Supplemental Table: Collaborative multilevel actions divided into pre- and intrahospital level and quality assurance

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| Level | Action | Details | Responsible  |
| Pre-hospital | Definition by healthcare authorities on admission of stroke patients  | Patients with suspected stroke only to be referred to hospitals with stroke unit | Healthcare authorities |
|  | Public campaign | Increase awareness for stroke, e.g. knowledge of symptoms and risk factors and behavior e.g. call 112 | Healthcare authorities, EMS, Stroke Centers, other project partners |
|  | EMS training | standardized teaching presentation used by all HAGS members to teach at the paramedic schools | Stroke centers, EMS |
| Intrahospital | Harmonized acute treatment algorithm | Based on the results of the data assessment regular evaluation of treatment algorithm and improvement | Stroke centers |
|  | Optimization of intra-hospital processes | Team trainings, including e.g. dummy runs | Stroke centers |
| Quality assurance | Regular HAGS meetings | Discuss cases and new developments, plan campaigns | Stroke centers |
|  | EQS | Mandatory structured data assessment | EQS, all hospitals in hamburg |

EMS:Emergency medical service; HAGS: Hamburg Against Stroke; EQS: External quality assurance.