

Economics of Drug Resistance Testing

Emily P. Hyle, MD, SM
Consultation on Global Trends on HIV Drug Resistance
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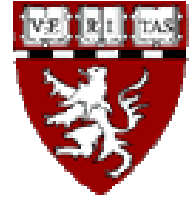


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I am a co-author of articles on UpToDate that are not related to this topic.



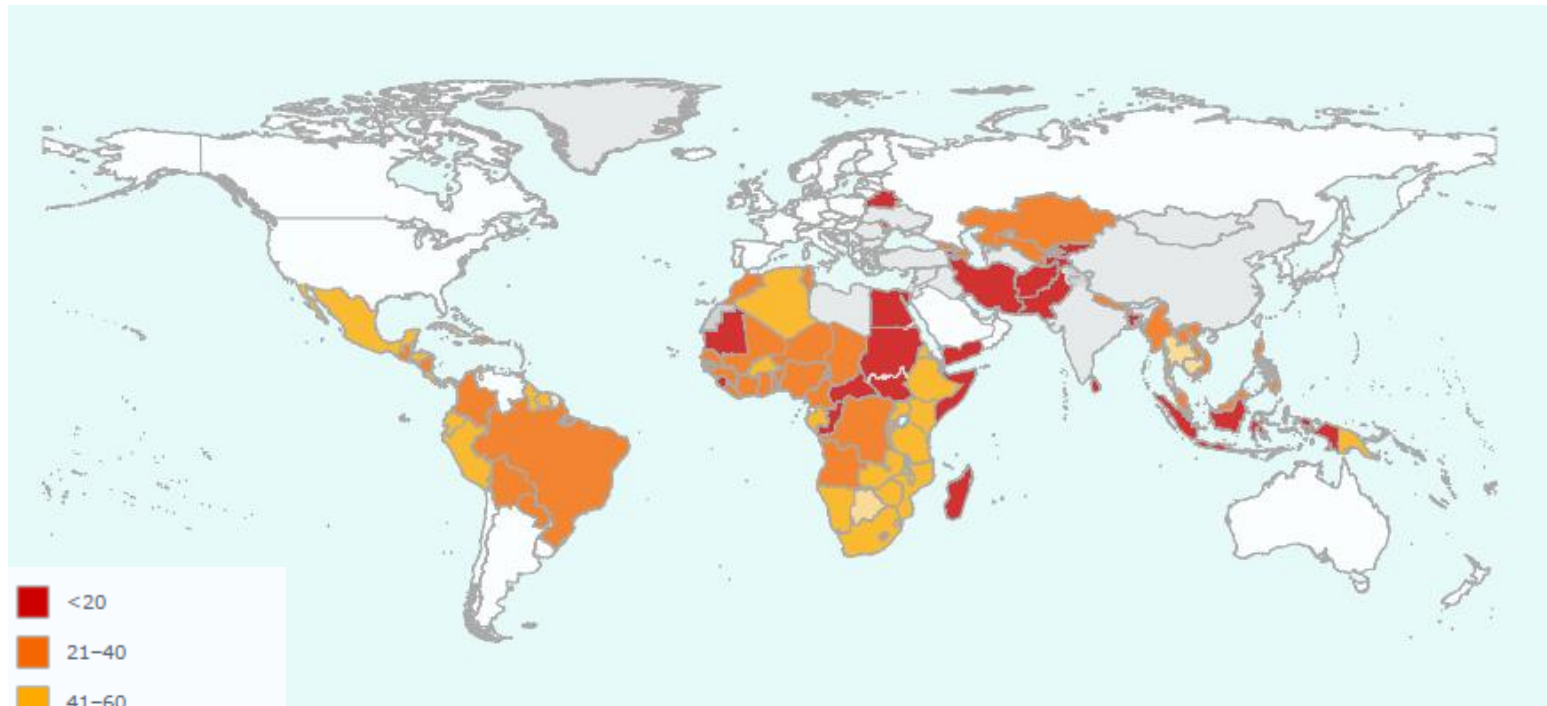
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Outline

- HIV Drug Resistance (DR) in LMIC
- Resource Utilization of DR Testing
- Cost-Effectiveness and Budget Impact Analyses

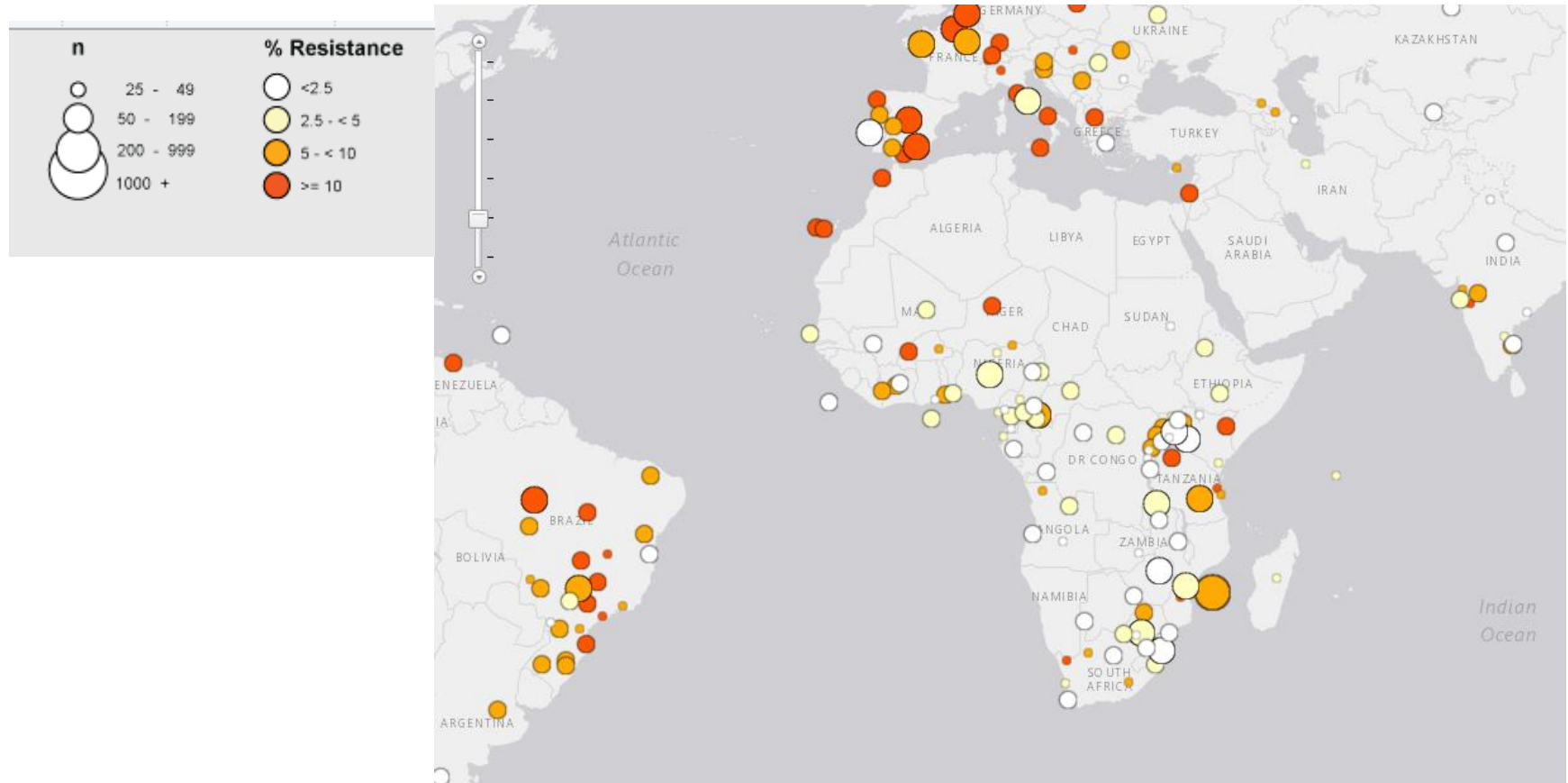
Improved ART Coverage



Percentage of HIV-infected patients on ART in LMIC (2014)

http://gamapserver.who.int/gho/interactive_charts/hiv/art/atlas.html

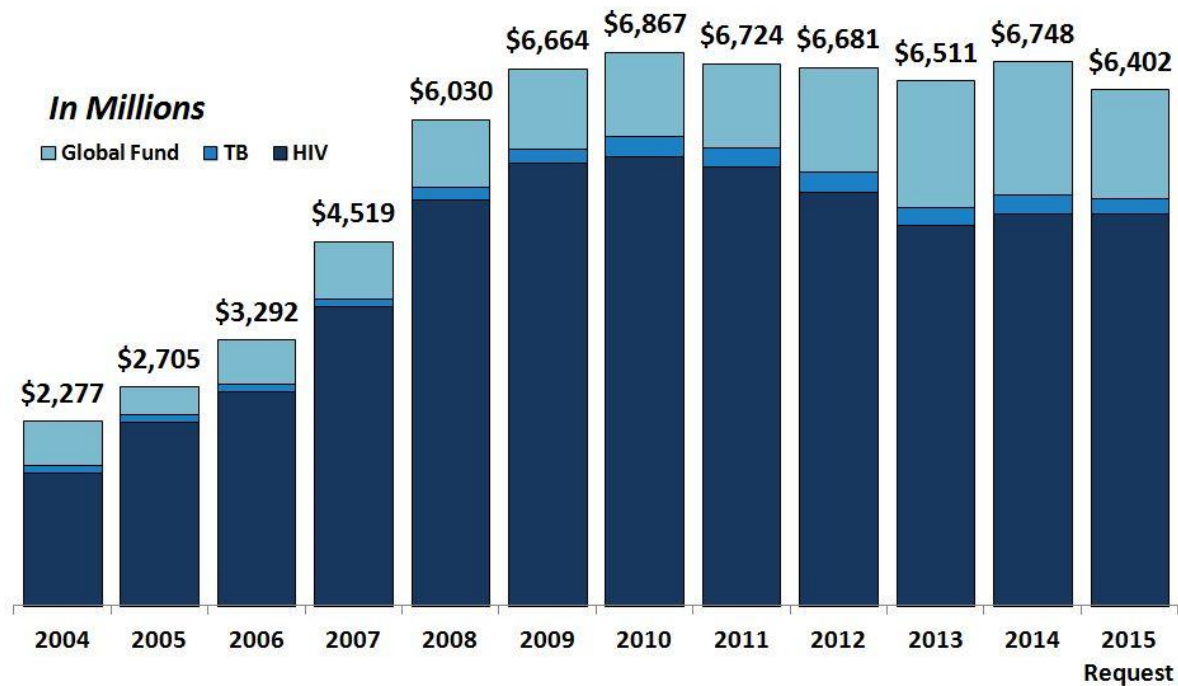
Drug Resistance Occurs



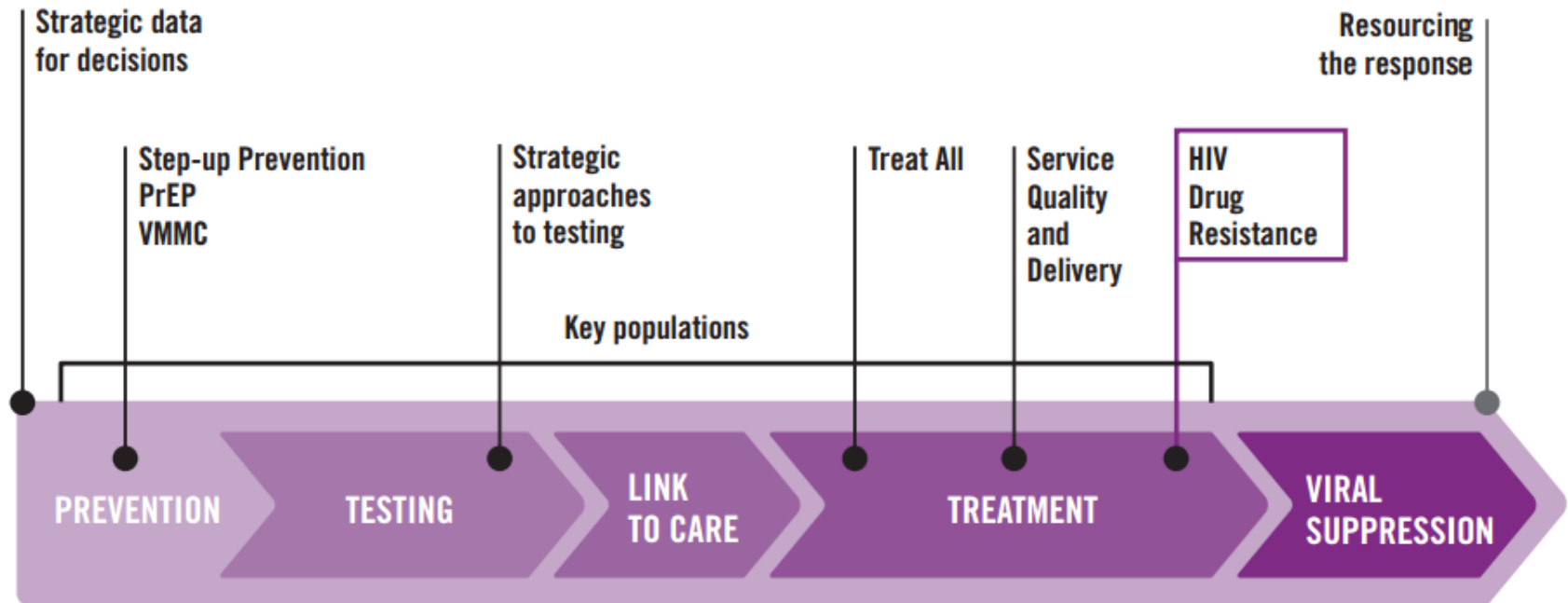
<http://hivdb.stanford.edu/surveillance/map/>

In an Era of Flat Funding

U.S. Global Health Funding for the President's Emergency Plan for AIDS Relief (PEPFAR), 2004-2015



Many Resources Needed



WHO. Global Action Plan for HIV Drug Resistance 2016-21.

Tests Require Resources

- Equipment
- Materials/Reagents
- Staff time
- Staff salaries
- Quality control
- Transport of samples
- Communication of results



Types of Costs

Fixed (per item)

- Machine
- Staff salaries
- Quality controls
- Transport

Marginal (per test)

- Reagents
- Staff time
- Transport

Example: Point-of-Care CD4

QC at mobile clinic

<u>Cost Component</u>	<u>Value</u>
Cost for QC materials (\$/day)	\$0.43
Machine start up (hours/day)	0.5
Salary (\$/hour)	\$14.67
Salary cost for QC (\$/day)	\$7.33
Total cost for QC (\$/day)	\$7.77

Adapted from Larson et al. PLoS One. 2012.

Impact of Staff Salaries

QC at clinic with enrolled nurse:

<u>Cost Component</u>	<u>Value</u>
Cost for QC materials (\$/day)	\$0.43
Machine start up (hours/day)	0.5
Salary (\$/hour)	\$8.82
Salary cost for QC (\$/day)	\$4.41
Total cost for QC (\$/day)	\$4.84

Adapted from Larson et al. PLoS One. 2012.

Costs Depend on Action Plan

Surveillance DR Testing

Guides level of concern
regarding DR at the
policy level

DR Testing for Patient Care

Guides decision-making
regarding treatment of
HIV-infected patients

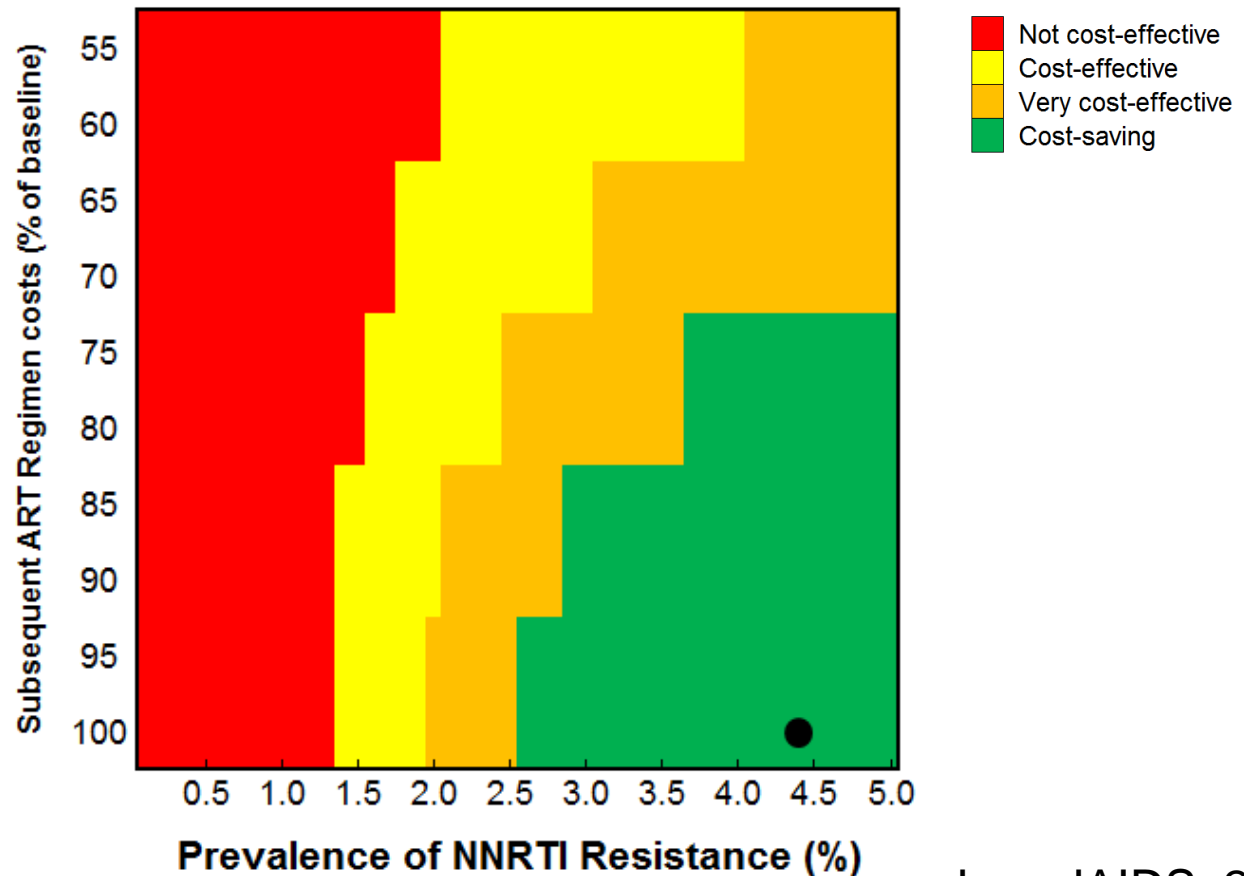
Opportunity Costs

- If DR testing is funded for patient care, we also need to invest in:
 - Enhancement of staff, transport, laboratory / clinic communications
 - Alternate ART regimens:
 - Available
 - Affordable
- What are the opportunity costs if DR testing is funded? What will not be funded?

Role of Cost-Effectiveness Analysis

- Project long-term outcomes (life expectancy)
- Examine impact of uncertain data (DR test cost; DR prevalence) on outcomes
- Determine thresholds: at what cost will DR testing affect policy conclusions?
- Assess the value of different strategies
 - Considers both effectiveness and resource utilization

CEA of Genotypes in Brazil



Role of Budget Impact Analysis

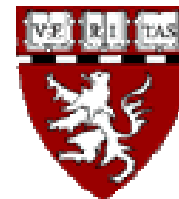
- Cost-effective does not mean affordable
- Budget impact analysis (BIA): what will it cost?
- WHO 2015 Guidelines include template for BIA that can be adapted for individual countries to undertake surveillance
- What will DR Testing cost to incorporate into patient care?

Conclusions

- Expanding DR testing in LMIC will be costly
- Investment must also include improvement in transportation, communication, and access to alternative ART
- Given ART expansion and rising prevalence of DR HIV, such investment may well be worth the costs



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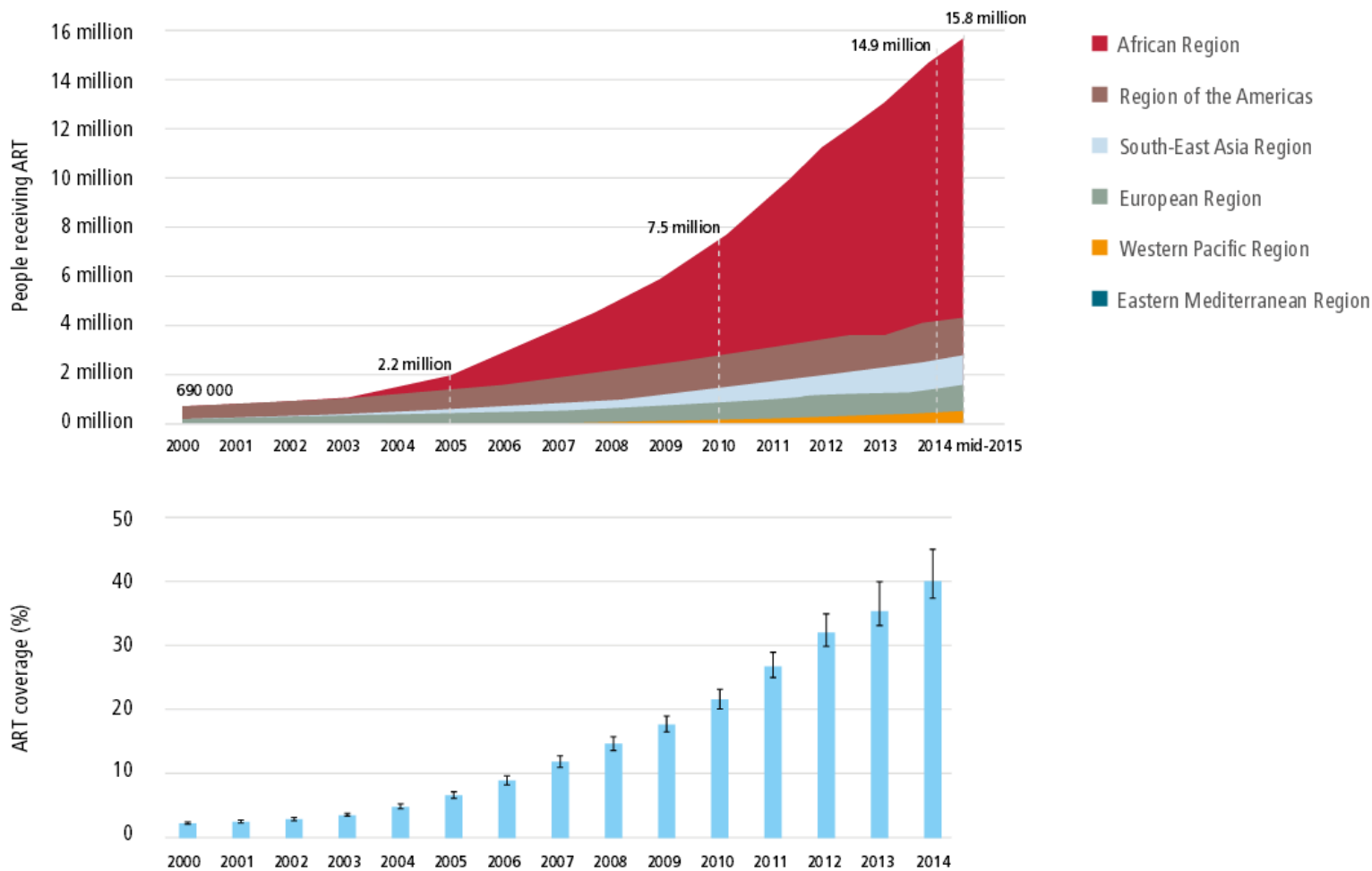
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Estimated numbers of people receiving antiretroviral therapy globally and by WHO Region and percentage coverage globally, 2000–2015



Source: Global AIDS Response Progress Reporting (UNAIDS/UNICEF/WHO) and UNAIDS/WHO estimates.