

Defining Disaster Effects on Healthcare Small-world Networks



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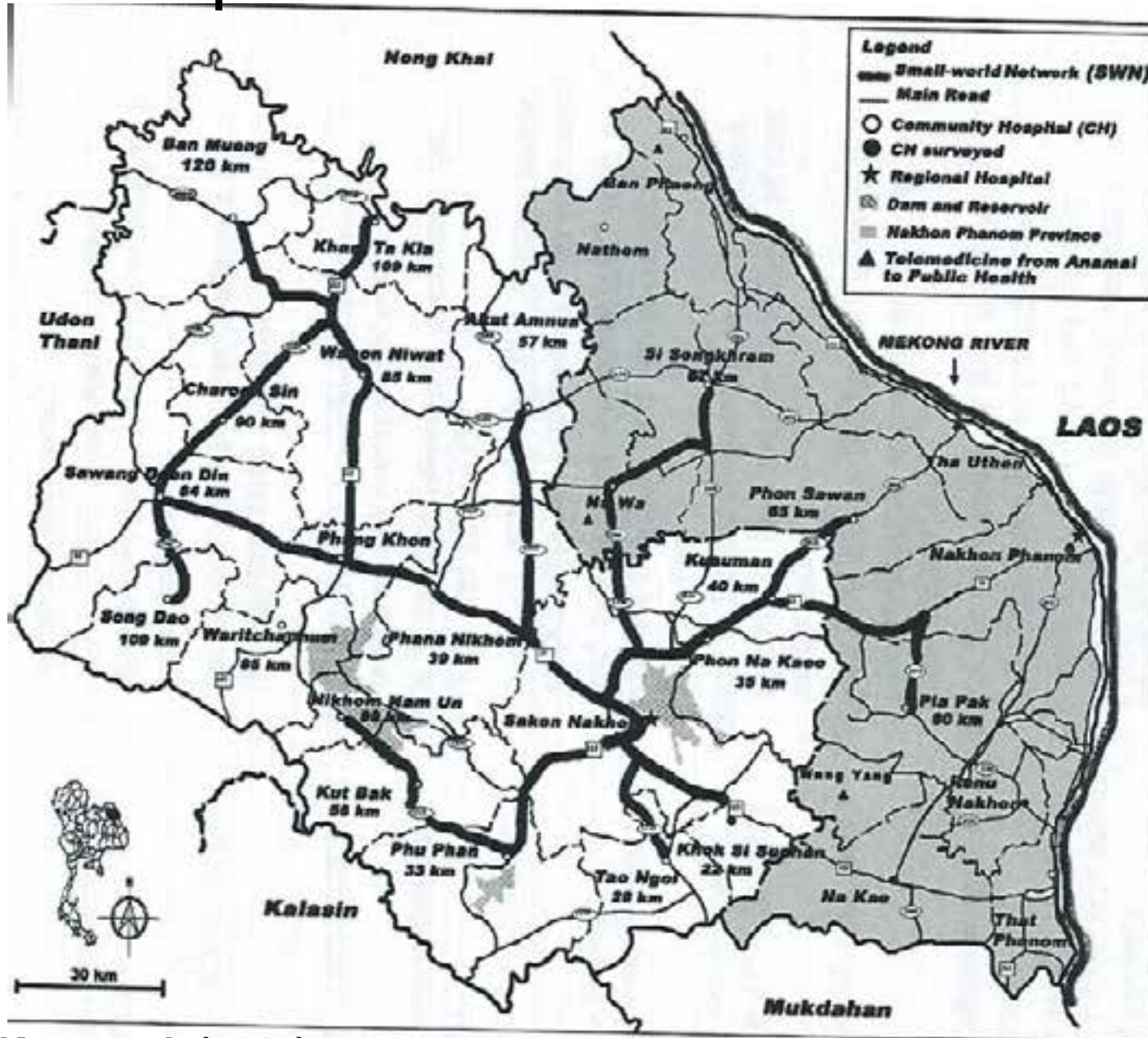
Motivation and Background

- Health networks can be thought of as Small-world networks based on natural connectivity.
- Disasters are unnatural events.
- Hypothesis: Using a GIS to model the effect of disasters on a Healthcare SWN will reveal inefficiencies which can be solved by prepositioning POC equipment.

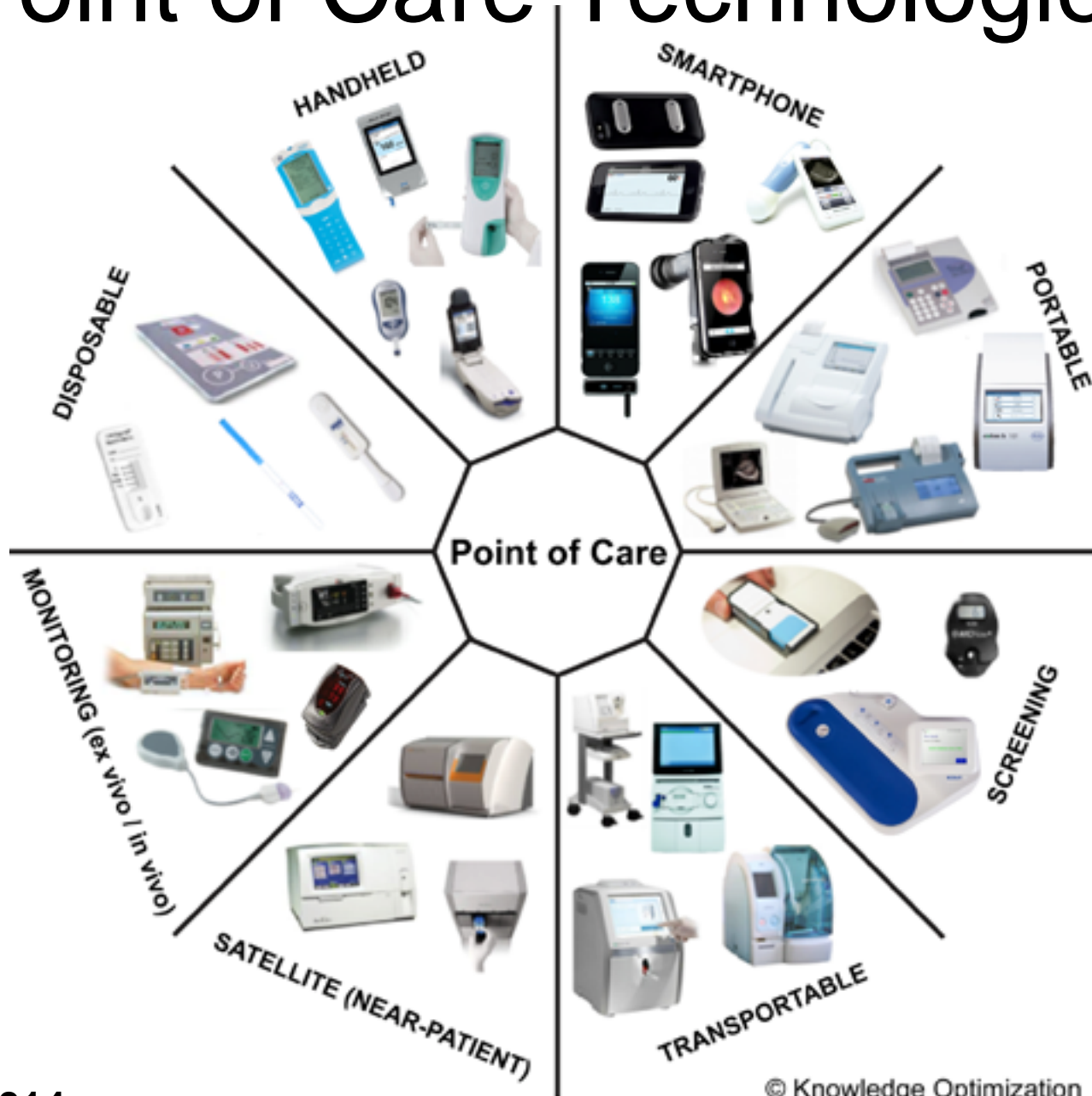
Presentation Outcomes

- 1) Healthcare networks are defined by their SWN properties.
- 2) Describe how POC supports evidence-based medical decisions at the point-of-need.
- 3) Spatial Carepaths can help understanding inefficiencies.
- 4) How a GIS was used to model a Tsunami in Phang Nga Thailand to understand vulnerabilities.

Example of a Small-world Network

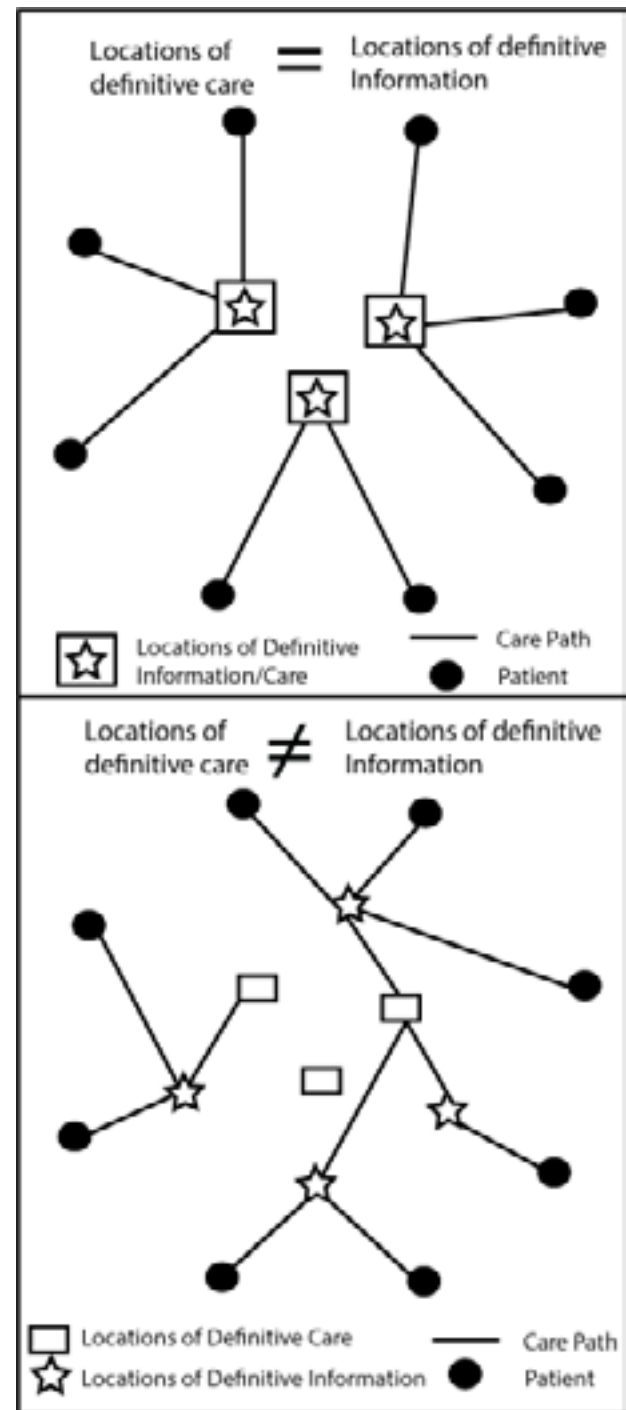


Point of Care Technologies



ASSURED Qualities

- Affordable
- Sensitive
- Specific
- User-Friendly
- Rapid/Robust
- Equipment-free
- Deliverable

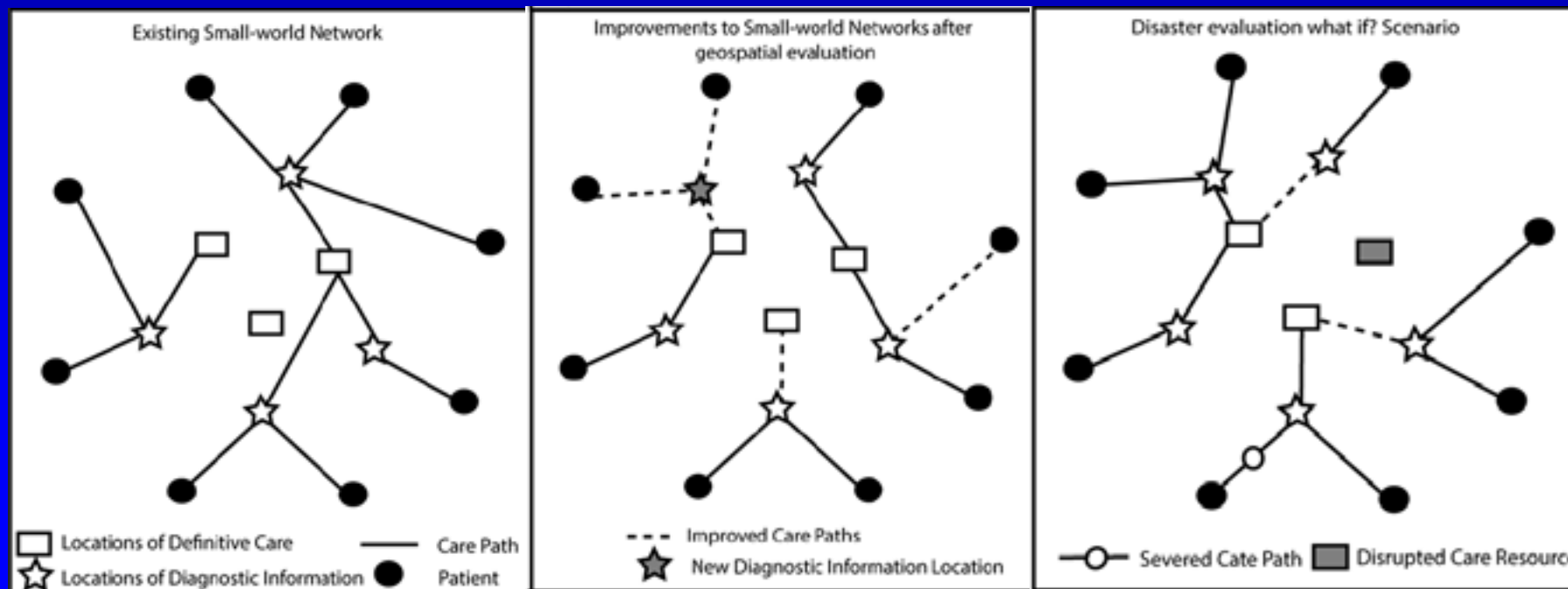


A Spatial Carepath

Empirical
Judgment



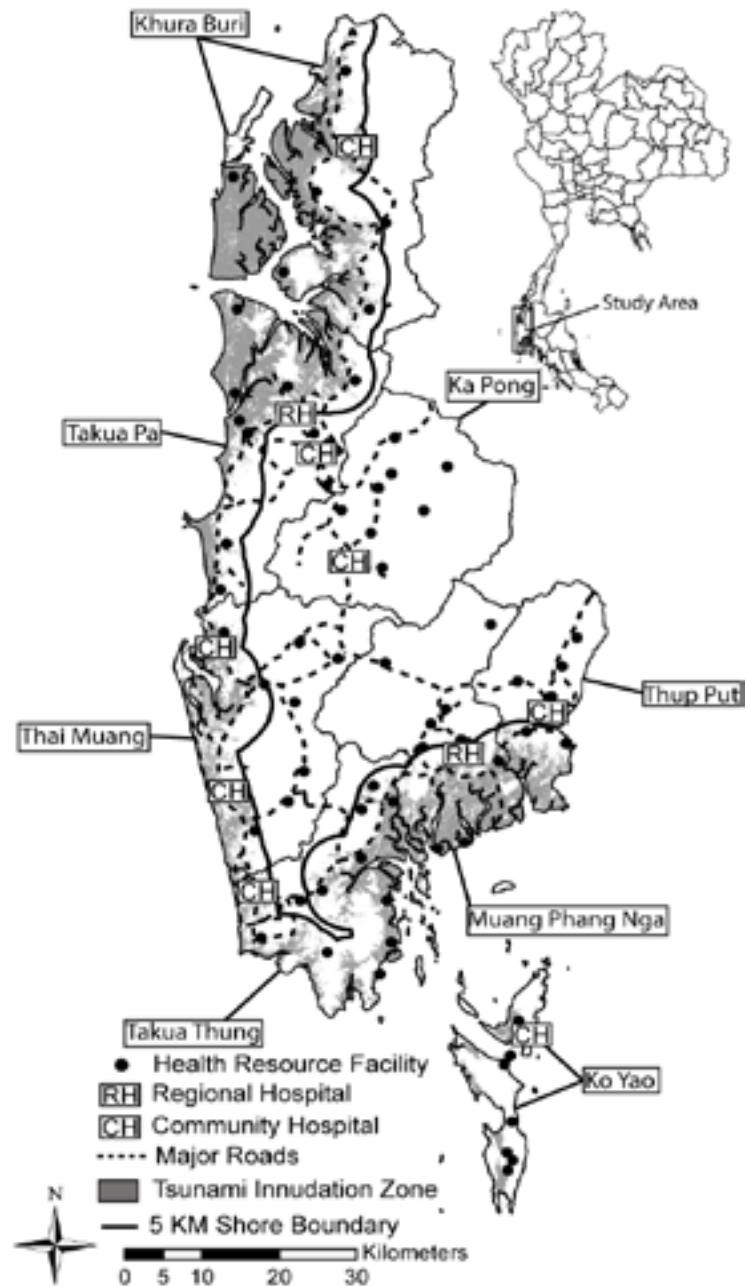
Evidence-based
Medicine

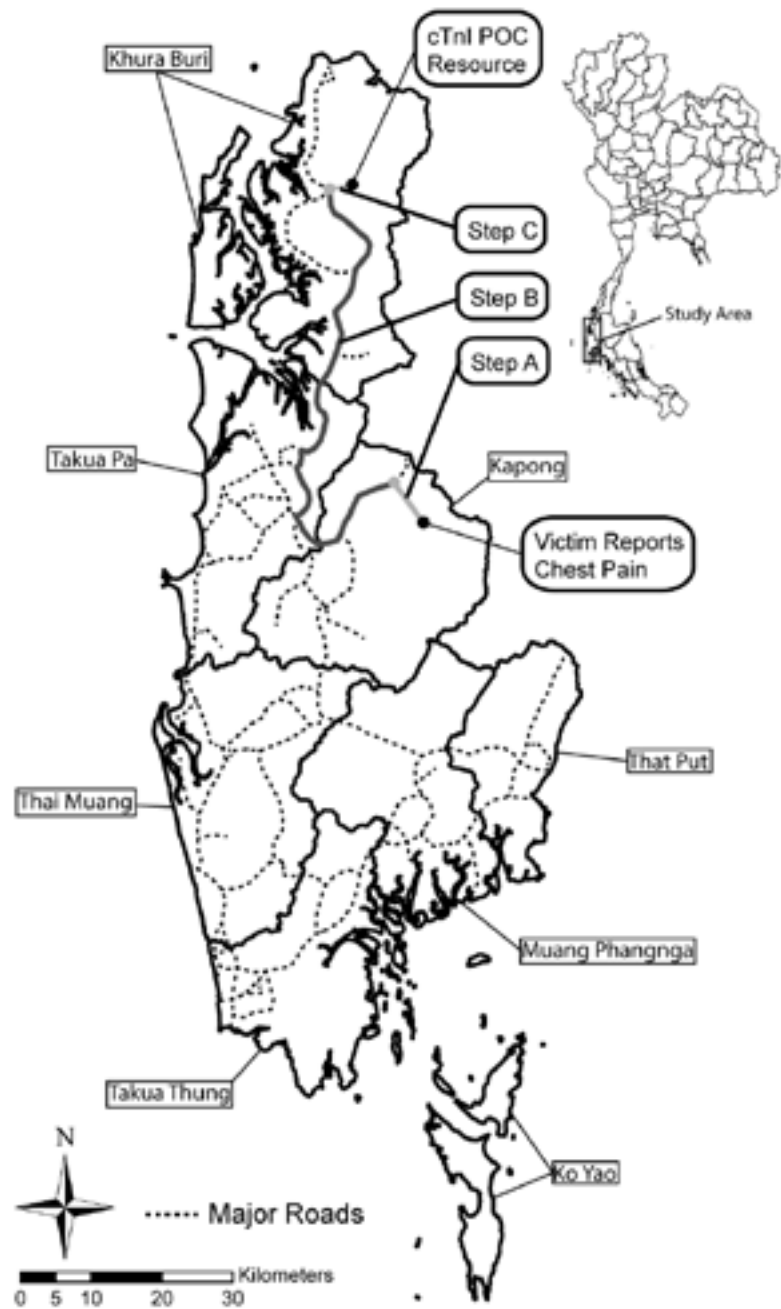
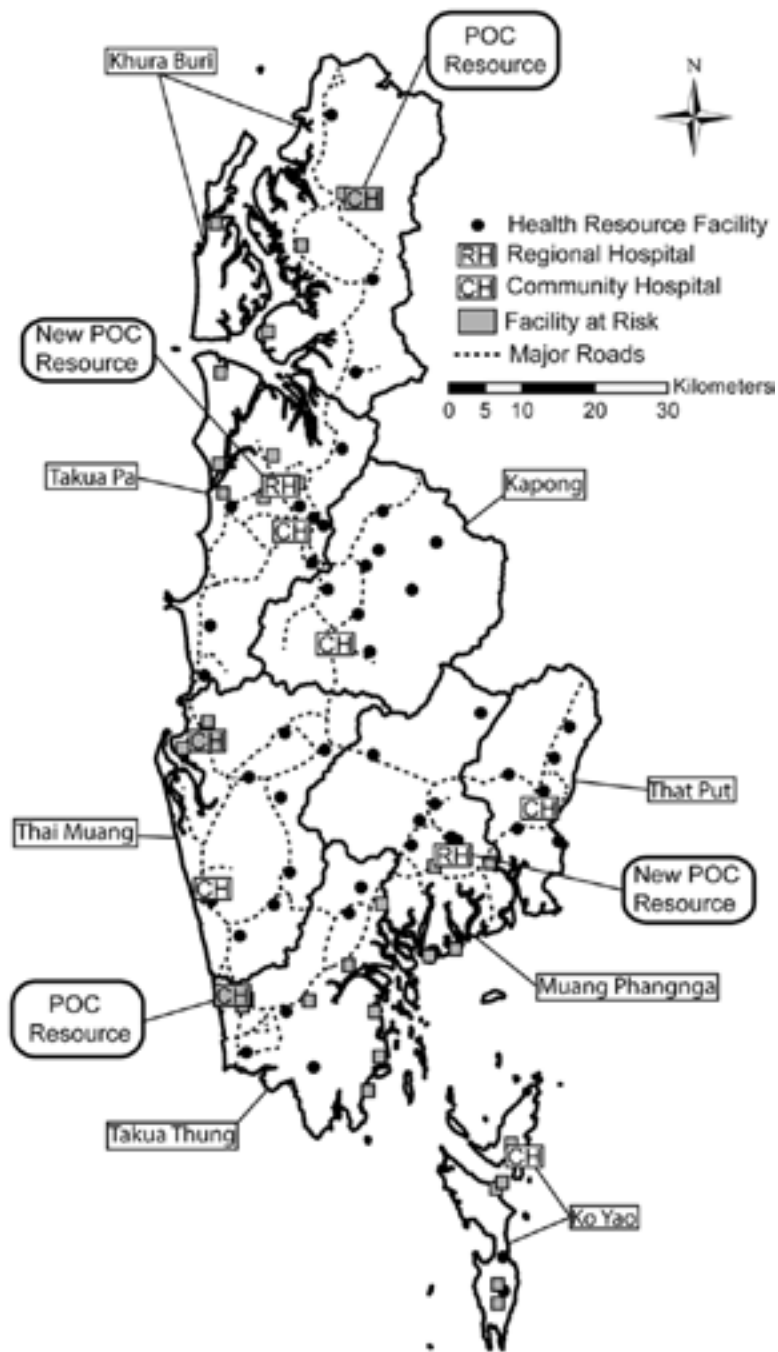


Study Area Phang Nga, Thailand

- December, 2004 Tsunami
 - Over 250,000 Killed
 - 1.5 Million Displaced
- Phang Nga, Thailand
 - Population (2011): 250,000
 - Over 4,000 deaths







Results

- Three analyses were performed.
 - Normal conditions
 - Normal conditions with new POC at Regional Hospitals
 - After Tsunami with new POC at Regional Hospitals

	<u>Normal conditions</u>	<u>New device placement in regional hospital without tsunami incapacitation</u>	<u>New device placement in regional hospital and tsunami incapacitation</u>
Mean (SD) km	37.3 (19.8)	15.4 (10.6)	22.9 (14.3)
Median (Max/Min)	40.7 (75.2/0)	15.1 (41/0)	22.2 (61.2/0)
HRF > 10 miles	80% (64/80)	46% (37/80)	66% (53/80)

*Simulates if cTnI resource was placed in regional hospitals.

Abbreviations: cTnI, cardiac Troponin I; HRF, Health Resource Facility.

Thank you for your attention!

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- 4) Curtis CM, Case Jr C, Koerner JF, et al. The point of care nurse: expectations and suitable technologies for rapid diagnosis, triage, and treatment in intensive, emergency, and disaster care.

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