www.ccsenet.org/cis) Computer and Information Science Vol. 3, No. 4; November 2010 114 ISSN 1913-8989 E-ISSN 1913-8997
- [11]. Rosen, I. D., & Maguire, P. (1995). Computer anxiety: A cross-cultural comparison of university students in ten countries. *Computers in Human Behaviour*, 11(1): pp 45-64.
- [12]. The WHOQOL Group, *The World Health Organization Quality of Life Assessment (WHOQOL), Development and General Psychometric Properties*.