

EMS Systems: An International Perspective

Nee-Kofi Mould-Millman, MD PhD MSCS

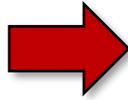
Professor, Department of Emergency Medicine

Director, C3 Global Trauma Network

University of Colorado, Anschutz Medical Campus



A little about me...



Disclosures

- Conflicts of Interest:

- none

- Commercial Relationships:

- none

- Grant funding:

- U.S. NIH
- U.S. Defense Health Agency

Learning Objectives

- Appreciate the diversity of EMS systems globally
 - Developed/mature EMS systems
 - Developing/nascent EMS systems
- Understand that local context drives configuration
- Recognize the role of adaptation and innovation
- Use a framework to assess EMS systems components

Why Should We Care?

- Interpreting int'l EMS reports
- Can inform consultancy work
- Awareness as an expert in the field
- Repatriating patients to the U.S.
- Disaster medicine situations
- Learn from other health systems





Roughly 55 percent of Medicaid enrollees are working full or part time, and a number aren't eligible for health insurance through their jobs. Read more in an explainer here.

AREA OF FOCUS
Improving Health Care Quality →

FUND REPORTS
SEPTEMBER 19, 2024

Mirror, Mirror 2024: A Portrait of the Failing U.S. Health System

Comparing Performance in 10 Nations



EXHIBIT 1 – All Rankings

Health Care System Performance Rankings



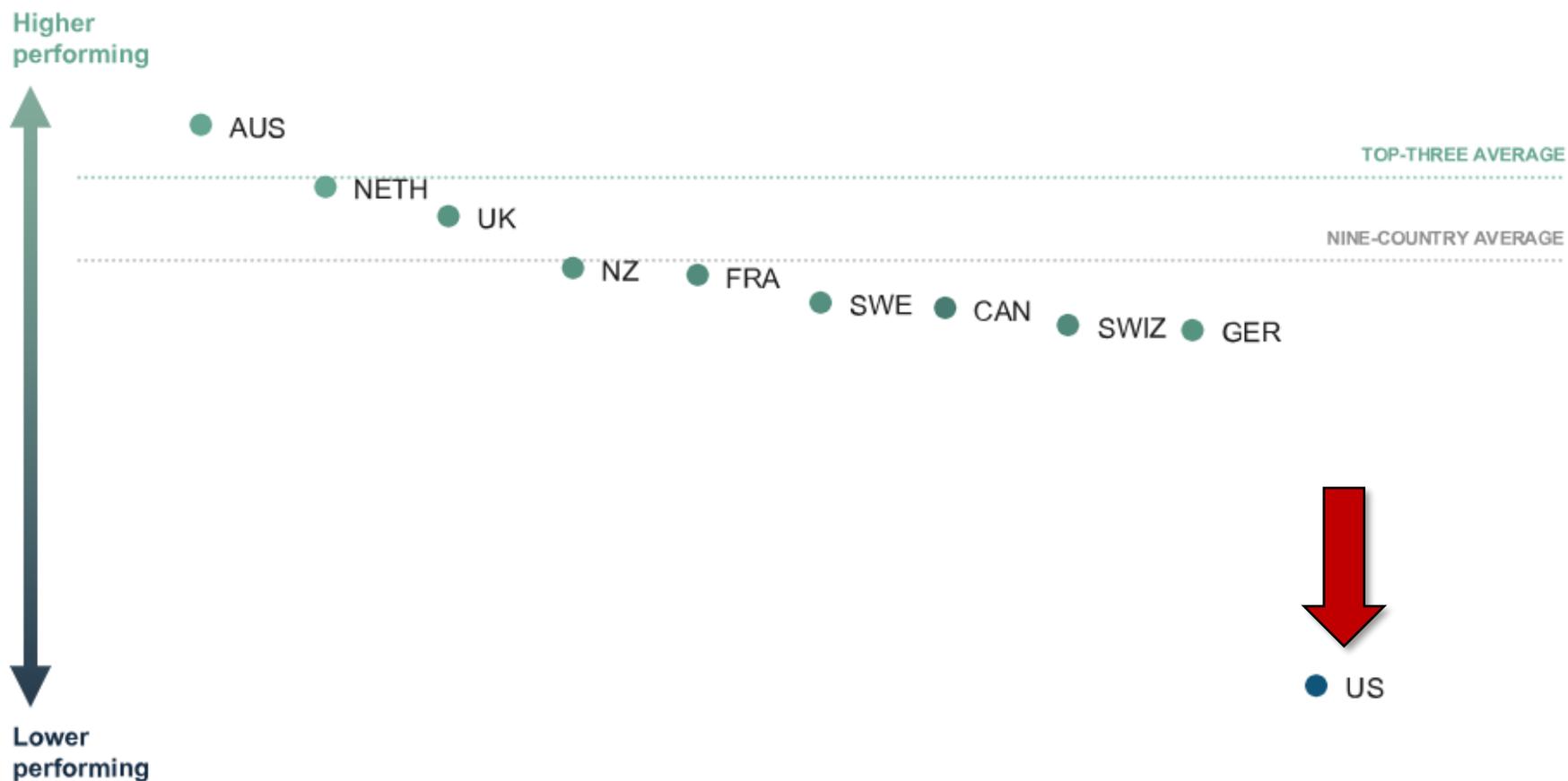
	AUS	CAN	FRA	GER	NETH	NZ	SWE	SWIZ	UK	US
OVERALL RANKING	1	7	5	9	2	4	6	8	3	10
Access to Care	9	7	6	3	1	5	4	8	2	10
Care Process	5	4	7	9	3	1	10	6	8	2
Administrative Efficiency	2	5	4	8	6	3	7	10	1	9
Equity	1	7	6	2	3	8	–	4	5	9
Health Outcomes	1	4	5	9	7	3	6	2	8	10

Note: SWE overall ranking calculation does not include Equity domain. See “How We Conducted This Study” for more detail.

Data: Commonwealth Fund analysis.

Source: David Blumenthal et al., *Mirror, Mirror 2024: A Portrait of the Failing U.S. Health System – Comparing Performance in 10 Nations* (Commonwealth Fund, Sept. 2024). <https://doi.org/10.26099/ta0g-zp66>

The United States lags its international peers considerably on health system performance.



Note: To normalize performance scores across countries, each score is the calculated standard deviation from a nine-country average that excludes the US. See "How We Conducted This Study" for more detail.

Data: Commonwealth Fund analysis.

Source: David Blumenthal et al., *Mirror, Mirror 2024: A Portrait of the Failing U.S. Health System – Comparing Performance in 10 Nations* (Commonwealth Fund, Sept. 2024). <https://doi.org/10.26099/ta0g-zp66>

EXHIBIT 3 – Health Care Spending

Health Care Spending as a Percentage of GDP, 1980–2023

Percent (%) of GDP

20

18

16

14

12

10

8

6

4

1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023

2023 data*:

- US (16.5%)
- FRA (11.9%)
- GER (11.8%)
- SWIZ (11.7%)
- NZ (11.3%)
- CAN (11.2%)
- SWE (10.9%)
- UK (10.9%)
- NETH (10.1%)
- AUS (9.8%)



Notes: GDP = gross domestic product. Current expenditures on health. Based on System of Health Accounts methodology, with some differences between country methodologies.

* Data for CAN, GER, SWE, and the UK from 2023; data for AUS, FRA, NETH, NZ, SWIZ, and the US from 2022.

Data: OECD Health Data, July 2024.

Source: David Blumenthal et al., *Mirror, Mirror 2024: A Portrait of the Failing U.S. Health System – Comparing Performance in 10 Nations* (Commonwealth Fund, Sept. 2024).

<https://doi.org/10.26099/ta0g-zp66>

EXHIBIT ES-1. OVERALL RANKING



COUNTRY RANKINGS

Top 2*
Middle
Bottom 2*



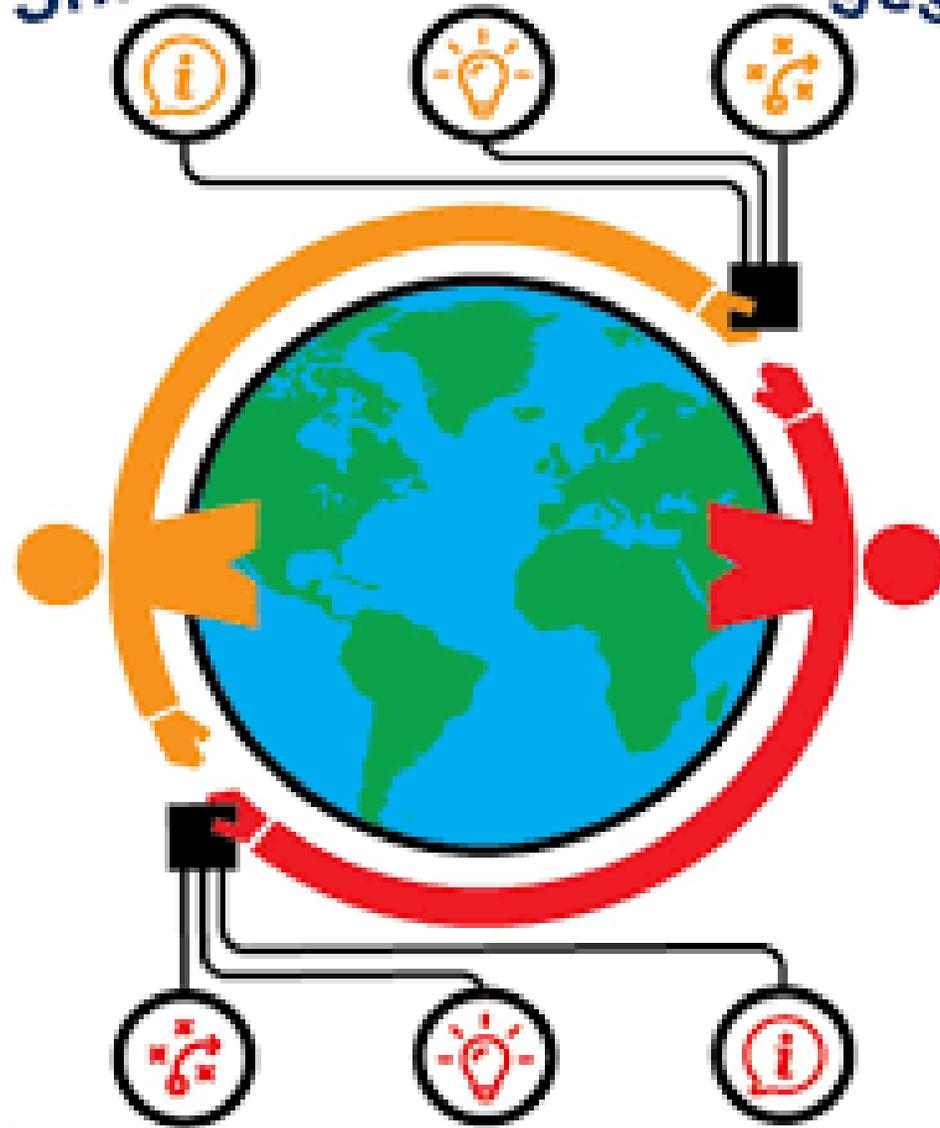
	AUS	CAN	FRA	GER	NETH	NZ	NOR	SWE	SWIZ	UK	US
OVERALL RANKING (2013)	4	10	9	5	5	7	7	3	2	1	11
Quality Care	2	9	8	7	5	4	11	10	3	1	5
Effective Care	4	7	9	6	5	2	11	10	8	1	3
Safe Care	3	11	10	8	7	9	11	5	4	1	7
Coordinated Care	4	11	10	8	7	9	11	11	3	1	6
Patient-Centered Care	5	11	10	8	7	9	11	9	2	1	4
Access	8	11	10	4	2	7	8	4	2	1	9
Cost-Related Problem	9	11	10	4	2	7	8	1	7	1	11
Timeliness of Care	6	11	10	4	2	7	8	9	1	3	5
Efficiency	4	10	8	9	7	3	4	2	6	1	11
Equity	5	9	7	4	8	10	6	1	2	2	11
Healthy Lives	4	8	1	7	5	9	6	2	3	10	11
Health Expenditures/Capita, 2011**	\$3,800	\$4,522	\$4,118	\$4,495	\$5,099	\$3,182	\$5,669	\$3,925	\$5,643	\$3,405	\$8,508

Unchanged for past 15-20 years

Notes: * Includes ties. ** Expenditures shown in \$US PPP (purchasing power parity); Australian \$ data are from 2010.

Source: Calculated by The Commonwealth Fund based on 2011 International Health Policy Survey of Sicker Adults; 2012 International Health Policy Survey of Primary Care Physicians; 2013 International Health Policy Survey; Commonwealth Fund National Scorecard 2011; World Health Organization; and Organization for Economic Cooperation and Development, *OECD Health Data, 2013* (Paris: OECD, Nov. 2013).

Shared Health Challenges



Shared Health Innovations

“If you’ve seen one EMS system, you’ve only seen one EMS system!”

*EMS is, by definition & necessity, local...
EMS systems are often contextually appropriate for geography, population, health system, and resources.*





EMRS

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OBSTETRIC UNIT

KZN EMERGENCY MEDICAL RESCUE SERVICES



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T 12170kg
V 13900kg

GAUTENG EMERGENCY
MEDICAL SERVICES



M02



AIDS TOLLFREE 0800012322



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First... Reflexivity

○ Assumptions we may make:

- Enabling laws & regulatory frameworks
- We may assume EMS is decentralized
- Functional singular 9-1-1 public access system
- Well-trained cadres of professionalized providers
- Ground + aeromedical vehicles (well-stocked)
- Respect for emergency vehicles on roads
- Facility care is the 'higher' level of care



Universal EMS 'Truths'

- Regulatory framework
- Means of public access
- Trained providers
- Vehicles with basic resources
- Medical direction
- Safety and quality
- Continuum of care

And of course...
EMS medical director

Classifications of EMS Systems Globally

○ Level of Development

- Mature vs. Developing vs. Nascent

○ Level of Care

- Basic vs. Advanced

○ Philosophy of Care

- Anglo-American (“load & go”)
- Franco-German (“stay & play”)

○ Country Wealth Status

- High income vs. Low- and Middle-Income

International Models of EMS

- Anglo-American model (“scoop and run”)
- Franco-German model (“stay and stabilize”)





Model	Franco-German model	Anglo-American model
Location of care	More treated on scene. Few transported to hospitals.	Few treated on scene. Most transported to hospitals.
Provider care	Medical doctors supported by paramedics.	Paramedics with medical oversight.
Main motive	Brings the hospital to the patient.	Brings the patient to the hospital.
Destination for transported patients	Direct transport to hospital wards i.e. bypassing EDs.	Direct transport to EDs.
Overarching organization	EMS is a part of public health organization.	EMS is a part of public safety organization.

**Difficult to rigorously perform an apples-to-apples comparison of effectiveness.*

International Models of EMS

- Which model is “better?” AMS vs FGS?
 - Urban response metrics:
 - Total prehospital times: longer in Franco-German (30min)
 - Patient outcomes:
 - Trauma mortality: same
 - Cardiac arrest survival: same
 - EMS Resources:
 - Ambulances: same
 - Equipment/meds: more in FGS
 - Physicians: more in FGS
 - Scene care:
 - Use of critical care skills: AAS >> FGS (not aero-medical)
 - Prehosp intubation: highest in Germany and Austria



Gries, A et al. *Anaesthesist*. 2006 Oct;55(10):1080-6.
Dick, WF. *Prehosp Disaster Med*. 2003 Jan-Mar;18(1):29-37.

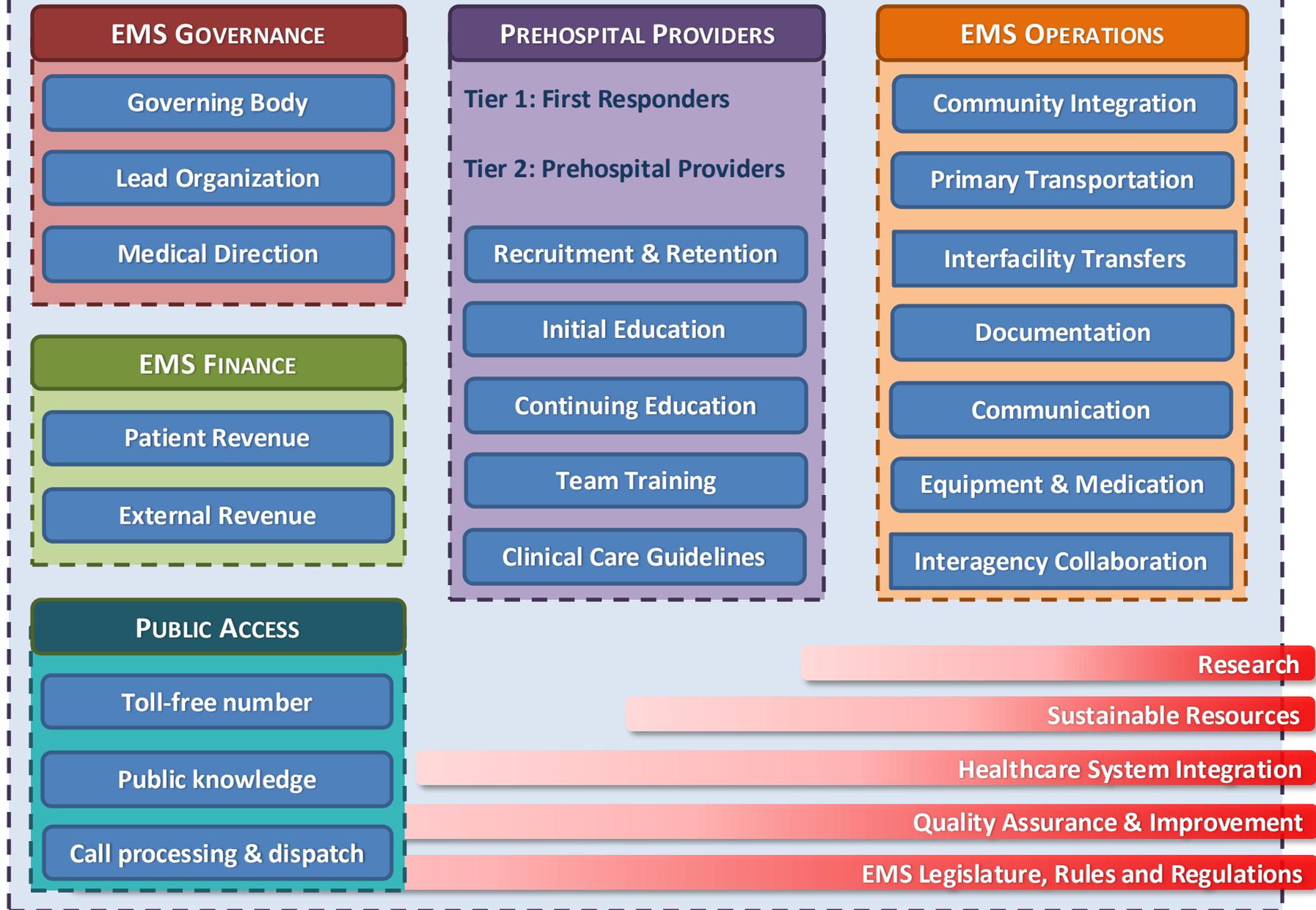
International Models of EMS

- Which model is “better?” AMS vs FGS?
 - AMS = better for low-resource settings (my opinion!)
 - FGS or AMS = either is fine for high-resource settings

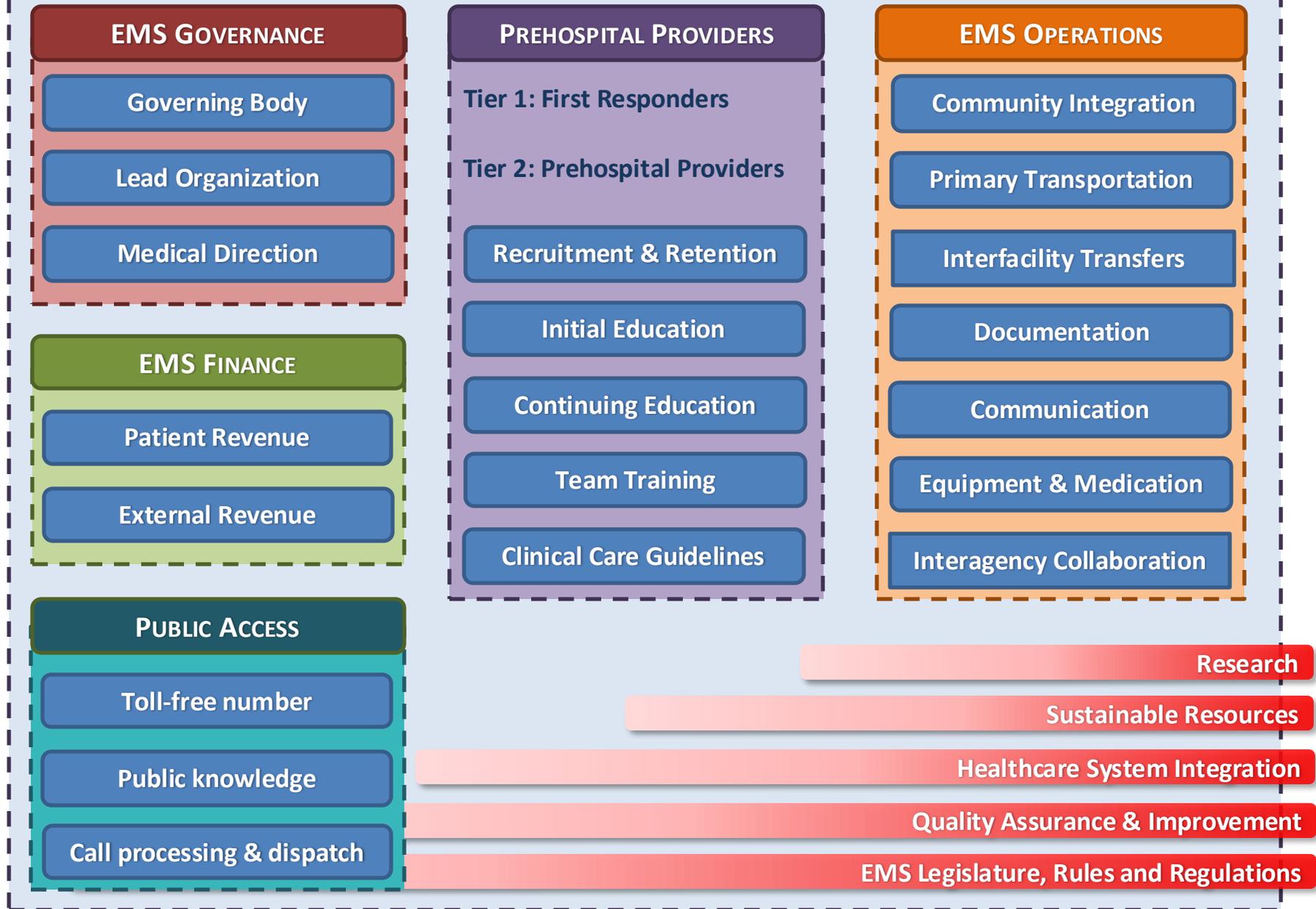


EMS Systems in Lower Income Countries

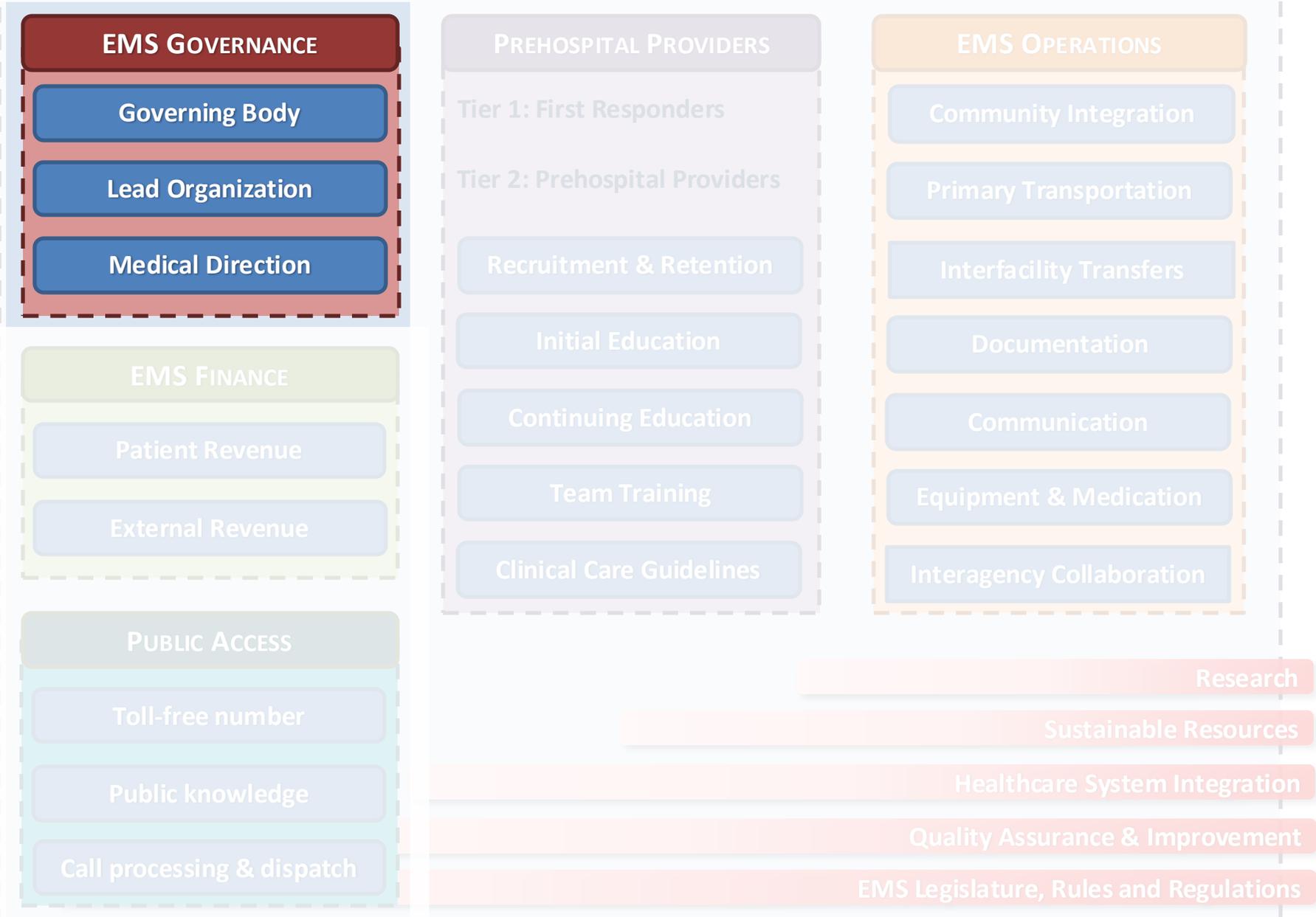
ESSENTIAL ELEMENTS OF AN EMERGENCY MEDICAL SERVICES (EMS) SYSTEM



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EMS Governance

○ Often centralized:

- Government or state operated
- Ministry of Health
- Ambulance Councils/Boards
- EMS CEO, COO, Medical Director

○ Leadership:

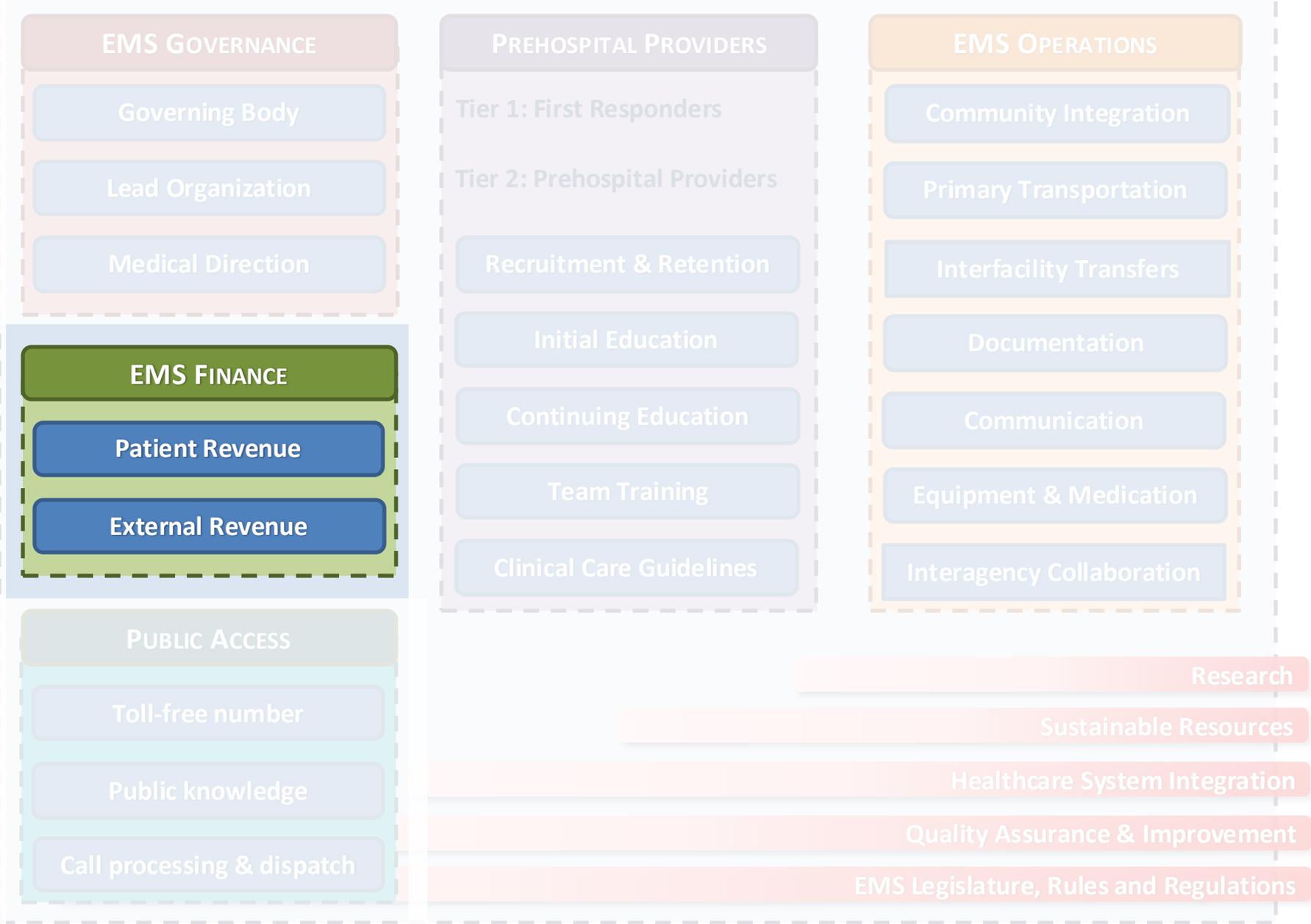
- Might not be any EM physicians in country
- Anesthesiologists, surgeons, intensivists
- Partnerships with foreign EMS systems

○ Case Study: MALAYSIA

- MoH + Civil Defense + NGOs
- Tied together by national legislature
- Centrally dispatched (999/991)



ESSENTIAL ELEMENTS OF AN EMERGENCY MEDICAL SERVICES (EMS) SYSTEM



Finance

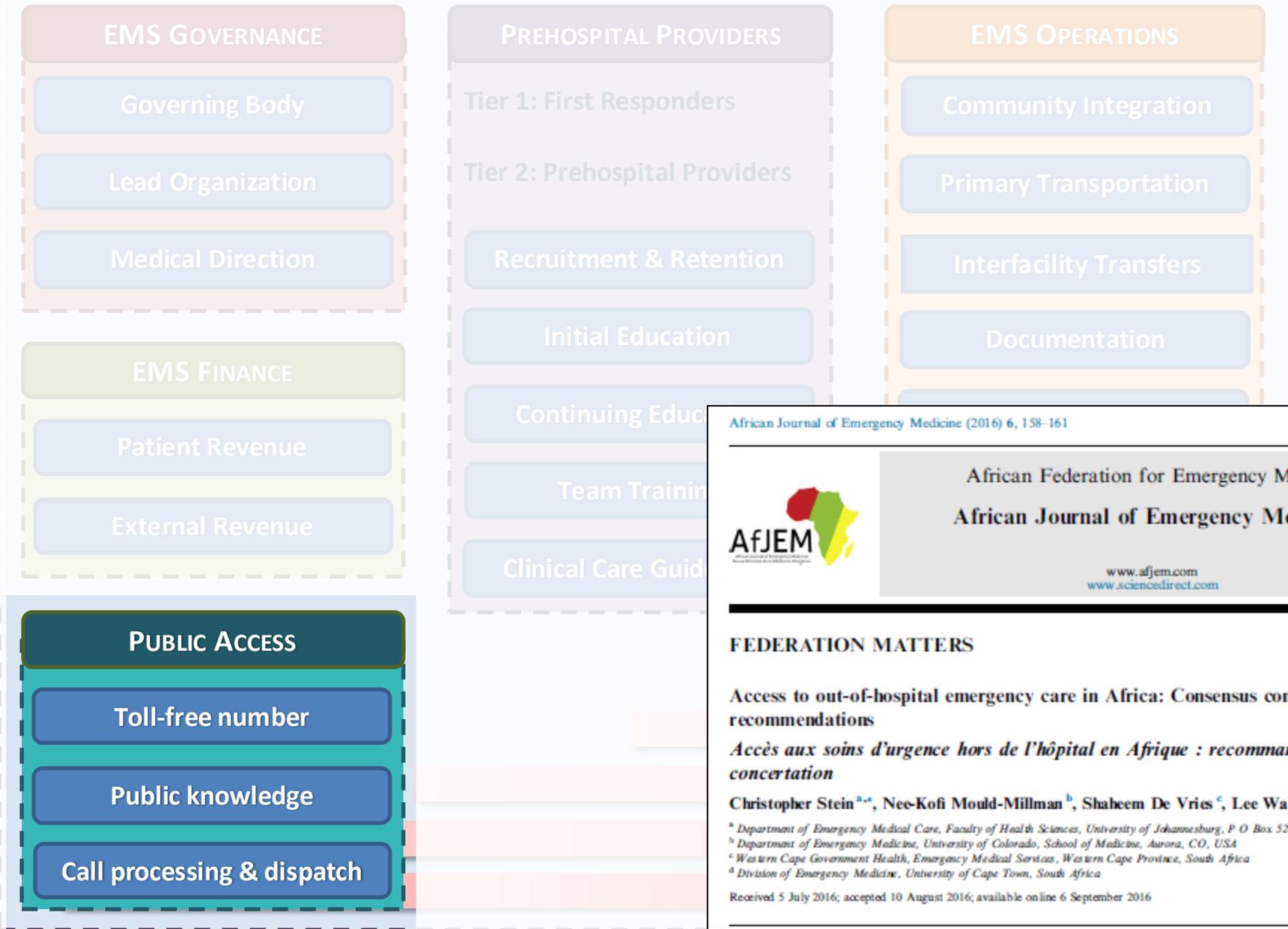
- National Health System financed
- Public-Private partnerships
- Charity/religious organization funded
- Patient subsidized

○ Case Study:

- GHANA
 - Free if truly emergent
 - Co-pay if non-emergency transport
- SOUTH AFRICA
 - Road traffic fund



ESSENTIAL ELEMENTS OF AN EMERGENCY MEDICAL SERVICES (EMS) SYSTEM

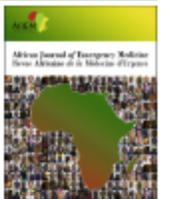


African Journal of Emergency Medicine (2016) 6, 158–161



African Federation for Emergency Medicine
African Journal of Emergency Medicine

www.afjem.com
www.sciencedirect.com



FEDERATION MATTERS

Access to out-of-hospital emergency care in Africa: Consensus conference recommendations



Accès aux soins d'urgence hors de l'hôpital en Afrique : recommandations de la Conférence de concertation

Christopher Stein^{a,*}, Nee-Kofi Mould-Millman^b, Shaheem De Vries^c, Lee Wallis^d

^a Department of Emergency Medical Care, Faculty of Health Sciences, University of Johannesburg, P O Box 524, Auckland Park, Johannesburg 2006, South Africa

^b Department of Emergency Medicine, University of Colorado, School of Medicine, Aurora, CO, USA

^c Western Cape Government Health, Emergency Medical Services, Western Cape Province, South Africa

^d Division of Emergency Medicine, University of Cape Town, South Africa

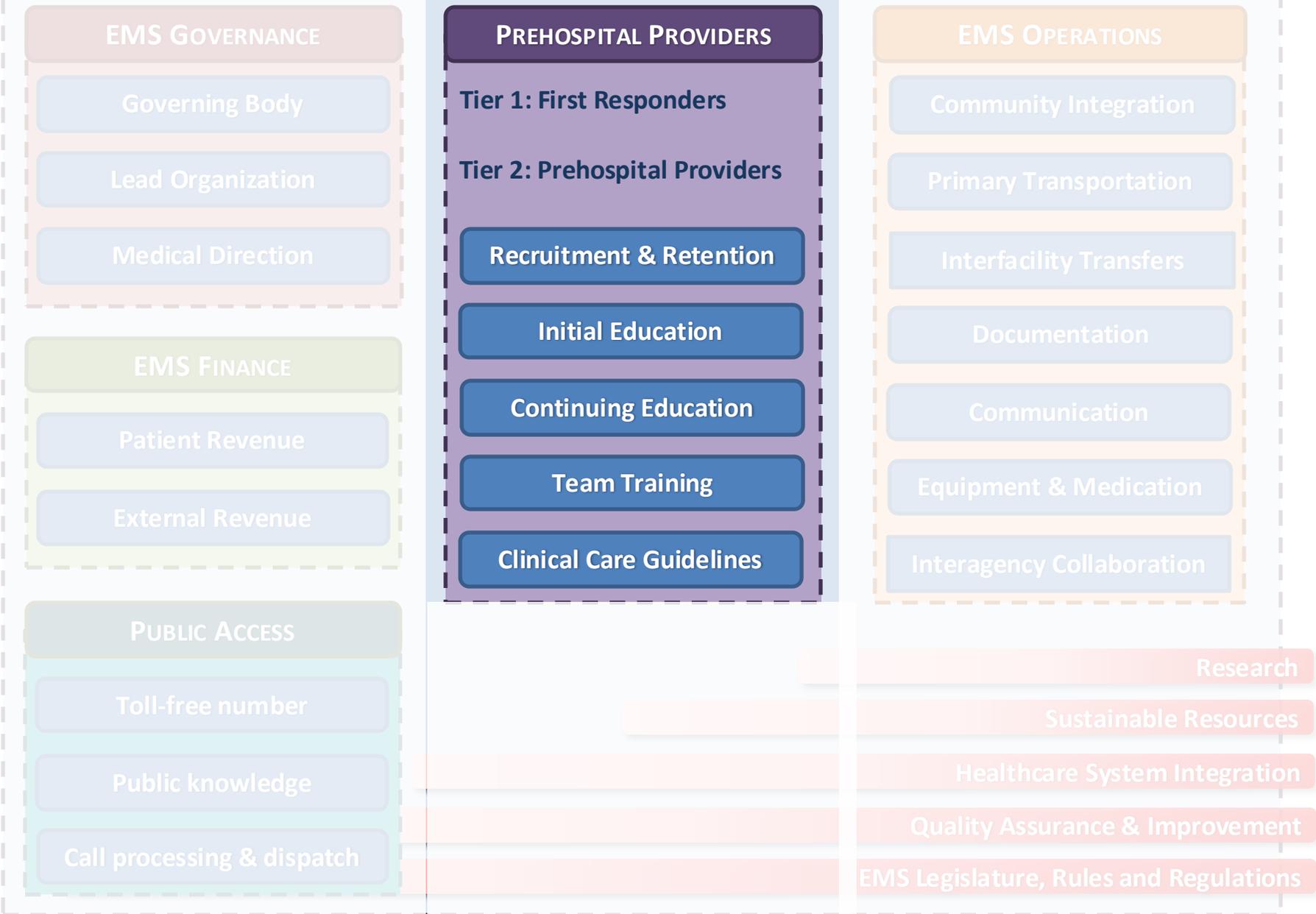
Received 5 July 2016; accepted 10 August 2016; available online 6 September 2016

Public Access

- Toll free number?
 - Singular number
 - Multiple numbers
- Public knowledge?
 - Likely low
 - Confidence low
- Call processing/dispatch
 - Often manual, no protocols
- Case Study: BEIJING
 - Prank calls overwhelm ECC
 - Solution: policy, education, & automation

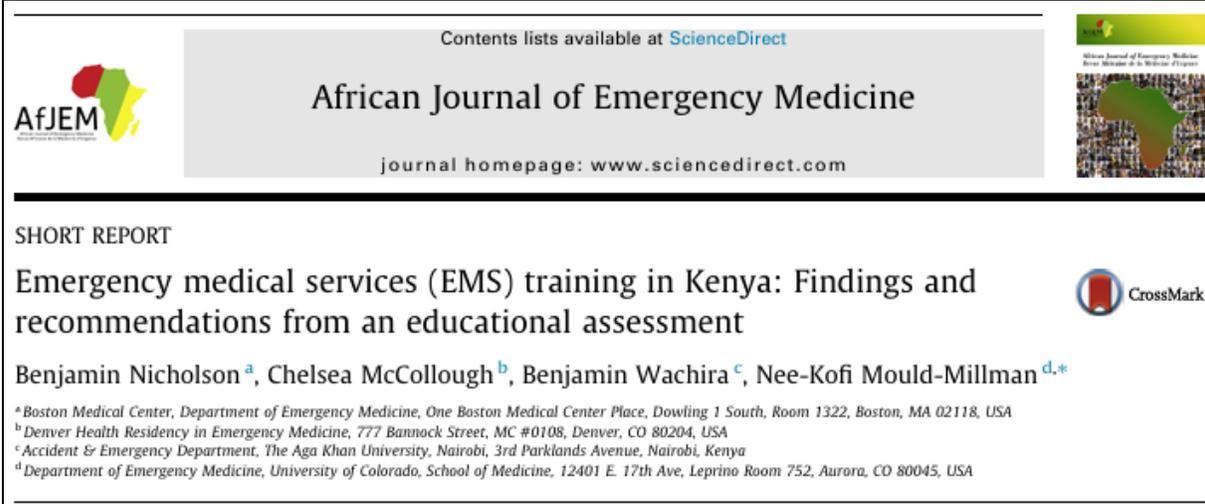


ESSENTIAL ELEMENTS OF AN EMERGENCY MEDICAL SERVICES (EMS) SYSTEM



Prehospital Providers

- Default EMS in many LMICs:
 - Red Cross/Crescent & hospital-based ambulances
 - Driver + a facility unit nurse
 - Primarily conduct IFTs/CCT
- Evidence supports BLS
 - More cost-effective
 - Easier/faster to train
- However, high IFT burden
 - With prolonged transport durations
 - Of critically ill patients
 - Necessitates ALS level of care
- Case Study: KENYA
 - Curricula & materials are high-income (not Afro-centric)
 - Focus on primary responses (but burden is IFTs)
 - Focus on short transfers (but transports often long)



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

African Journal of Emergency Medicine

journal homepage: www.sciencedirect.com

SHORT REPORT

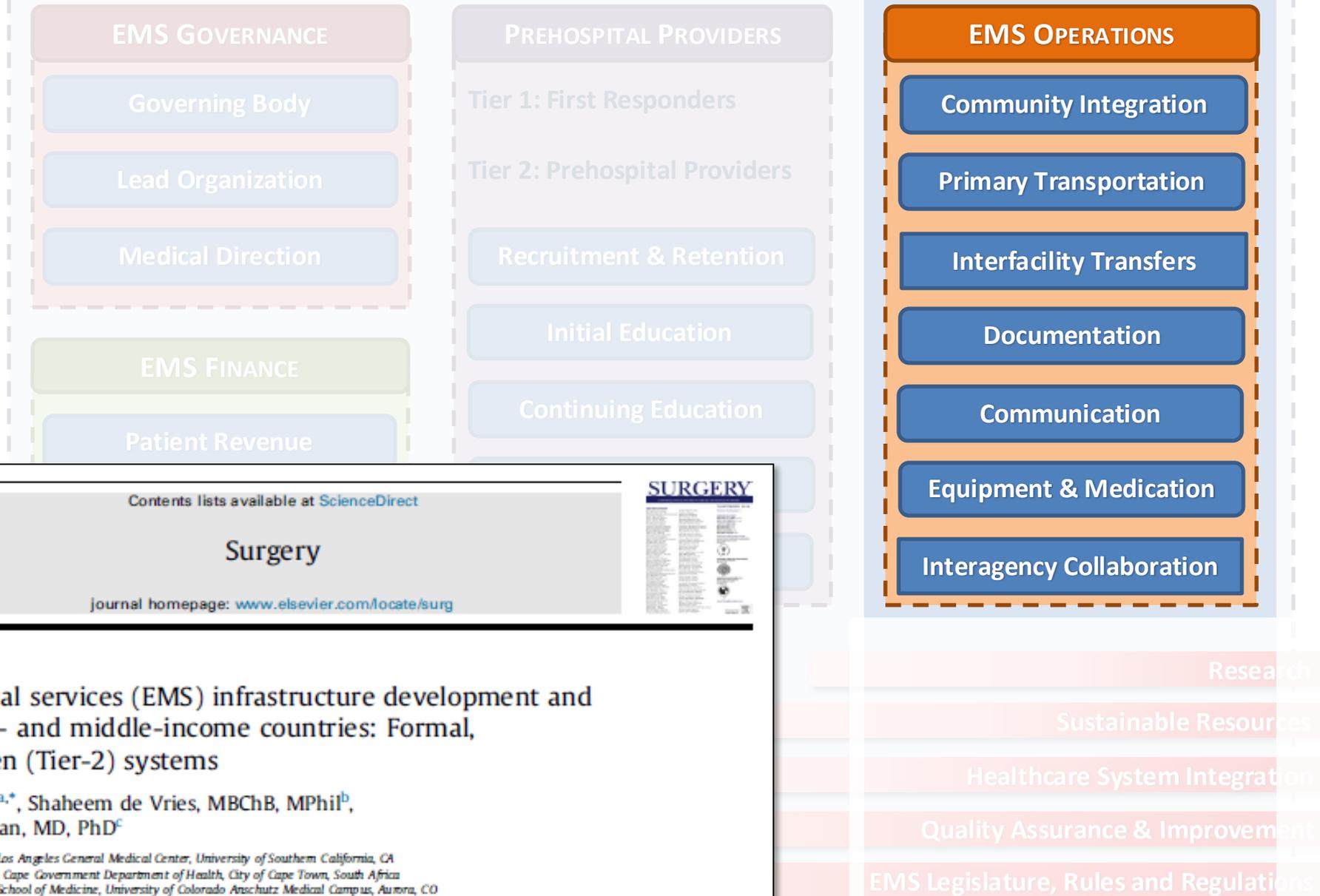
Emergency medical services (EMS) training in Kenya: Findings and recommendations from an educational assessment

Benjamin Nicholson ^a, Chelsea McCollough ^b, Benjamin Wachira ^c, Nee-Kofi Mould-Millman ^{d,*}

^a Boston Medical Center, Department of Emergency Medicine, One Boston Medical Center Place, Dowling 1 South, Room 1322, Boston, MA 02118, USA
^b Denver Health Residency in Emergency Medicine, 777 Bannock Street, MC #0108, Denver, CO 80204, USA
^c Accident & Emergency Department, The Aga Khan University, Nairobi, 3rd Parklands Avenue, Nairobi, Kenya
^d Department of Emergency Medicine, University of Colorado, School of Medicine, 12401 E. 17th Ave, Leprino Room 752, Aurora, CO 80045, USA

CrossMark

ESSENTIAL ELEMENTS OF AN EMERGENCY MEDICAL SERVICES (EMS) SYSTEM



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Surgery

journal homepage: www.elsevier.com/locate/surg

SURGERY

Emergency medical services (EMS) infrastructure development and operations in low- and middle-income countries: Formal, professional-driven (Tier-2) systems

Jared H. Sun, MD, PhD^{a,*}, Shaheem de Vries, MBChB, MPhil^b,
Nee-Kofi Mould-Millman, MD, PhD^c

^a Department of Emergency Medicine, Los Angeles General Medical Center, University of Southern California, CA

^b Emergency Medical Services, Western Cape Government Department of Health, City of Cape Town, South Africa

^c Department of Emergency Medicine, School of Medicine, University of Colorado Anschutz Medical Campus, Aurora, CO

EMS Operations

- Blood deserts
 - Obstetric hemorrhage
 - Hospital transfusions
- Case Study: GHANA & RWANDA
 - Drone blood program
 - EMS system augmented



BBC NEWS PIDGIN



Drones Have Transformed Blood Delivery in Rwanda

The autonomous aircraft have shuttled blood to rural, mountainous areas for years. A new analysis proves they're faster than driving.



EMS Operations

○ IFTs dominant

- 80%+ of EMS in sub-Saharan Africa = IFTs

○ Case Study: WESTERN CAPE EMS, SOUTH AFRICA

- Quadruple burden of disease
 - Trauma burden
 - Obstetric burden
- IFT burden (HealthNET)



Western Cape
Government
Health

BETTER TOGETHER.

WESTERN CAPE
METRO EMS





The quadruple burden of disease in South Africa: A cocktail of four colliding epidemics

Maternal, newborn & child health

- ~1% of global burden
- *2-3 times > average for comparable countries*

HIV/AIDS and TB

- 17% of HIV burden
- *23 times > global average*
- 5% of TB burden
- *7 times > global average*

Non-communicable diseases

- <1% of global burden
- *2-3 times > average developing countries*

Violence and injury

- 1.3% global burden of injuries
- *2 times global average for injuries*
- *5 times global average for homicide*

Source: Lancet Series





T 12170kg
V 13900kg

GAUTENG EMERGENCY
MEDICAL SERVICES



M02



AIDS TOLLFREE 0800012322



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An aerial photograph of a densely packed informal settlement, likely a slum. The buildings are small and closely packed, with roofs made of various materials, including corrugated metal in shades of blue, green, and grey. The settlement is built on a hillside, with hills visible in the background under a clear sky. A white text box with a black border is overlaid on the center of the image, containing red text.

Search and rescue...
Then patient care...
Occasionally under fire...
Red zones = delayed access...
Casualty collection points...



EMRS

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OBSTETRIC UNIT

KZN EMERGENCY MEDICAL RESCUE SERVICES



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HEALTHNET

PATIENT TRANSPORT SERVICE

4475



Learning Objectives (recap)

- Appreciate the diversity of EMS systems globally
 - Developed/mature EMS systems
 - Developing/nascent EMS systems
- Understand that local context drives configuration
- Recognize the role of adaptation and innovation
- Use a framework to assess EMS systems components

Thank you.



Nee-Kofi.Mould-Millman@cuanschutz.edu

Reserve Slides

International Models of EMS

- Franco-German model (Europe, Francophones):
 - General Practitioners (GPs) treat urgent patients
 - Physician is brought to emergent patient
 - “Extended immediate scene care” is provided
 - Resuscitation teams: surgeons, intensivists, peds, etc
 - Paramedics assist prehospital physicians
 - Paramedics on-scene first can initiate treatment
 - Response metrics: 80% in 10-mins, 95% in 15-mins
 - Of 830,000 deaths/year, trauma fatalities lowest (4%)
 - OOH cardiac arrest survival: USA ≈ Germany (2003)



Gries, A *et al.* *Anaesthetist*. 2006 Oct;55(10):1080-6.

Dick, WF. *Prehosp Disaster Med*. 2003 Jan-Mar;18(1):29-35; discussion 35-7.

EMS SCENE CARE/TRANSPORT AND FACILITY STABILIZATION



Western Cape EMS



Primary Level Facility

0.5 to 3-Hours



Secondary Health Care Center
(e.g., district hospitals)

12 to 48-Hours



Secondary Health Care Center
(e.g., regional hospitals)

24 to 72-Hours



Tertiary Health Care Facility
(e.g., specialized trauma care)

DEFINITIVE CARE