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# Practical Difficulties of Delivering Medicines Where Infrastructure Does Not Exist

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# Presentation Outline

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1. Background
2. Case studies on Afghanistan and Liberia
3. Pilots of last-mile distribution models and lessons learned
4. Effective interventions for improving availability of medicines, based on published studies

# Background

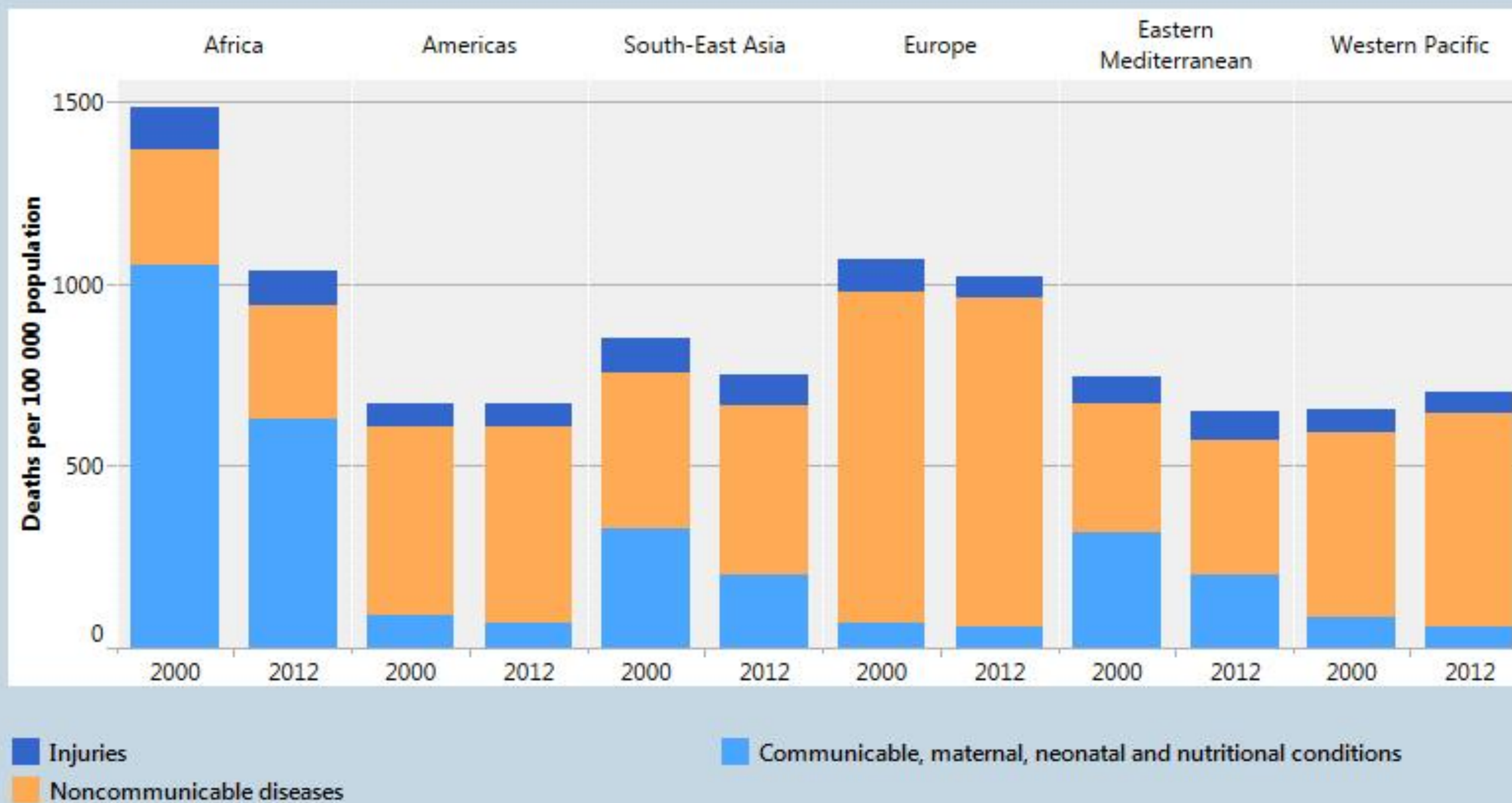
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1. About a third of the world's population does not have access to essential medicines, worsening morbidity and mortality
2. Medicines have a significant health impact, and the market is thriving; however, their delivery in low- and middle- income countries (LMICs) is hindered by lack of infrastructure. Lower levels of the health system, particularly “last mile”, have fewer medicines available than teaching or district hospitals
3. Effective distribution models must be adopted to achieve health goals, such as the Joint United Nations Program on HIV/AIDS' (UNAIDS) ambitious 90-90-90 global goals: 90% of people with HIV **diagnosed**, 90% of them on **ART**, and 90% of them **virally suppressed** by 2020
4. Definitions of infrastructure  
**Hard:** utilities, transport vehicles, telecommunication systems, roads , railways, airports  
**Soft:** software and programs, governing rules and regulations, financial system, and the organizational structure required to operate and maintain supply systems
5. Reasons infrastructure may not exist (or is nonfunctional)
  - Lack of political commitment and leadership
  - Lack of transparency and accountability allowing corruption
  - Conflicts
  - Natural disasters



# Crude death rate by broad cause group, 2000 and 2012

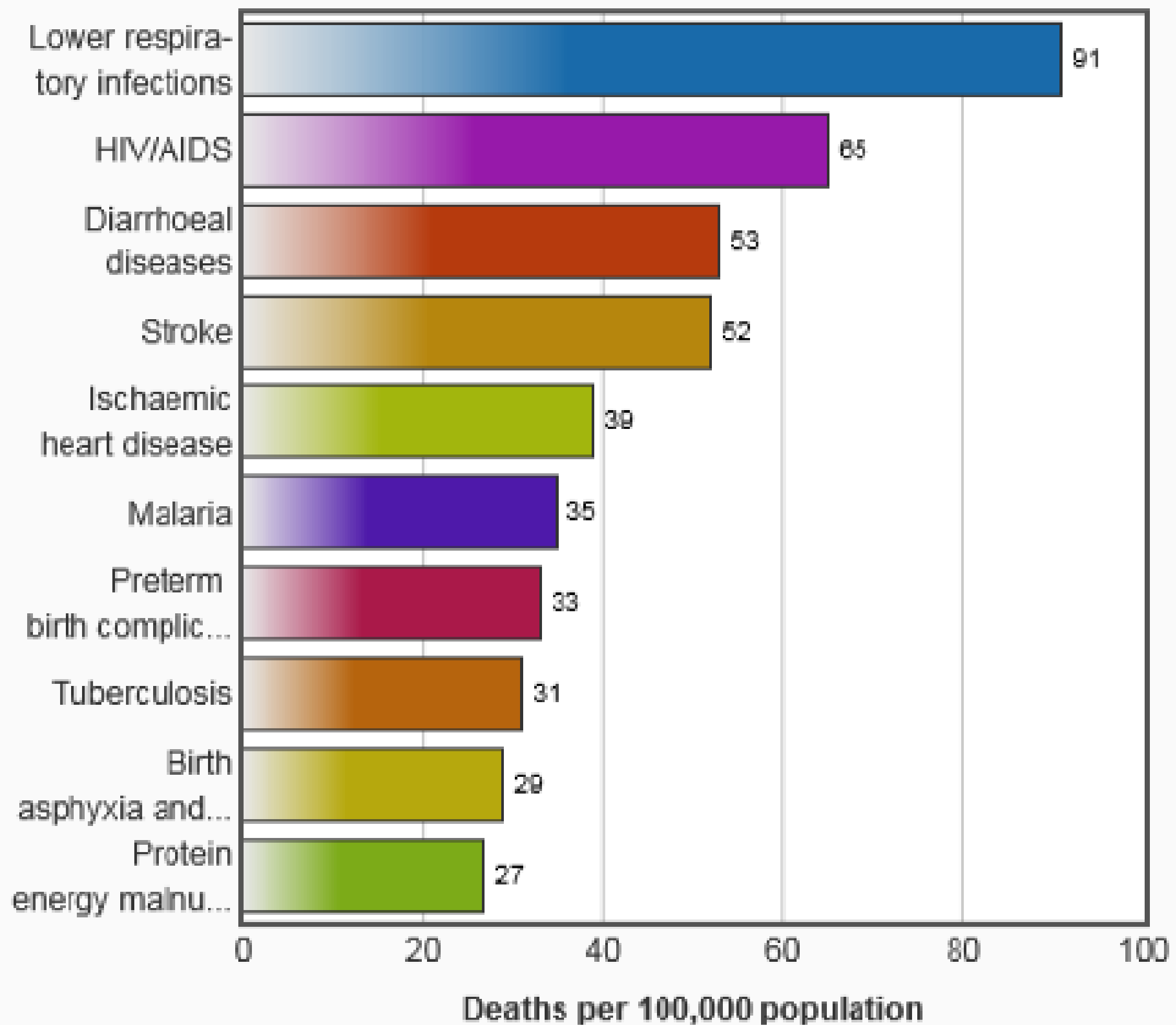
## By WHO region



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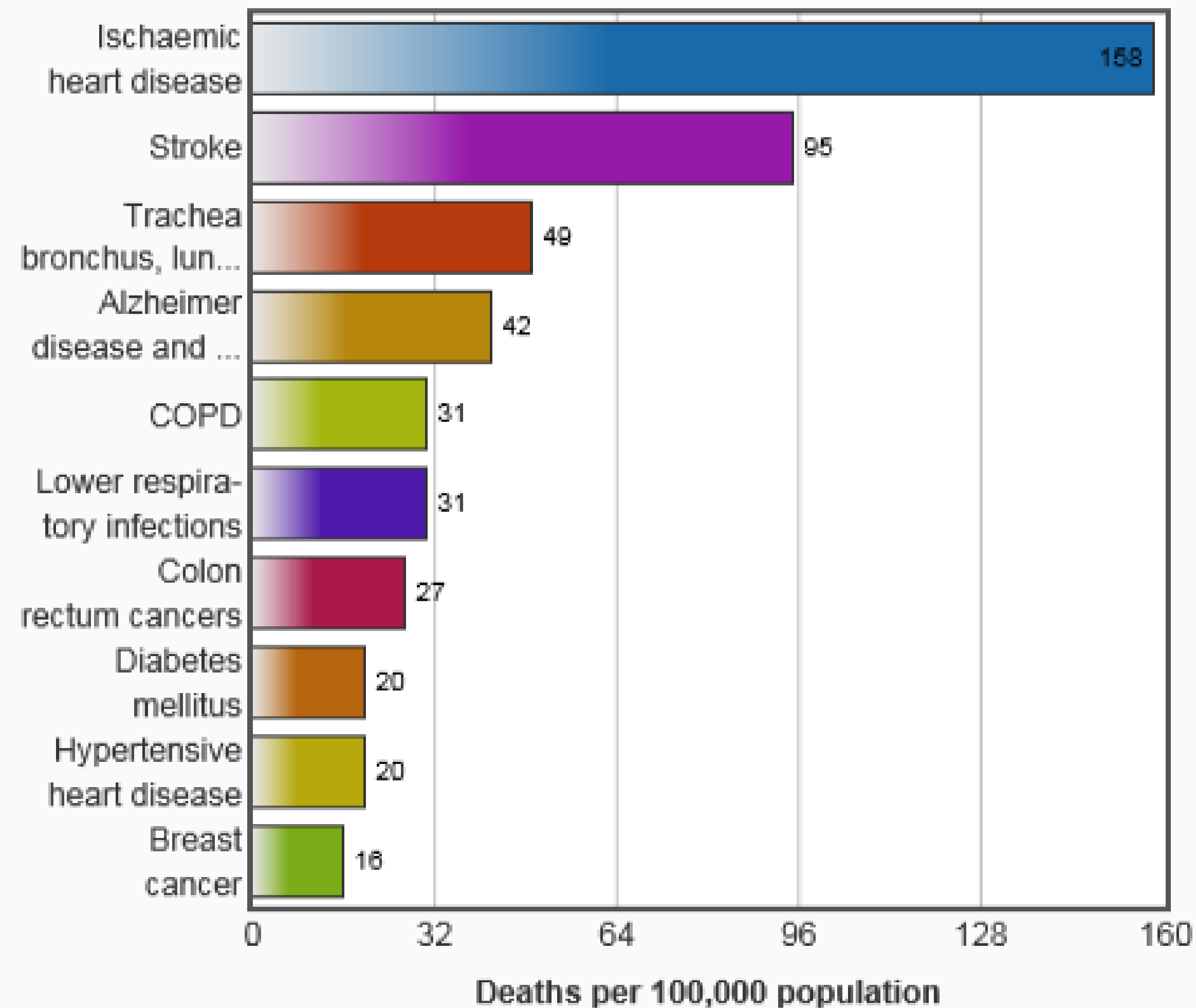
### Top 10 causes of death in low-income countries

2012



### Top 10 causes of death in high income countries

2012



*In terms of number of deaths, 28 million (about three quarters) of the 38 million of global NCD deaths in 2012 occurred in low- and middle-income countries. Source: <http://www.who.int/mediacentre/factsheets/fs310/en/index2.html>*

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# Case Studies

# Afghanistan, Post-Conflict: Problem

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## **Problem: Political crisis that ended in 2001 left a devastated health system**

- Damaged infrastructure, limited human resources, weak stewardship, proliferation of non-governmental organizations (NGOs)
- Dysfunctional public-sector health system
- 80% of health services provided by NGOs with huge gaps in critical services and inequity in service distribution
- Only 10% of population had access to health services
- Some of the world's worst health indicators, e.g., maternal mortality ratio approximately 1,600 per 100,000 live births (highest ever recorded); infant and child mortality rates of 165 and 257 per 1,000 live births, respectively, ranked 4th highest in the world in 2002 (W. Newbrander et al.)





# Afghanistan, Post-Conflict: Response (1)

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## *Response: Ministry of Public Health (MOPH), donors, and international agencies*

- MOPH's desire to prioritize underserved rural areas
- Interest of many donors (European community, USAID, World Bank) to strengthen the health system, coordinate and provide considerable funding
- Development and implementation of Basic Package of Health Services (BPHS) to tackle the most urgent health problems while rebuilding the health system

# Afghanistan, Post-Conflict: Response (2)

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## *Response: MOPH, donors, and international agencies*

- BPHS defined: Type of health facility and size of catchment population, including linked services and types and number of staff, and required equipment and essential medicines
- MOPH competitively contracted NGOs to deliver the BPHS in defined geographic areas, and payment based on achievement of agreed goals
- Institutionalization of Grants and Contracts Management Unit in MOPH, leading planning and implementation of BPHS
- BPHS-enabling strategies: Community-based health care, including midwives and monitoring and evaluation

# Afghanistan, Post-Conflict: Results

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**Results:** Significantly improved health indicators and health system strengthened between 2003 to 2011

Illustrative results:

- **Medicines and other technologies:** 20% decrease in percentage of facilities with stock-outs of one essential medicine
- **Service delivery:** 70% increase in active BPHS facilities
- **Information:** 60% increase in number of facilities regularly reporting their data to the Health Management Information System
- **70% of the NGOs provide comprehensive training for CHWs, 95% of CHWs reported regular supervision, and more than 60% of the health posts had adequate essential medicines**

# Liberia, Post-Conflict: Problem

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**Problem: Liberia emerged from a brutal 14-year civil war in 2003 with a ruined economy, infrastructure, health system, and the health and education of its people**

- Fragmented health system, lack of basic information about health care, and 70% facilities operated by NGOs
- Human resources for service provision and management severely limited
- Extreme logistical challenges, for example, infrastructure for communication and transport extremely poor (no landlines and power by diesel generators only)
- Under-5 mortality 235 per 1,000 (WHO 2006), and maternal mortality rose to 994 per 100,000 live births (Liberia Institute of Statistics & Geo-Information Services Statistics)





# Liberia, Post-Conflict: Response (1)

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***Response: Strengthen the health system by multi-faceted approaches and stakeholder engagement***

- Election of President Ellen Johnson Sirleaf in 2005
- New National Health Policy (NHP) and National Health Plan (2007–2011), including BPHS free of charge
  - BPHS enabled facilities to be funded by donors through competitive bidding process
- NHP and BPHS are consistent with observation that a focus on *primary care initiatives and infrastructure* is an effective method for health system strengthening (Kruk et al. 2010)
- NHP included government commitment to:
  - Decentralize, including management authority by county health teams
  - Progressively increase health spending to eventually reach Abuja target of 15% of national budget



# Liberia, Post-Conflict: Response (2)

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***Response: Strengthen the health system by multi-faceted approaches and stakeholder engagement***

- Innovative financing mechanism – Health Sector Pool Fund, established in 2008 by agreement between government and partners
- Launch of BPHS accreditation process to assess and monitor implementation (Cleveland et al. 2011)

# Liberia, Post-Conflict: Results

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- Alignment of health actors through the Pool Fund
- Government funding increased, but funding gap grew due to departure of NGOs
- Rapid scale-up of health facilities and health workers
  - However, 41% of all households (15% urban and 66% rural) did not have ready access to a health facility (Lee et al., 2011)
- Accreditation process enabled
  - MOHSW to gather unprecedented amounts of comprehensive, timely, and detailed information about health facilities, including data on availability of essential medicines and key supplies
  - Increased accountability (needs, priorities, and responsibilities more clearly defined and monitored at all levels)
- Under-5 mortality rate declined from **235** (in 2006) to **75** (in 2012) per 1,000 live births



# Difficulties of Delivering Medicines in LMICs

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## 1. Inadequate public financing

- Medicines account for 25-70% of overall health care expenditure, compared to less than 10% in most high-income countries (WHO 2008)

## 2. Weak procurement and supply management

- Medicine procurement procedures are inefficient, nontransparent, and probably corrupt (Kotwani 2011)
- Insufficient qualified personnel

## 3. Weak regulatory and quality assurance frameworks

- 5.6% of total samples of antibiotic, antimalarial, and anti-TB medicines tested between 2003 and 2013 in 17 countries of Africa, Asia, and South America failed quality test (Hajjou et al. 2015)

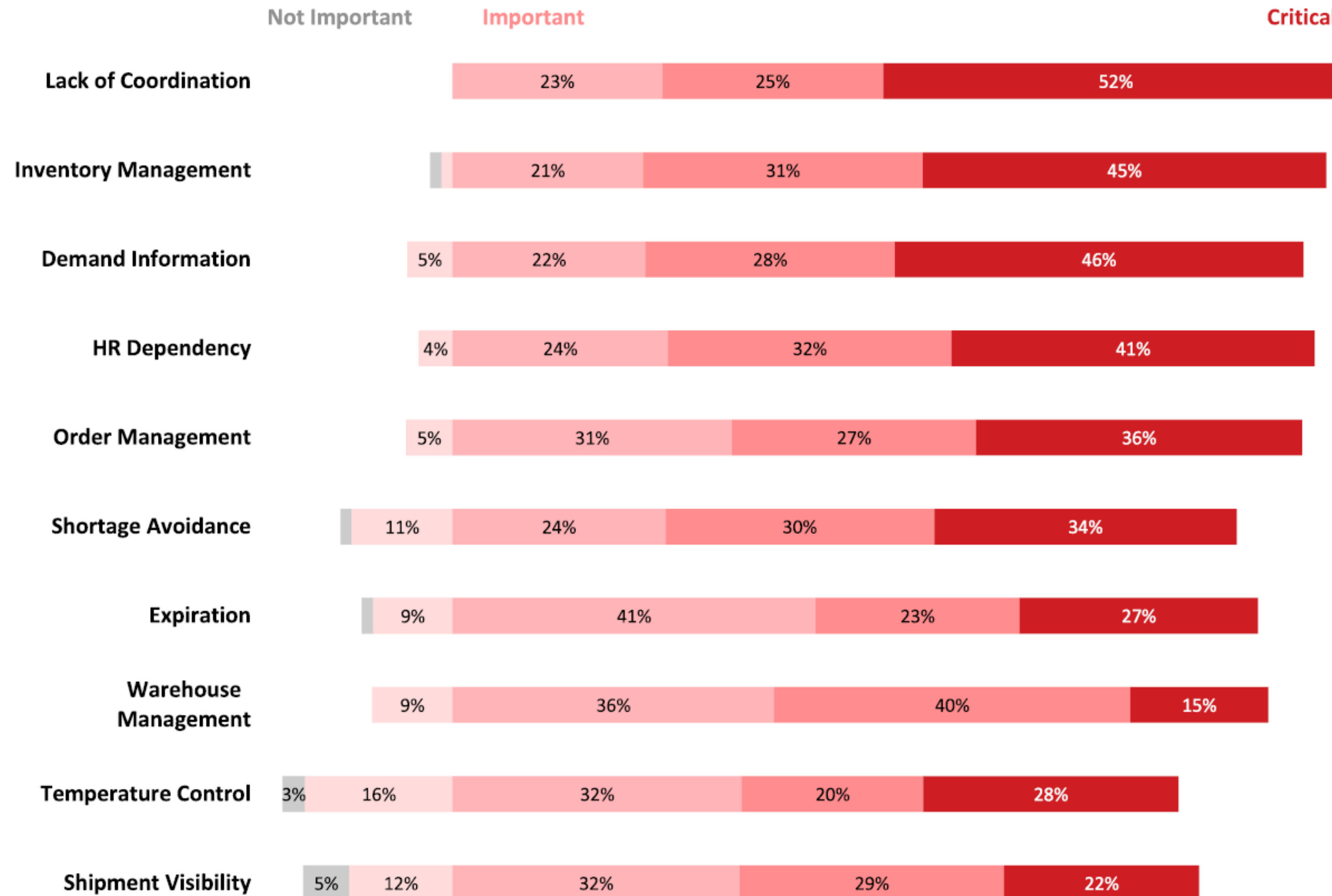
## 4. Unaffordable prices

- Up to 90% of population in LMICs pays for medicines out-of-pocket because of lack of social insurance and inadequate publicly subsidized services (McIntyre, Thiede, Dahlgren, and Whitehead 2006)



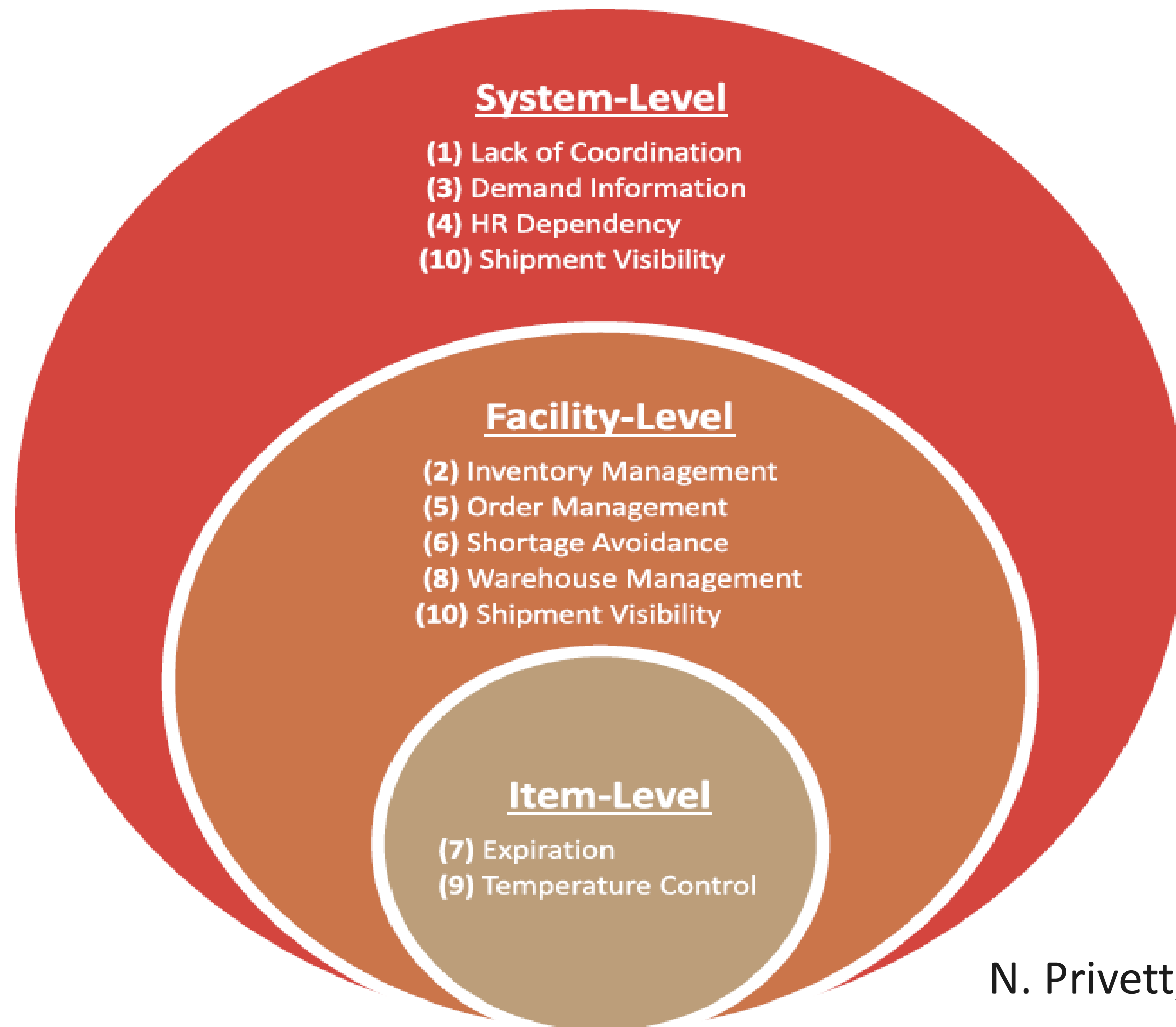
# Top 10 Global Health Medicine Delivery Difficulties

*N. Privett, D. Gonsalvez / Operations Research for Health Care 3 (2014) 226–230*



# Dependency Model: “System-Level” Difficulties are Key Drivers

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N. Privett, D. Gonsalvez (2014)



# Community-Level (“Last Mile”) Medicine Delivering Difficulties

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1. Medicine stock-out at community health workers’ (CHWs) resupply points
2. Inadequate supply chain knowledge and capacity among CHWs and their supervisors
3. Lack of adequate or reliable transport

Chandani et al. 2012

# Pilots of Last-Mile Distribution Models

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**Informed push model (IPM):** trained drivers and staff monitor and restock medicines at service delivery points (SDPs)

1. Direct distribution and information capture (DDIC) – Nigeria
2. Delivery team topping up (DTTU) – Zimbabwe
3. IPM for contraceptive distribution – Senegal
4. Dedicated logistics system (DLS) – Mozambique

# Pilots of Last-Mile Distribution Models: Lessons Learned

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1. Third-party logistics company (3PL): Capacity, management, key performance indicators, monitoring and performance improvement, cost recovery, cost barrier to servicing extremely rural locations
2. Human resources: Drivers require literacy and numeracy skills, in addition to knowledge of terrain and routine vehicle maintenance
3. Communication and coordination: Plan, link between 3PL, SDPs, and IPM management
4. Data collection: Type of software and computers and connections to other existing information systems
5. Advocacy and partnerships: System optimization, leadership, government, and donor-funding flows
6. Medicine supply at central level

# Effective Interventions for Improving Availability of Medicines, based on Published Studies reviewed by Nunan et al. 2011 (1)

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## **Good evidence (controlled trials)**

1. Structured supervision of health facilities (Zimbabwe: Trap et al. 2001 )
2. Community-directed interventions for facilitation and delivery of medicines (Cameroon, Nigeria, Uganda: Special Program for Research & Training in Tropical Diseases 2008)

## **Some evidence (program description only)**

1. Staff training
2. Integration of disease-specific programs

## **Weak/mixed evidence (operational intervention with historical control)**

1. Privatized distribution
  2. Public-private partnerships
  3. User-fees
  4. Revolving drug funds
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# Effective Interventions for Improving Availability of Medicines, based on Published Studies (2)

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1. Home- or community-based interventions, which provide antimalarial drugs free of charge probably improve prompt access to antimalarials (Okwundu et al. 2013)
2. Public-private partnerships using government accreditation (ADD0 model) increases **access** to quality medicines and services in underserved areas; ADD0 model is **scalable, sustainable and transferable** (Rutta 2014)
3. Antiretroviral therapy provided at home by trained volunteers shows no difference in outcomes when compared to facility-based care (Kredo et al. 2013)



# Conclusion

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- CHWs serve as village primary care providers, functioning as a liaison between the community and health care facilities
- LMIC governments, international community, pharmaceutical industry, and NGOs must identify and support scale-up of effective interventions to close medicine-access gaps in order to meet global health goals.
- Last-mile delivery solutions must be **affordable, simple, and sustainable**; these solutions should be informed by evidence and country context, including:
  - i. Community-based interventions, including CHWs
  - ii. Public-private partnerships, including accreditation and use of private logistics services
- Transparent, accountable, sustainable supply systems are possible, provided high-level political commitment exists to mandate and enforce the system

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Thank you!

# References (1)

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Afghanistan National Hospital Survey, 2004. [http://pdf.usaid.gov/pdf\\_docs/pnaea825.pdf](http://pdf.usaid.gov/pdf_docs/pnaea825.pdf)

Chandani et al., *Factors affecting availability of essential medicines among community health workers in Ethiopia, Malawi and Rwanda: Solving the Last Mile puzzle*. Am. J. Trop. Med. Hyg., 87 (suppl. 5), 2012, 120-126

Cleveland, E. C. et al. Introducing health facility accreditation in Liberia, *Global Public Health*, 2011, 6:3, 271-282

Hajjou et al., *Monitoring the Quality of Medicines: Results from Africa, Asia, and South America*, Am. J. Trop. Med. Hyg., 92 (Supplement 6), 2015, pp. 68-74

Kotwani, A. *Transparency and Accountability in Public Procurement of Essential Medicines in Developing Countries*, *International Journal of User-Driven Healthcare*, 2011, 1(4), 15-30

Kredo, T. et al., *Decentralizing HIV treatment in lower- and middle-income countries*. *Cochrane Database of Systematic Reviews* 2013, Issue 6.

Kruk, M. E. et al., *The contribution of primary care to health and health systems in low- and middle-income countries: A critical review of major primary care initiatives*. *Soc Sci Med* 2010, 70(6):904-911.



## References (2)

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Lee et al., An analysis of Liberia's 2007 national health policy: Lessons for health system strengthening and chronic disease care in poor, post-conflict countries, *Globalization and Health* 2011, 7:37

McIntyre, Thiede, Dahlgren, and Whitehead, *What are the economic consequences for households of illness and of paying for health care in low- and middle-income country contexts?*, *Soc Sci Med.* 2006 Feb;62(4):858-65

Newbrander, W. et al., Afghanistan's Basic Package of Health Services: Its development and effects on rebuilding the health system, *Global Public Health*, Vol. 9, 2014, No. S1, S6–S28,  
[http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4136668/pdf/rgph9\\_S6.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4136668/pdf/rgph9_S6.pdf)

Nunan et al., *Effectiveness of pharmacy interventions in improving availability of essential medicines at the primary healthcare level.* *Systematic Review* 2011, Vol 16: 5 pp 647-658

Okwundu, C. I. et al., Home- or community-based programmes for treating malaria. *Cochrane Database of Systematic Reviews*, 2013, Issue 5

Privett, N. and Gonsalvez, D. *The top ten global health supply chain issues: Perspectives from the field*, *Operations Research for Health Care* 3, 2014, 226-230



## References (3)

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Rutta, E. *Accredited Drug Dispensing Outlets, Chapter 5 in Medicines in Health Systems: Advancing access, affordability and appropriate use*, 2014, Available at:

[http://apps.who.int/iris/bitstream/10665/179197/1/9789241507622\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/179197/1/9789241507622_eng.pdf?ua=1)

Special Programme for Research and Training in Tropical Diseases (TDR),

[http://www.who.int/tdr/publications/documents/cdi\\_report\\_08.pdf](http://www.who.int/tdr/publications/documents/cdi_report_08.pdf)

Trap et al., *The impact of supervision on stock management and adherence to treatment guidelines: a randomized controlled trial*. Health Policy And Planning, 2001 Sep; Vol. 16 (3), pp. 273-80

WHO, *Measuring medicine prices, availability, affordability and price components*, 2nd Edition, WHO/PSM/PAR/2008.3. [http://www.who.int/medicines/areas/access/OMS\\_Medicine\\_prices.pdf](http://www.who.int/medicines/areas/access/OMS_Medicine_prices.pdf)