

# Management of dengue hospitalizations in Brazil during and outside epidemic periods: Insights from Data Mining

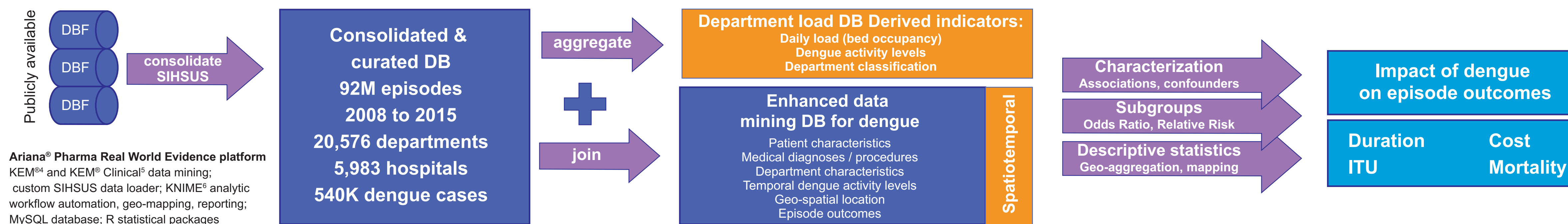
Nicolas Baurin<sup>1</sup>; David Morley<sup>2</sup>; Leon Ochiai<sup>1</sup>; Mariana Guergova-Kuras<sup>2</sup>; Mohammad Afshar<sup>2</sup>; Laurent Coudeville<sup>1</sup>  
<sup>1</sup>Sanofi Pasteur, Lyon, France; <sup>2</sup>Ariana Pharmaceuticals, Paris, France

## BACKGROUND & OBJECTIVES

- Brazil reported 1.5 million dengue cases in 2015, more than any other country. All publicly funded hospitalizations are registered in a publicly available database (SIH/SUS)<sup>1</sup>.
- Over 2008-2015, the SIH/SUS database describes 92 million admissions managed by 20,576 departments of 5,983 hospitals, of which 540k are admissions associated to a dengue diagnostic.
- Data mining of hospital databases provides insights on the impact of diseases on the healthcare infrastructure<sup>2,3</sup>, and contributes to document the disease burden on public health.
- We present here the consequences of the seasonal aspect of dengue on the management of dengue hospitalization in Brazil and some implications for dengue-related mortality.

## METHODS

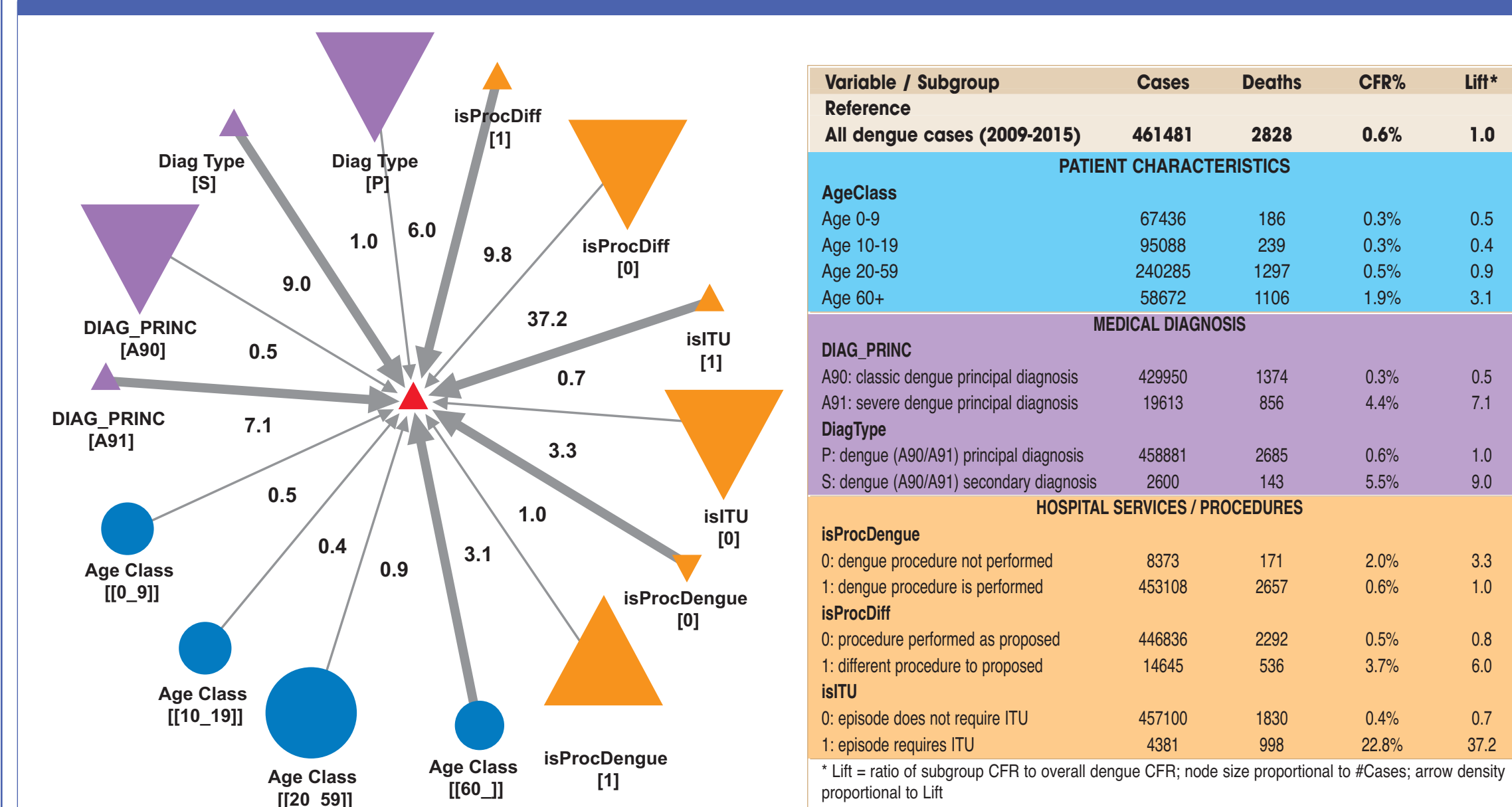
Ariana® Pharma Real World Evidence process - data consolidation, spatiotemporal exploration and data mining



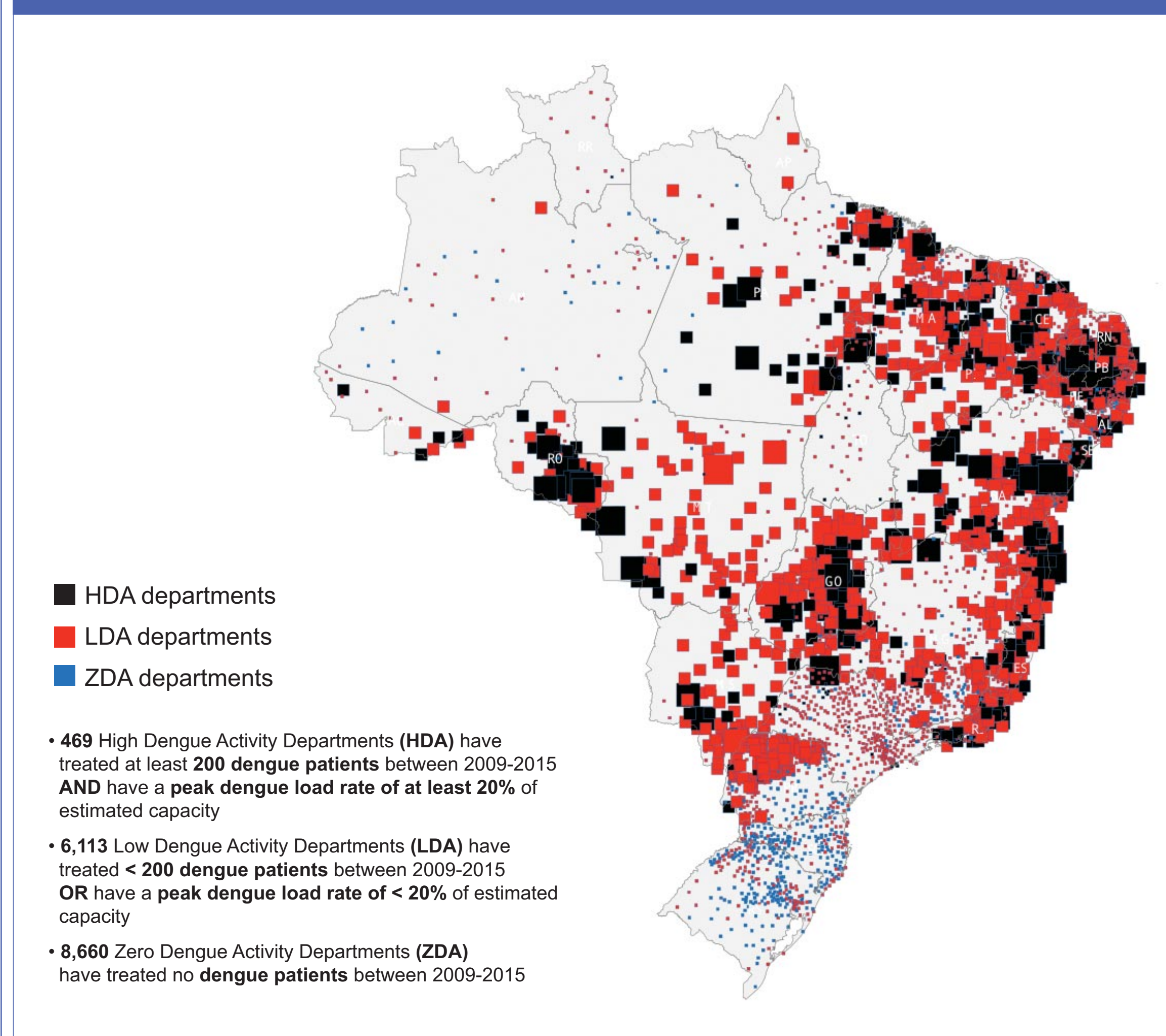
## RESULTS

### CHARACTERIZATION OF DENGUE EPISODES AND DEATHS

Characterization confirms higher Case Fatality Rate (CFR) for older adults (60+) and for more severe dengue cases

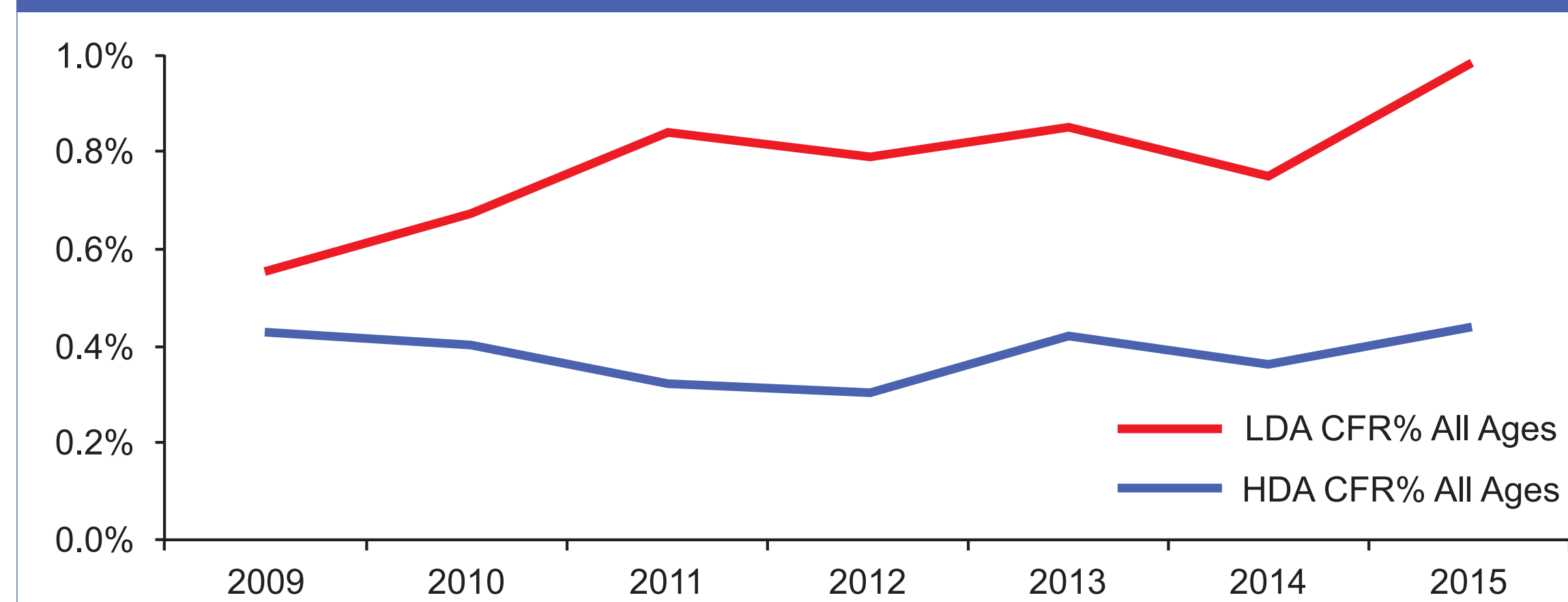


Dengue cases are managed by 40% of hospital departments throughout Brazil



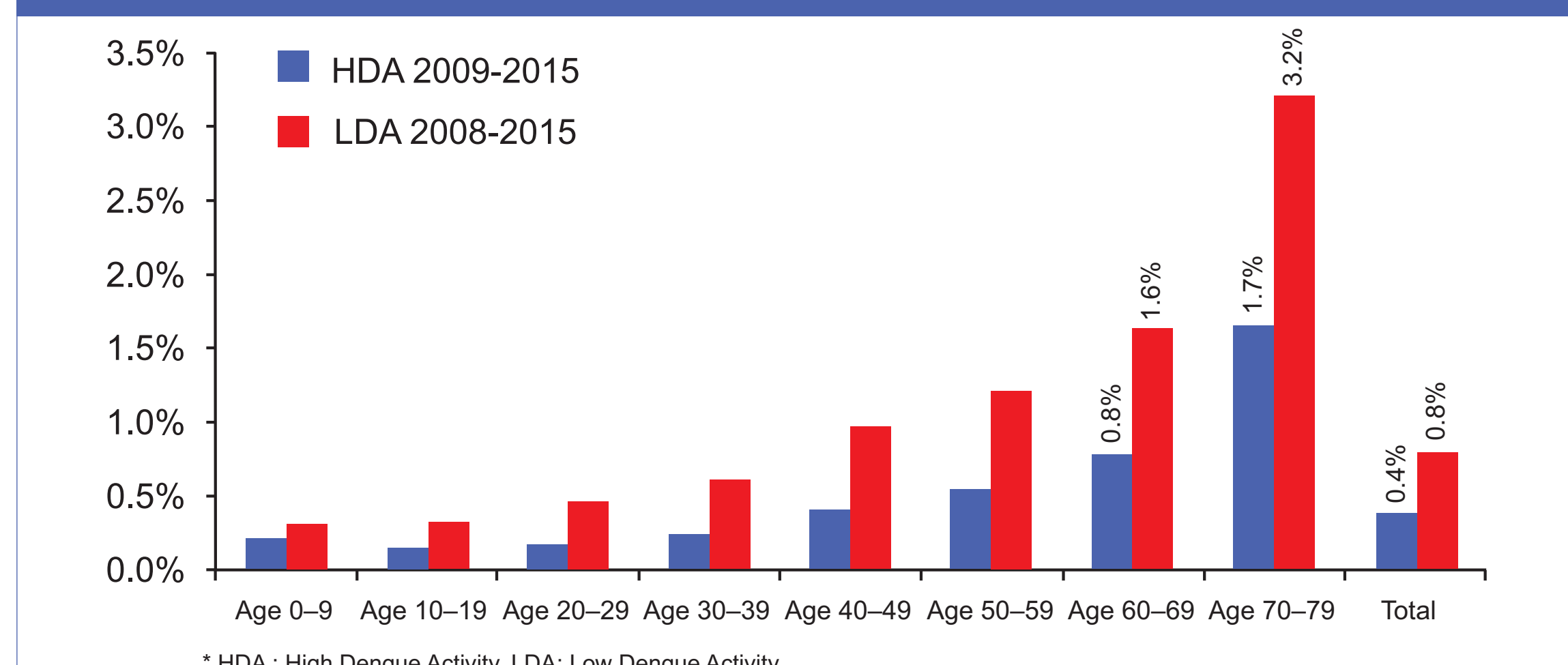
### COMPARISON OF HDA vs LDA departments

Higher dengue case fatality rates in LDA departments: on the rise over the years ("All ages")

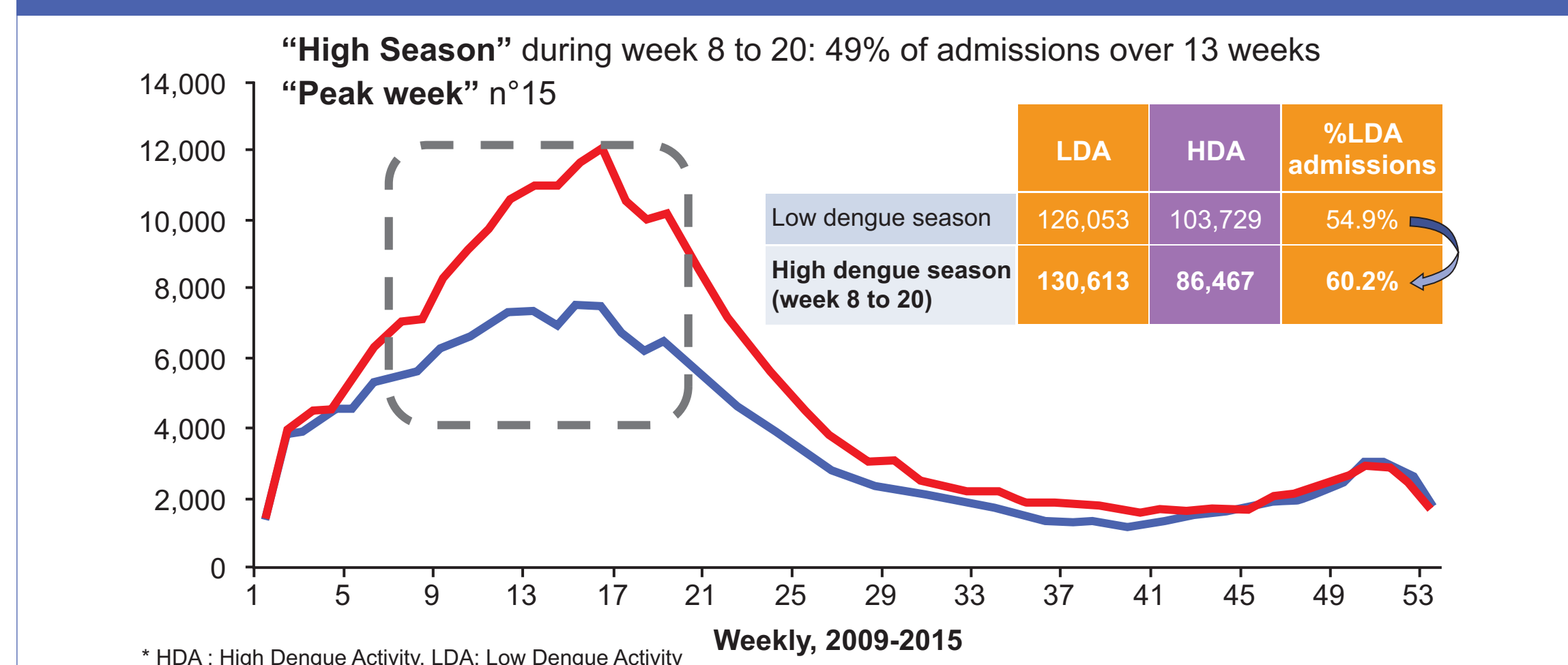


75% increase of CFR in LDA departments (.56% in 2009 to .98% in 2015)

~2-fold higher dengue case fatality rate in LDA vs HDA departments: for all ages, up to 3% for elderly

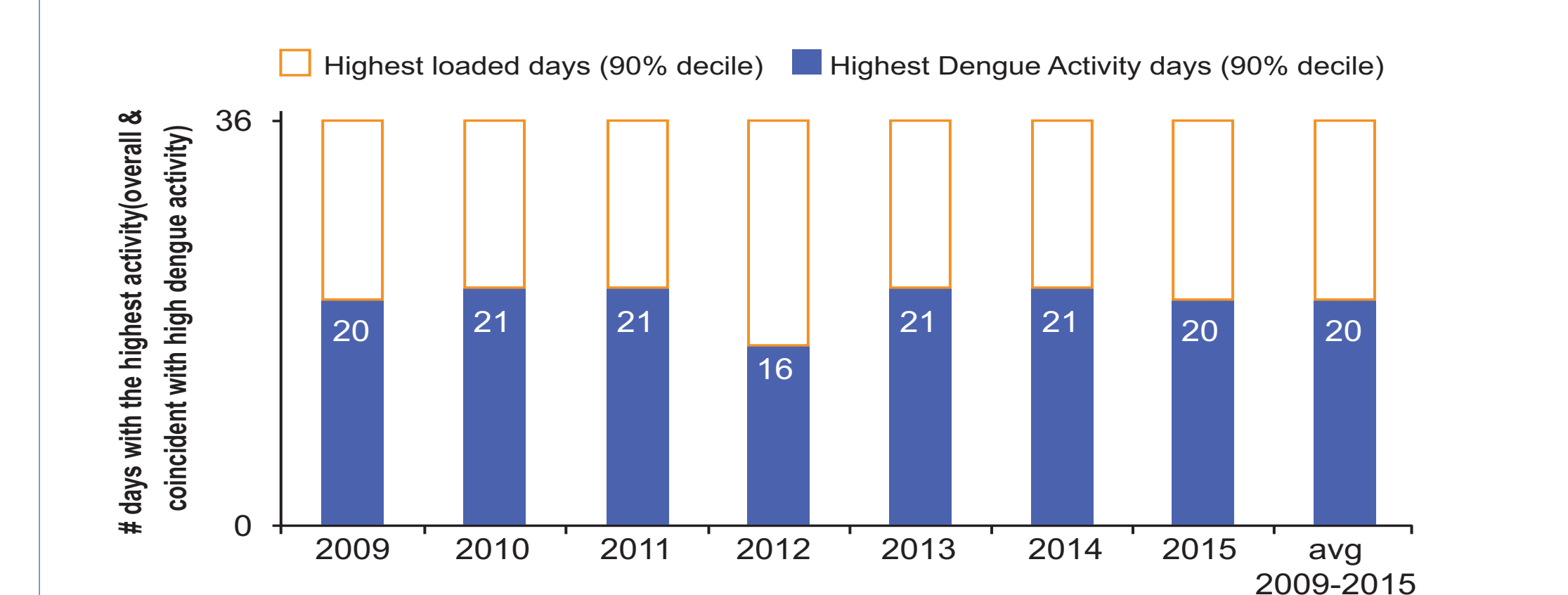
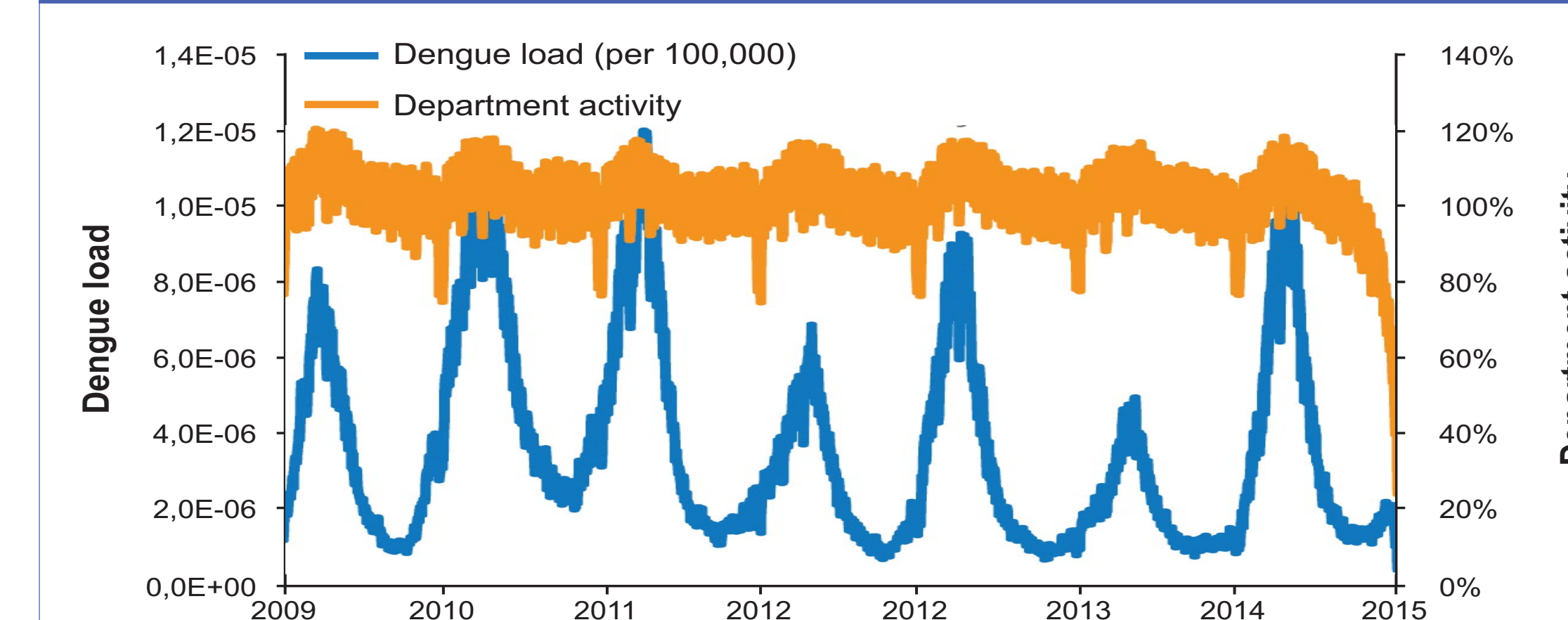


The proportion of LDA-managed dengue admissions increases during the high dengue season



### IMPACT OF DENGUE ON HOSPITAL ACTIVITY

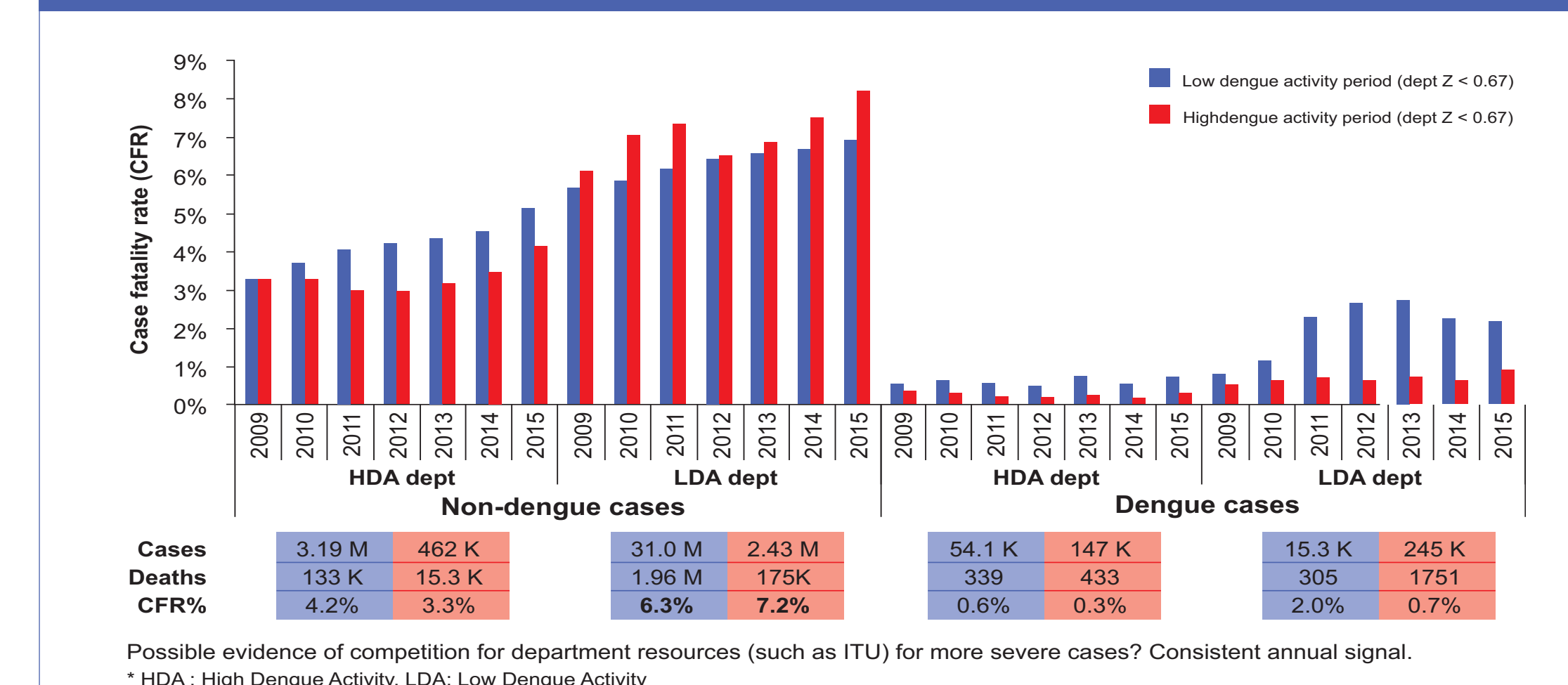
Seasonality of hospital activity is dominated by dengue



- Department activity is calculated as the #in-patients vs the average calculated over the past 6 months
- Department dengue load is calculated as the #in-patients with a dengue diagnostic vs the average calculated over the past 6 months

### IMPACT OF DENGUE ON NON-DENGUE DEATHS

Non-dengue mortality increases in LDA departments during periods of high dengue activity



## REFERENCES

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## DISCLOSURES

This study was funded by Sanofi Pasteur

## STRENGTHS & LIMITATIONS

- Main findings are supported by a robust database
  - 99% of admissions have clean records
  - ~20 indicators for each admission (ICD diagnostic, Length of Stay, costs, Hospital identifier, Geo-localization ...)
  - Temporality: SIHSUS database documents 8 years of hospital activity
- Big Data analytics platform enables exploration of these massive databases
- Data mining identifies actionable insights into Public Health infrastructure
- Current findings are not final, role of confounding factors remain to be fully investigated
- Interpretation of data supported findings/trends must be confirmed, fine-tuned by local experts (hospital management, physicians ...)
- SIHSUS database does not capture the activity of all hospitals in Brazil, notably the private sector (25% of the population enrolled)

## CONCLUSIONS

- The characteristics of dengue hospitalized admissions in Brazil (heterogeneity, seasonality, mortality, high activity load) confirm the significant burden imposed by dengue on the population
- Dengue case fatality rate is 2-fold higher in the LDA departments (.8% overall, consistent for all ages, up to 3.1% for 70+) vs HDA departments (.4%). This could be due to a combination of the ability of departments to manage dengue, and also characteristics of patients admitted
- The proportion of dengue admissions managed by LDA departments (compared to HDA) is higher during periods of high dengue activity
- Seasonality of hospital activity is dominated by dengue : 56% of the most overloaded hospital days coincide with days with high dengue related activity (20/36 days at the national level in 2015)
- Non-dengue mortality increases in LDA departments during periods of high dengue activity