Small Area Variation in the Public Health Response to H1N1

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 Local health department leaders and staff

Background

- The 2009 national N1H1 outbreak provided a chance to explore variation in PH response

- The role of accreditation of particular interest – promote standardization, interoperability, quality

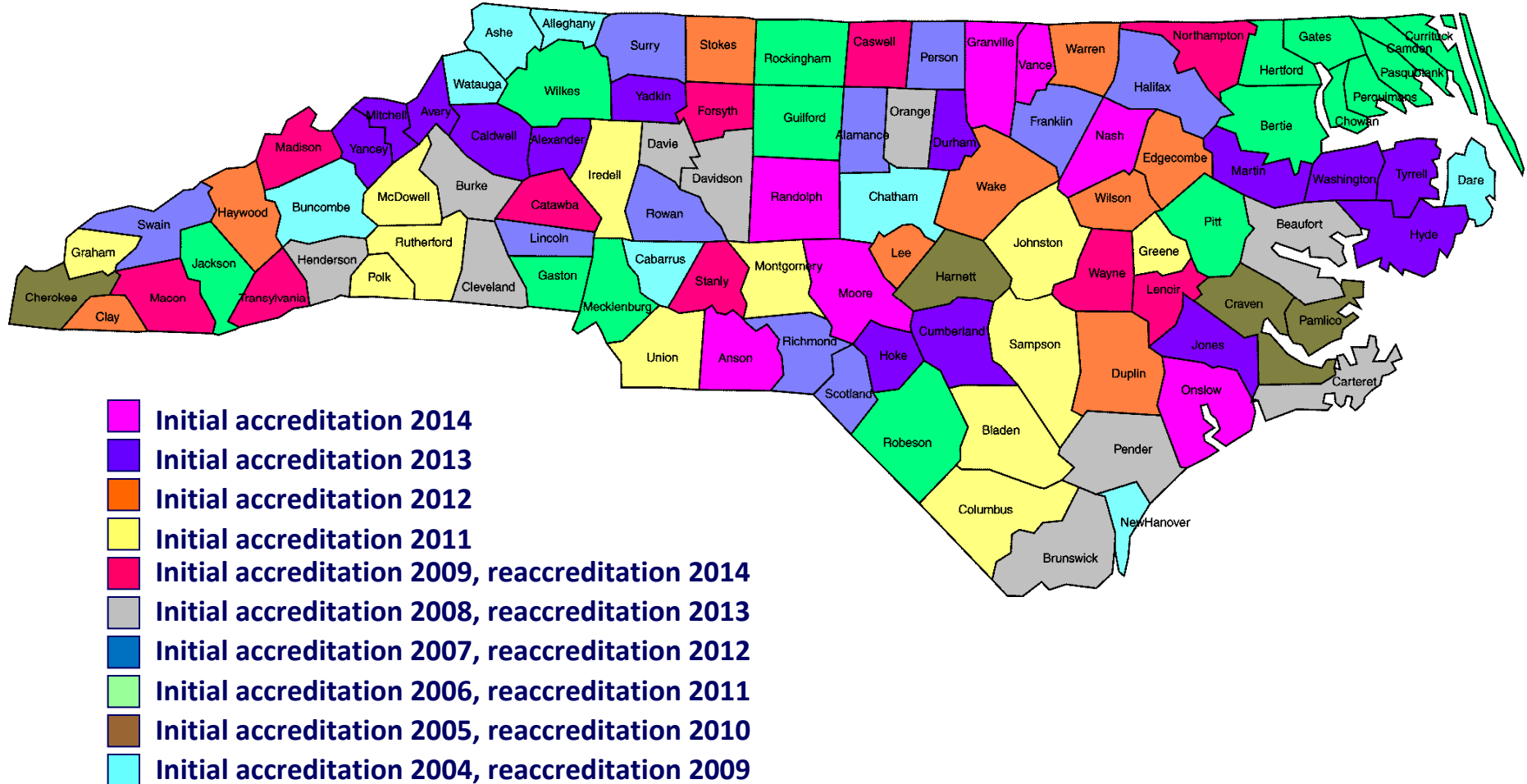- Two vehicles for study: PERRCs and PBRNs

Objectives

- Describe the nature and timing of the public health response to H1N1 outbreak in NC (and KY, MA, WA)

- Test for differences in local response between accredited and non-accredited health agencies

- Identify factors that facilitated and inhibited H1N1 response activities

- Use findings to create After Action Reports (AARs) and identify improvement areas for public health agencies

PERRCs and PBRNs in December 2009
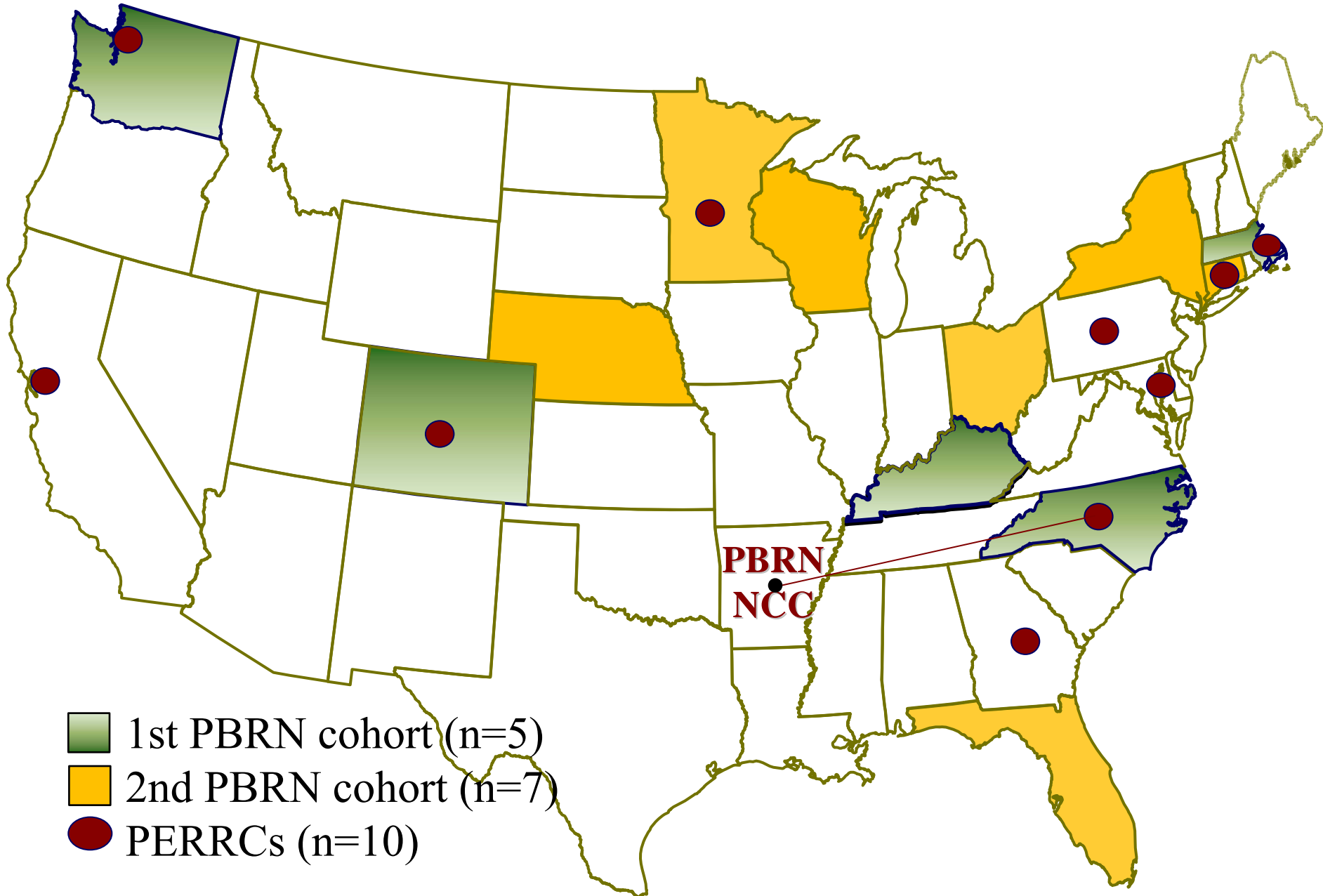
PBRN
NCC

1st PBRN cohort (n=5)
2nd PBRN cohort (n=7)
PERRCs (n=10)

Accreditation in North Carolina

Legend:
- Initial accreditation 2014
- Initial accreditation 2013
- Initial accreditation 2012
- Initial accreditation 2011
- Initial accreditation 2009, reaccreditation 2014
- Initial accreditation 2008, reaccreditation 2013
- Initial accreditation 2007, reaccreditation 2012
- Initial accreditation 2006, reaccreditation 2011
- Initial accreditation 2005, reaccreditation 2010
- Initial accreditation 2004, reaccreditation 2009

Study Design & Methods

- Case-control study of 9 communities selected to contrast accreditation status

- Structured interviews capture key elements of the nature & timing of investigation & response

- Factor analysis used to group survey items into domains and construct composite measures of *scope* and *timing*

- Multivariate models used to test for differences by accreditation status, controlling for domain and community fixed effects

Analytic strategy

- Problem: small # communities, large # measures

- Desire to summarize patterns across measures, but also maximize power to detect differences across communities

- Bayesian Hierarchical Latent Variable Model – use variability across measures & communities
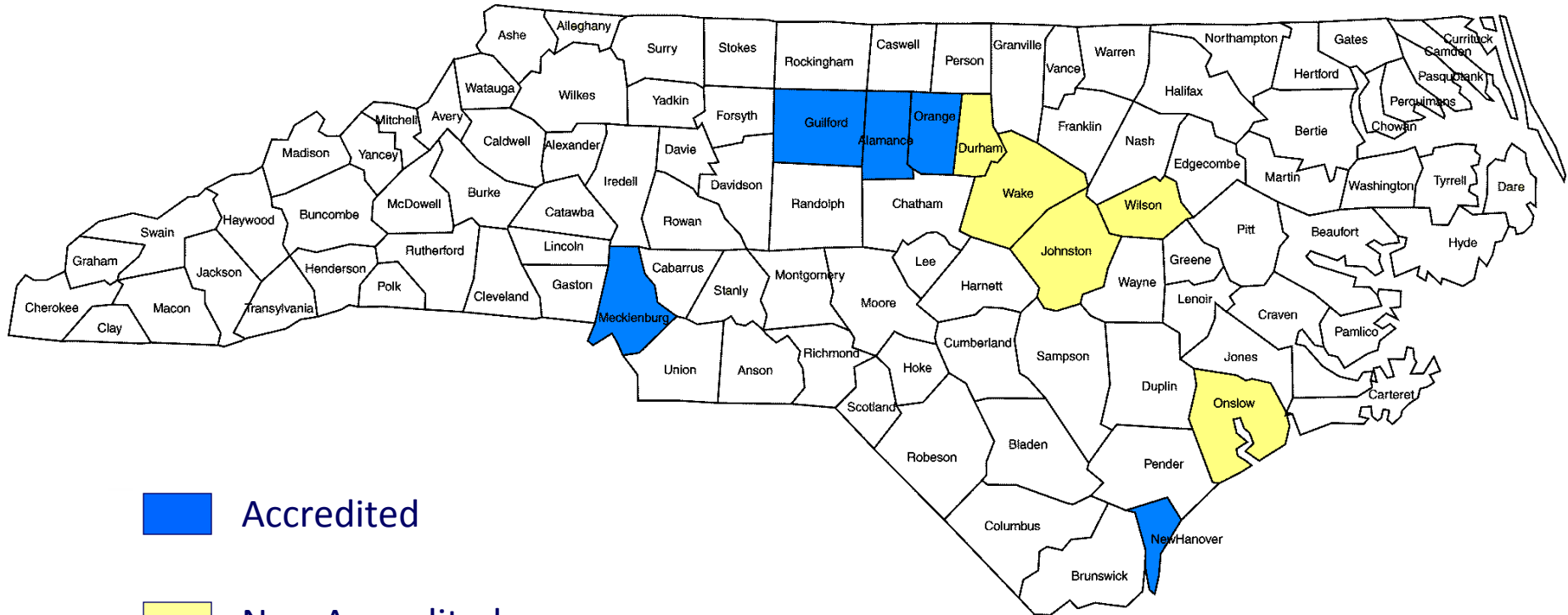
$$\text{Logit } (t_{qi}) = f \quad (\ a_0 \quad \text{- intercept/baseline rate}$$

$$a_q\theta_i \text{ - association between q and latent quality in comm.}$$

$$a_jD_j \text{ - association between q and type of activity}$$

$$a_A \quad \text{- association between q and accreditation status}$$

$$s_q \quad \text{- random error })$$

Landrum MB et al. 2000. Analytic methods for constructing cross-sectional profiles of health care providers. *Health Services & Outcomes Research Methodology* 1:23-47

Study Communities

Survey Items

| DOMAIN	SCOPE: was activity performed?	TIMING: Days since outbreak*
Planning	45	--
Communication	105	14
Incident command	9	4
Investigation	21	6
Response and mitigation	27	13
Total	207	37

*Outbreak onset defined as 15April2009

Example Survey Items

| Item	Pct/Mean
Planning: local plan is in place for enforcing isolation and quarantine orders	**89%** scope
Communication: physician guidelines were disseminated about acquisition of supplies	**44%** scope
Incident command: local EOC was activated	**43%** scope
Investigation: days to initiation of hospital case-finding activities	**16.5** timing
Response: health alert network notification	**33%** scope
Mitigation: contact notification initiated	**67%** scope

Scope and Timing of H1N1 Response Activities: Composites from All 9 Communities
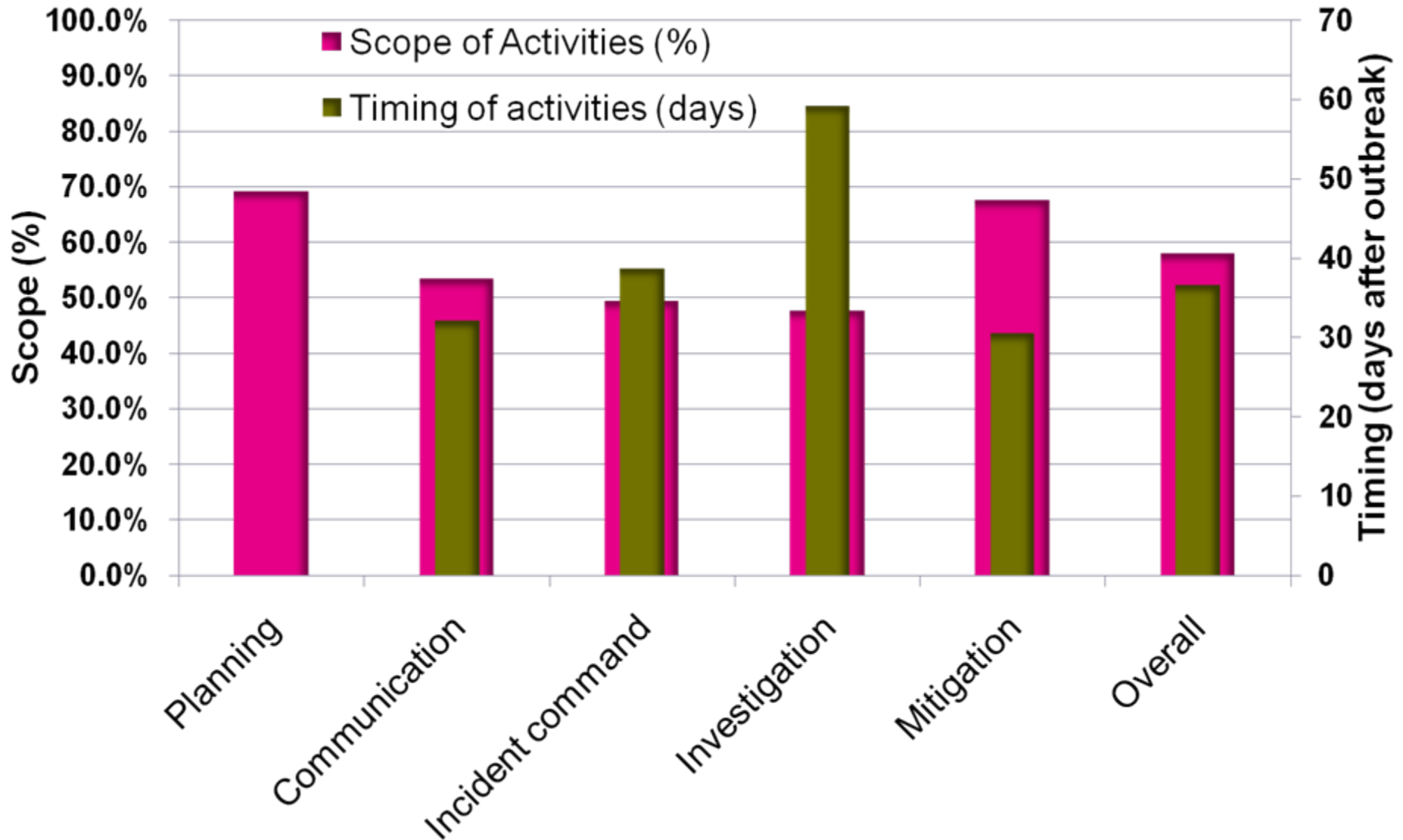
Scope and Timing of H1N1 Response Activities: by Agency Accreditation Status
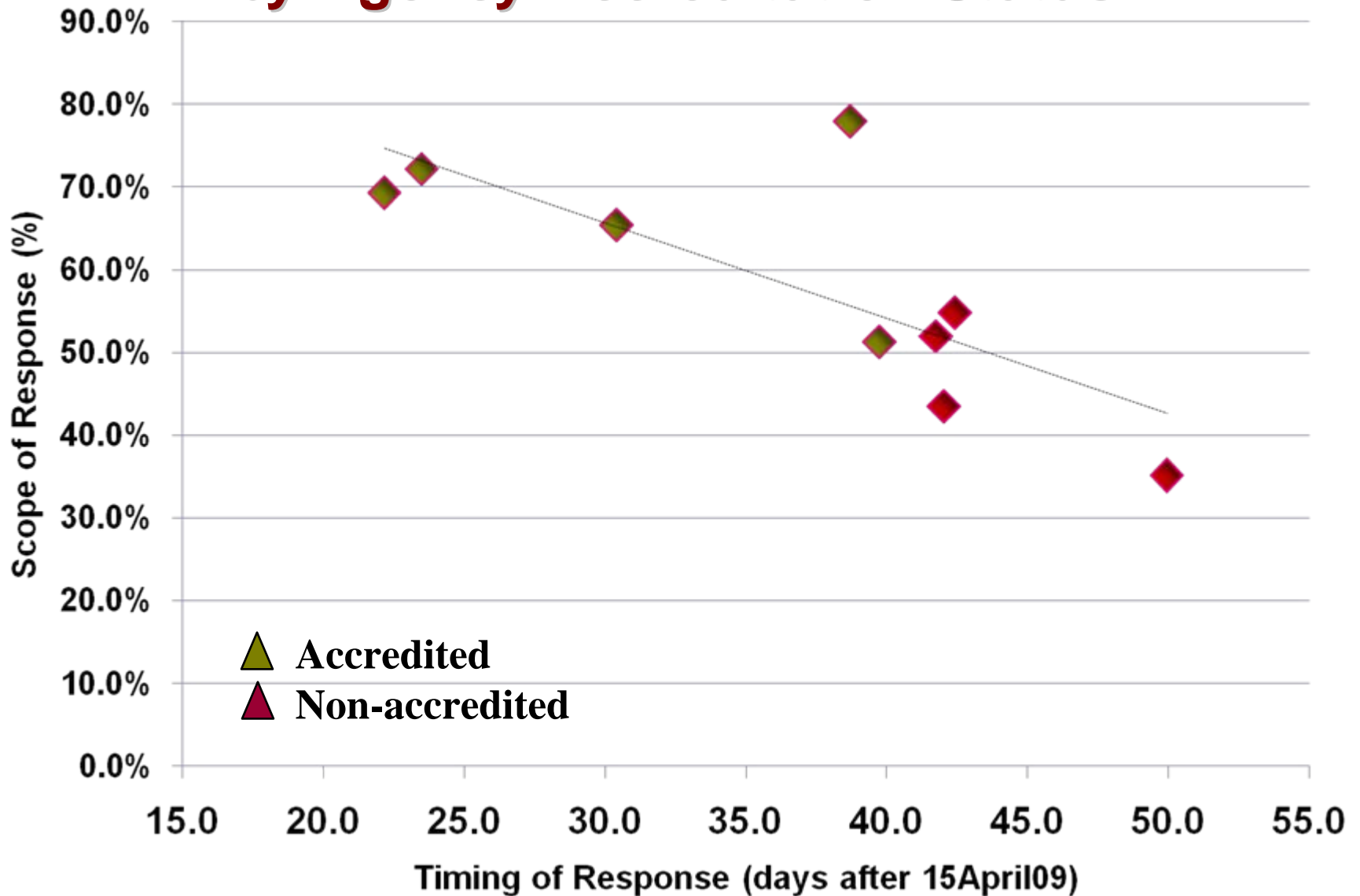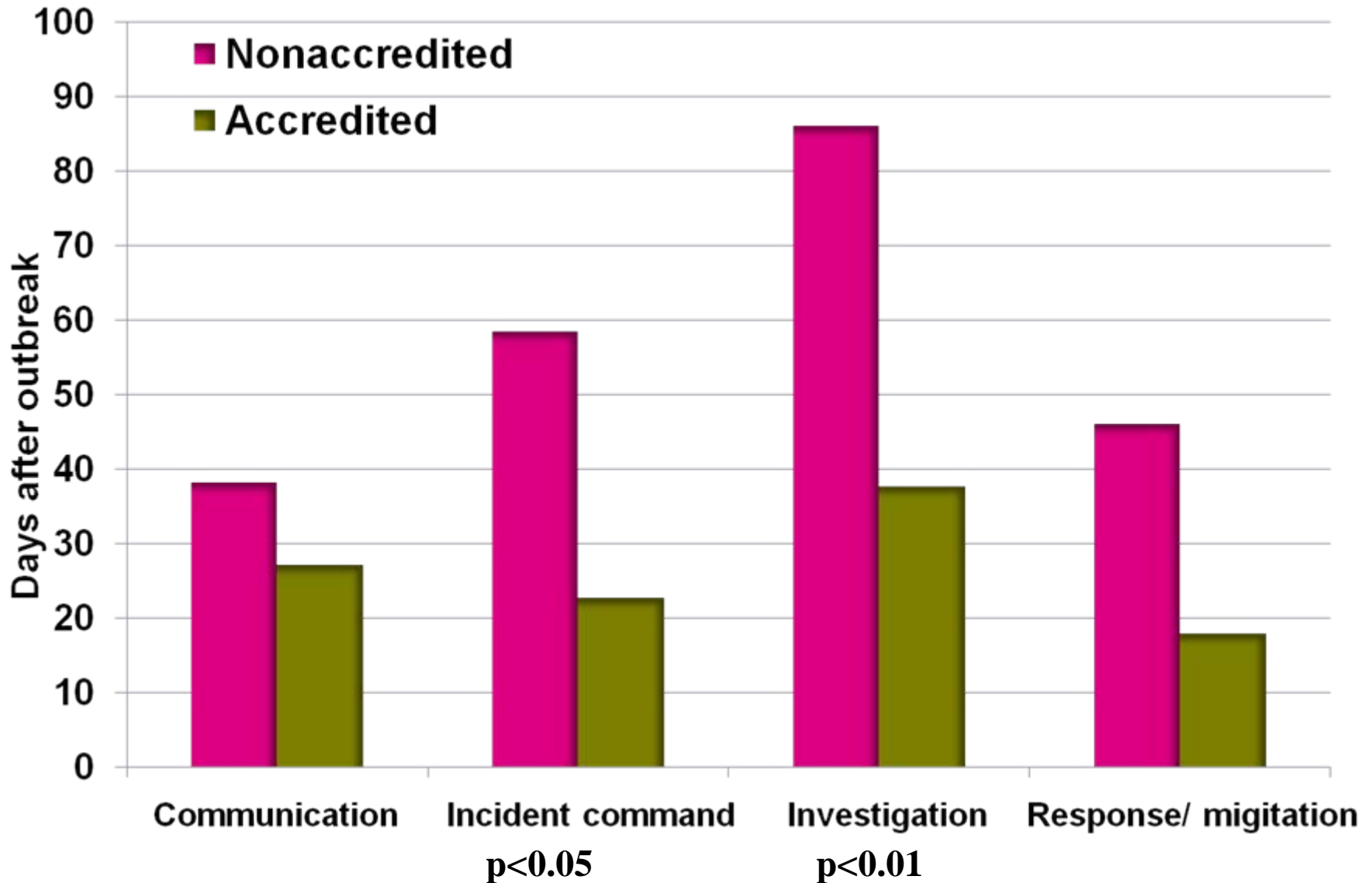
Multivariate-adjusted Scope of H1N1 Activities
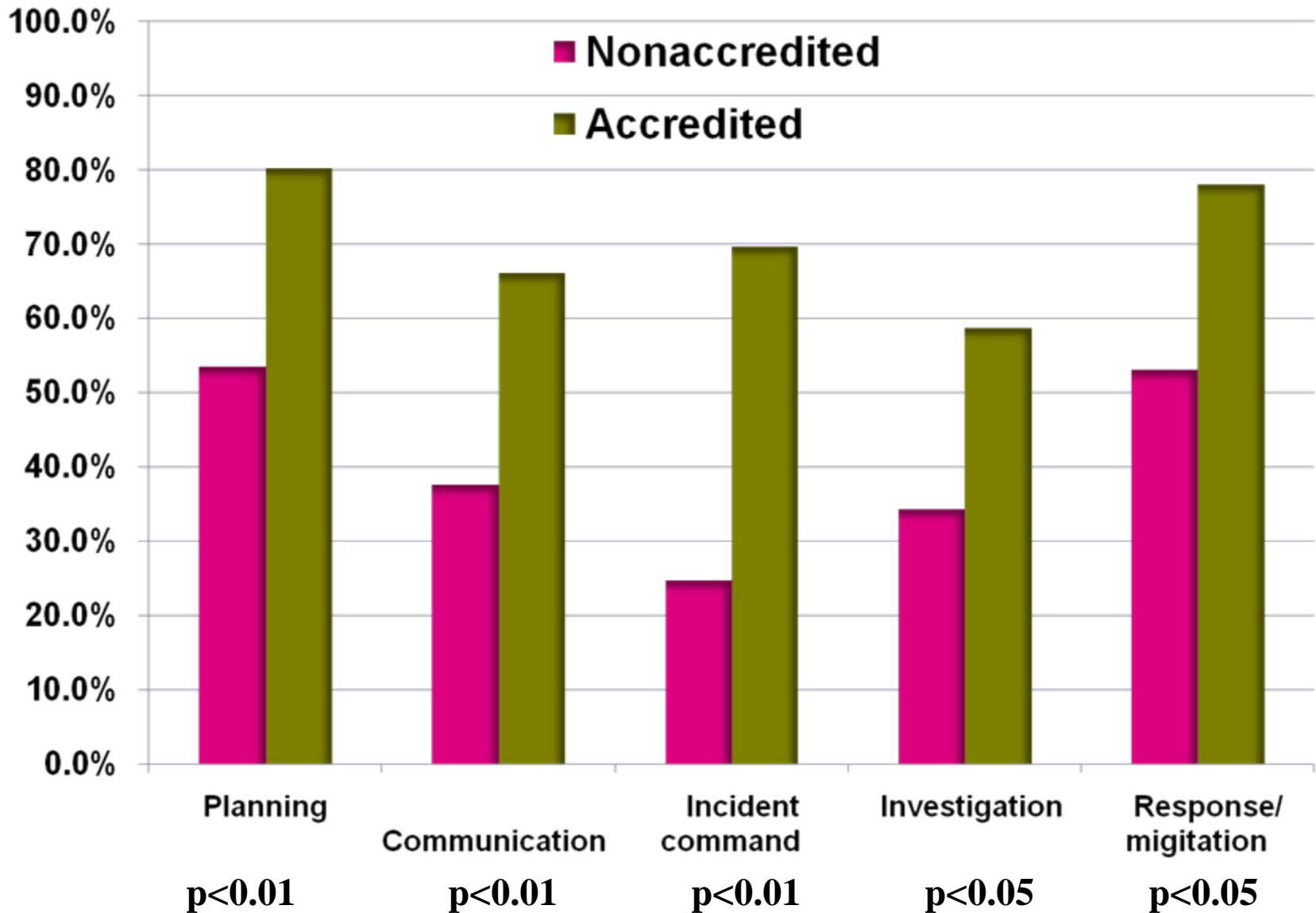
Controlling for domain-level heterogeneity and community-level heterogeneity

Multivariate-adjusted Timing of H1N1 Activities

Controlling for domain-level heterogeneity and community-level heterogeneity

Conclusions and implications

- Wide variation in the scope and timing of local public health responses to H1N1

- Accredited agencies implemented a broader scope of responses

- Accredited agencies implemented IC and investigation activities more rapidly

- Accreditation may confer and/or detect enhanced capacity for H1N1 response

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What's next

- Qualitative analyses to understand mechanisms behind the differences

- Multi-state analyses across NC, KY, MA, QA

- Larger-scale data collection in 2010 – statewide in NC and propensity-matched comparison group

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