“Health of your EMS Protocols”

How Good are Rural Ambulance Protocols for Cardiac Arrest, STEMI and Stroke?

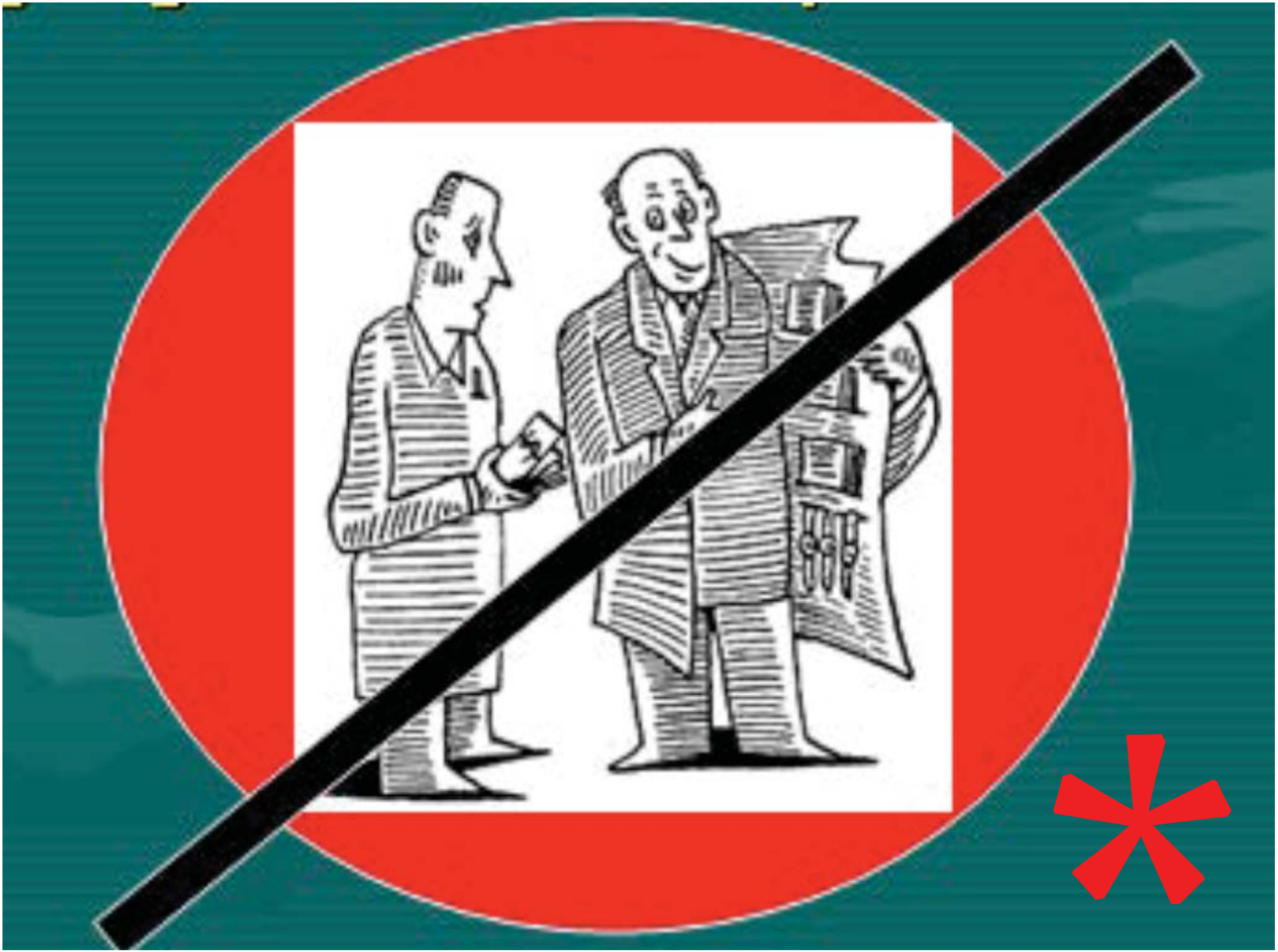
Paul S. Rostykus, MD, MPH, FAEMS

Supervising Physician

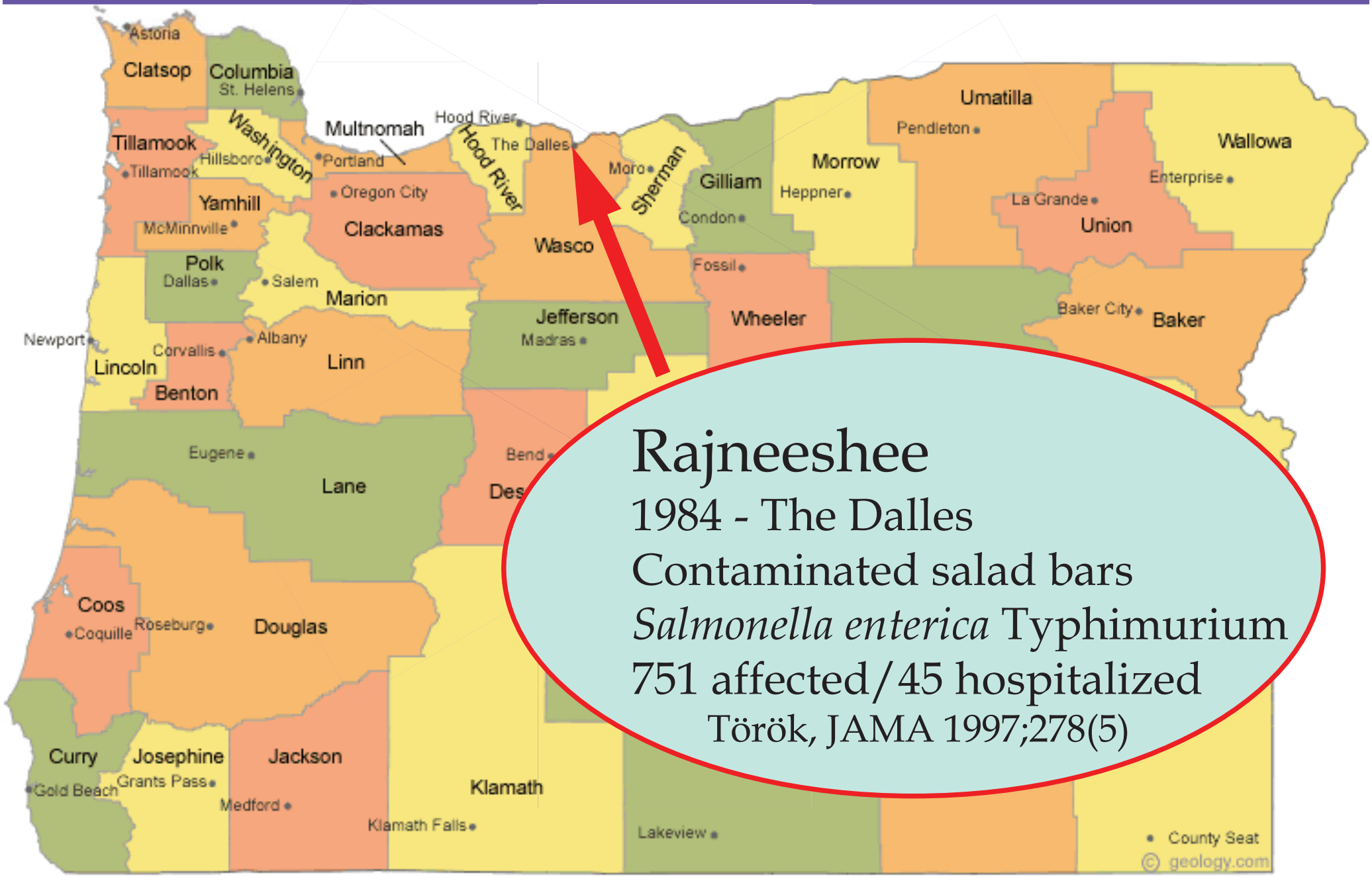
Jackson County Fire EMS Agencies

rostykusmd@mind.net

www.jcems.net



Largest US Bioterror Attack



Rajneeshee

1984 - The Dalles

Contaminated salad bars

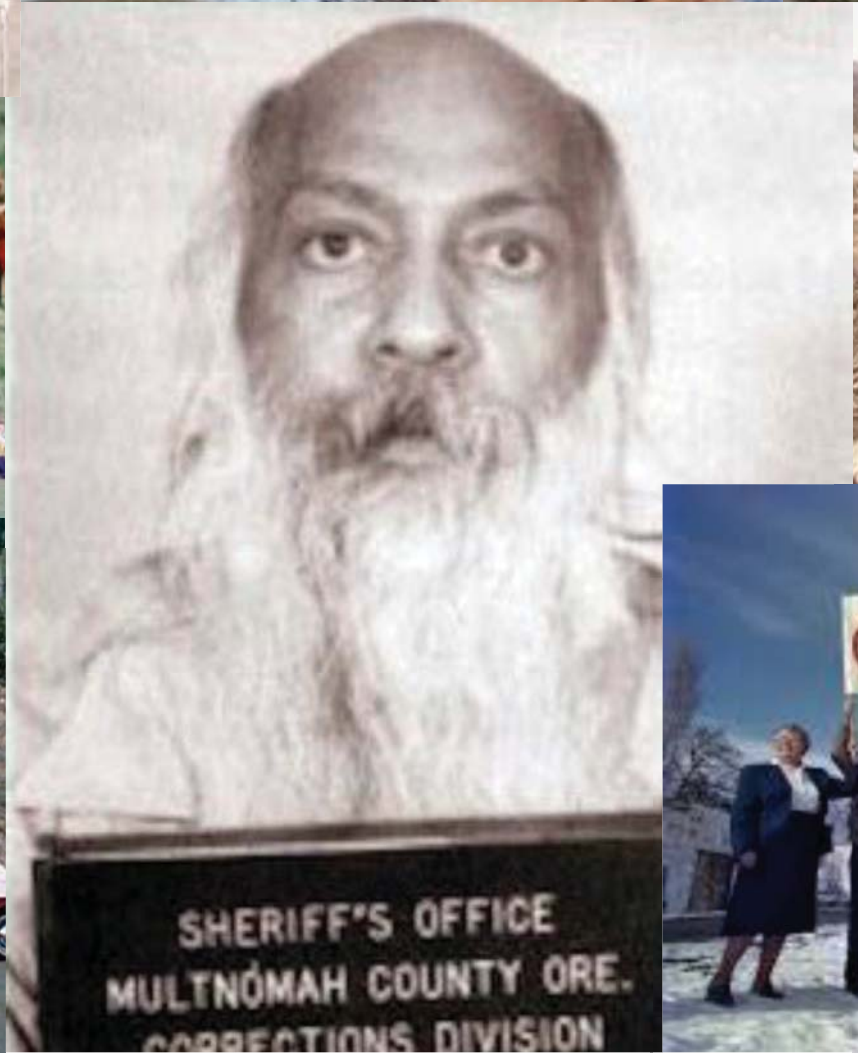
Salmonella enterica Typhimurium

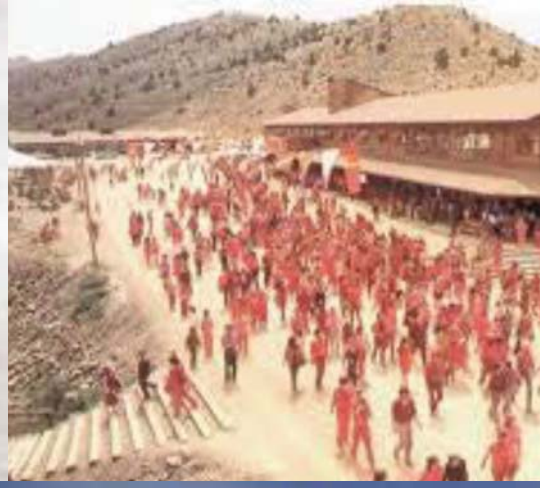
751 affected/45 hospitalized

Török, JAMA 1997;278(5)


Washington
5
84
HOOD RIVER
The Dalles
SHERM.
MULT.
Portland
Sandy
26
WASCO CO.
97
CLACK.
Rancho Rajneesh
Antelope
N
0
40
MILES
JEFFERSON
Madras


YOU ARE NOW ENTERING
THE CITY OF RAJNEESHPURAM
ZONING AND BUILDING PERMITS REQUIRED
APPLY AT CITY HALL IN DEVATEERTH MALL
POPULATION 1222


SHERIFF'S OFFICE
MULTNOMAH COUNTY ORE.




CITY OF
"...ANTELOPE HOSTAGES..."
FREE AT LAST!

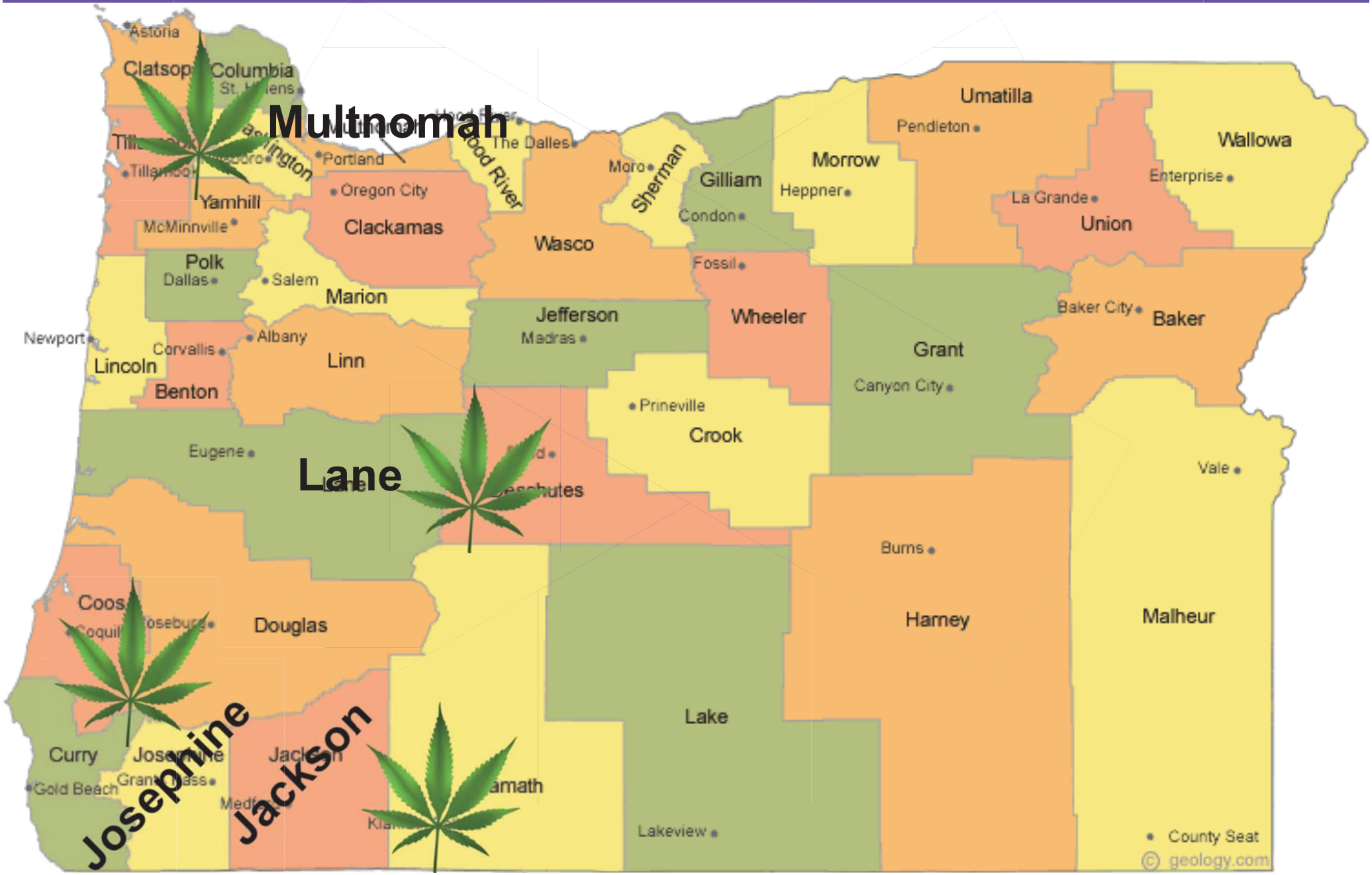
Health of EMS Protocols

- ✓Oregon EMS
- ✓EMS medical direction
- ✓Systems of care
- ✓Adequacy of EMS protocols
- ✓Next steps

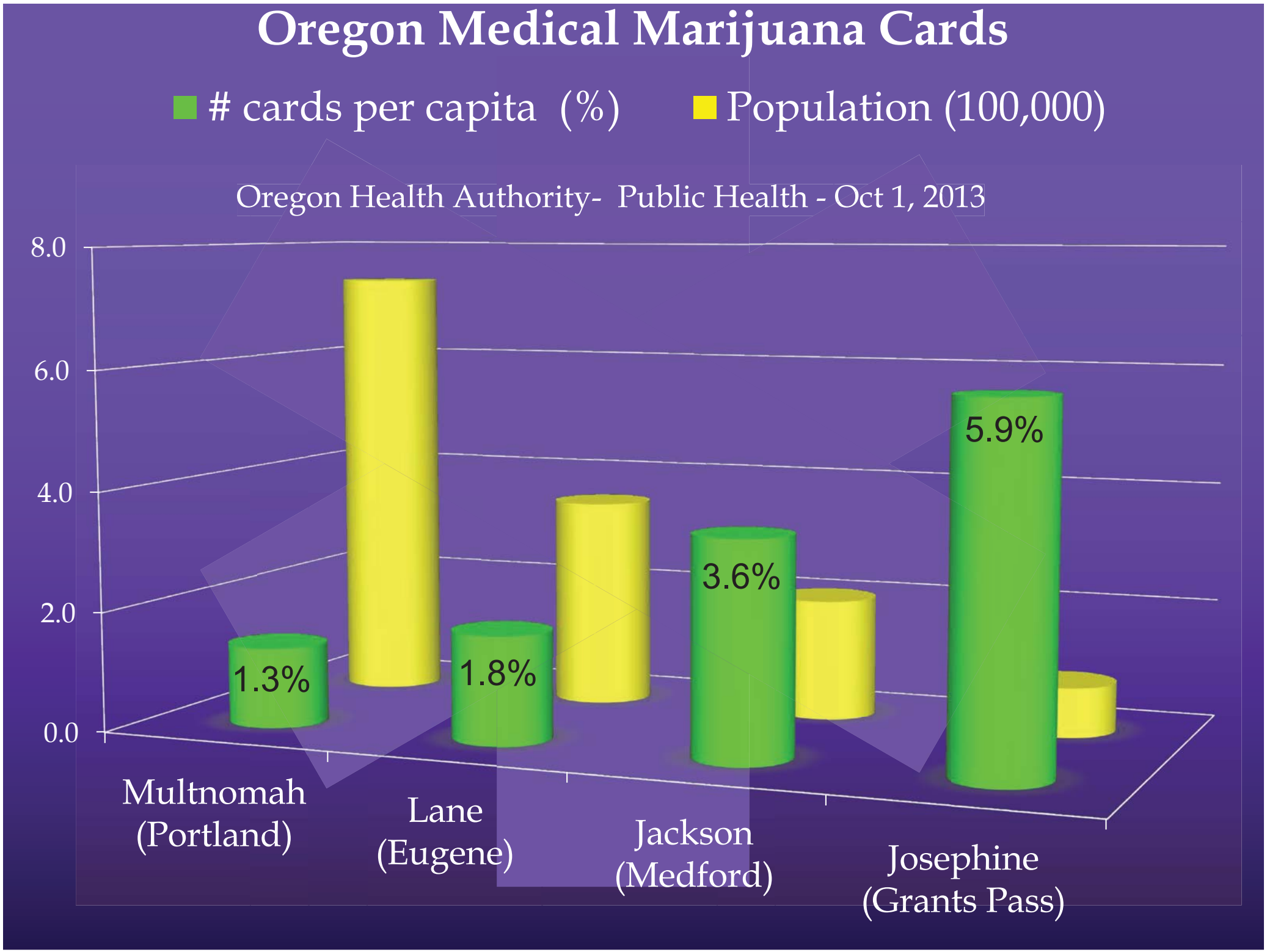
Paul S. Rostykus, MD, MPH

- Family Medicine - 4 years
  OR, AK, AZ, WV, Nepal, CO
- Emergency Medicine – 25 years
  Southern Oregon
- EMS medical director – 25 years
- State EMS Committee
- NAEMSP
  Rural Committee chair
  Program Committee chair

Medical Marijuana



Oregon Medical Marijuana Cards



Medical Marijuana & Oregon EMS

Oregon Medical Marijuana Program (OMMP)

OMMP → 56% of EMS & Trauma $

$1,025,000/year

EMS & Medical Marijuana

THE GREAT SEAL OF STATE OF JEFFERSON

DONT TREAD ON ME

State of Jefferson (Southern Oregon) doing its share to support EMS

EMS

(Emergency Medical Services)

- 911 dispatched – 24/7/365
  - First responding – usually fire department
  - Transporting - ambulance
- Aeromedical transport
- Inter-facility transport
- Event EMS, S&R, Industrial EMS
- Mobile Integrated Health (MIH)

If you've seen one EMS system…..

….then you've seen one EMS system.

EMS in Oregon

Counties 36

EMS Providers

Non-transporting Agencies

Ambulance Agencies

EMS Medical Directors

OHA - EMS & Trauma – January 30, 2015

OHA - EMS & Trauma – April11, 2017*

EMS in Oregon

# Counties	36
# EMS Providers	12,779*
# Non-transporting Agencies	
# Ambulance Agencies	
# EMS Medical Directors	

OHA - EMS & Trauma – January 30, 2015

OHA - EMS & Trauma – June 2017*

EMS in Oregon

# Counties	36
# EMS Providers	12,779*
# Non-transporting Agencies	380*
# Ambulance Agencies	
# EMS Medical Directors	

OHA - EMS & Trauma – January 30, 2015

OHA - EMS & Trauma – June 2017*

EMS in Oregon

# Counties	36
# EMS Providers	12,779*
# Non-transporting Agencies	380*
# Ambulance Agencies	137*
# EMS Medical Directors	141

OHA - EMS & Trauma – January 30, 2015

OHA - EMS & Trauma – June 2017*

EMS Provider Levels

EMR
Emergency Medical Responder

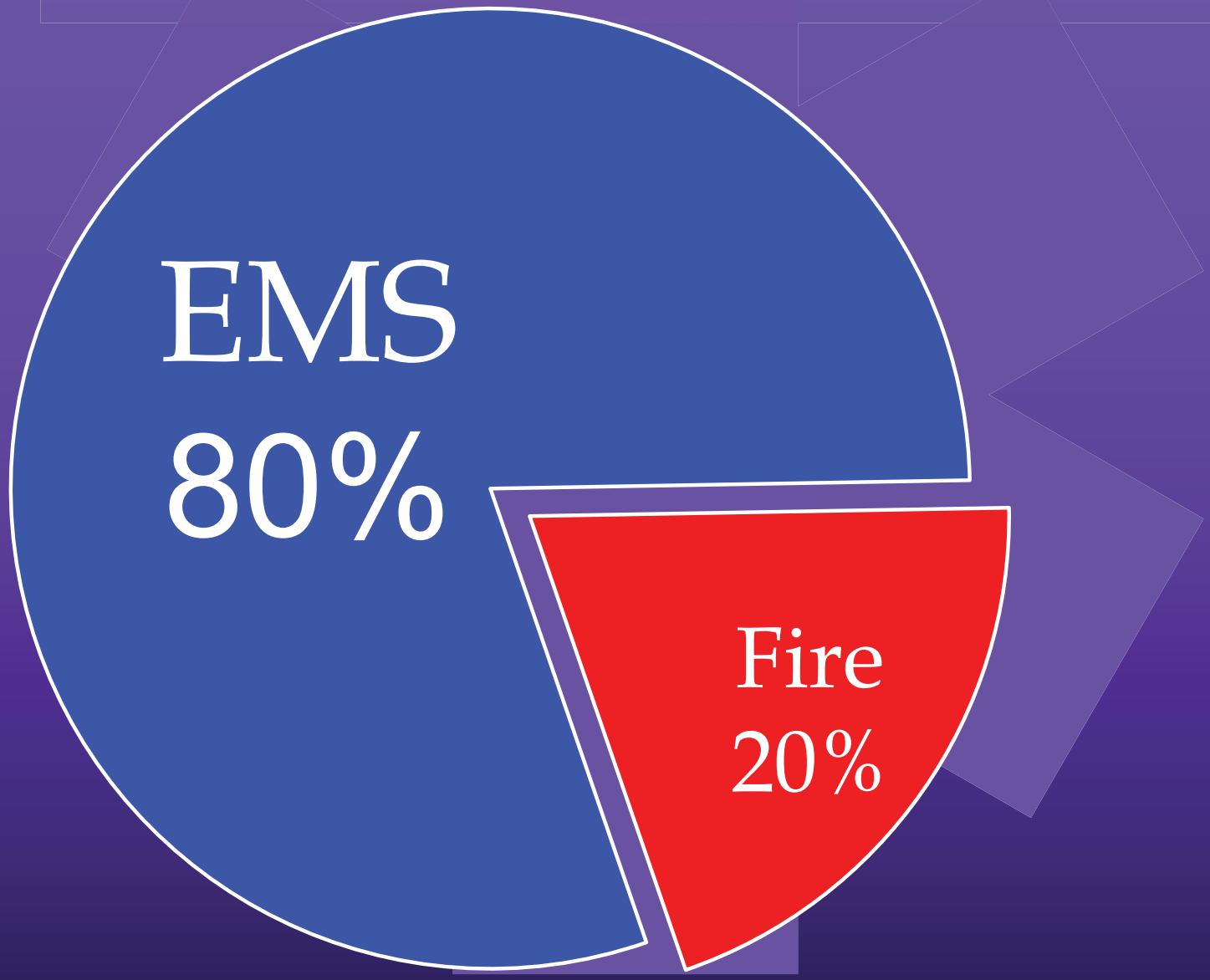
EMT
Emergency Medical Technician

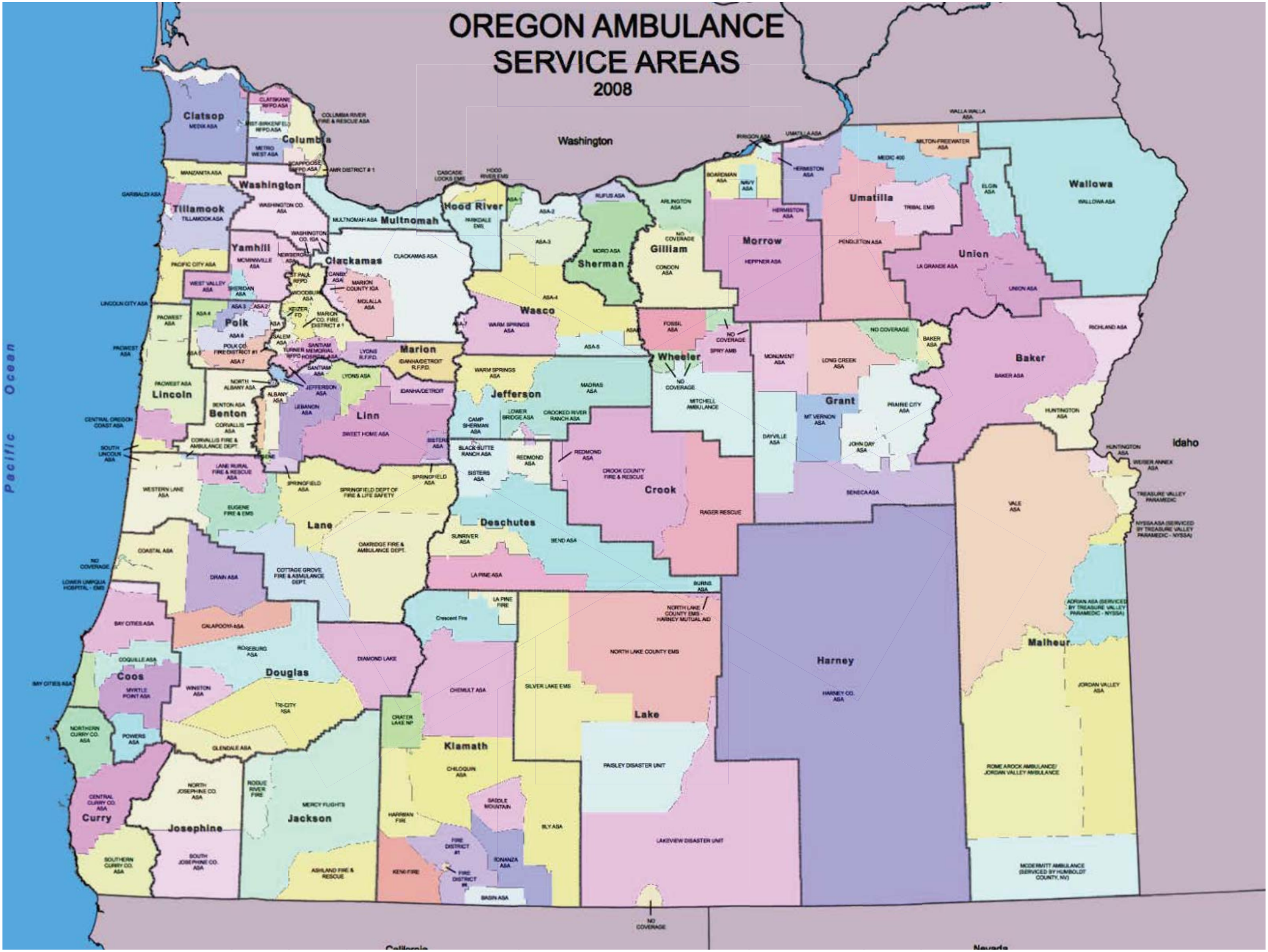
AEMT
Advanced Emergency Medical Technician

EMT-I
EMT-Intermediate - Oregon-only

Paramedic

Fire Department Calls




OREGON AMBULANCE SERVICE AREAS
2008
Washington
Clatsop
Columbia
Tillamook
Washington
Multnomah
Hood River
Yamhill
Clackamas
Wasco
Sherman
Gilliam
Morrow
Umatilla
Wallowa
Union
Polk
Marion
Jefferson
Wheeler
Grant
Baker
Lincoln
Benton
Linn
Lane
Deschutes
Crook
Harney
Malheur
Coos
Douglas
Lake
Klamath
Curry
Josephine
Jackson
Idaho
Pacific Ocean
California
Nevada

EMS Medical Directors

Knowledge: Ø → FAEMS

Experience: Ø → 25+ years

Time: Ø → 0.5 FTE

Pay: Ø → $250/hour

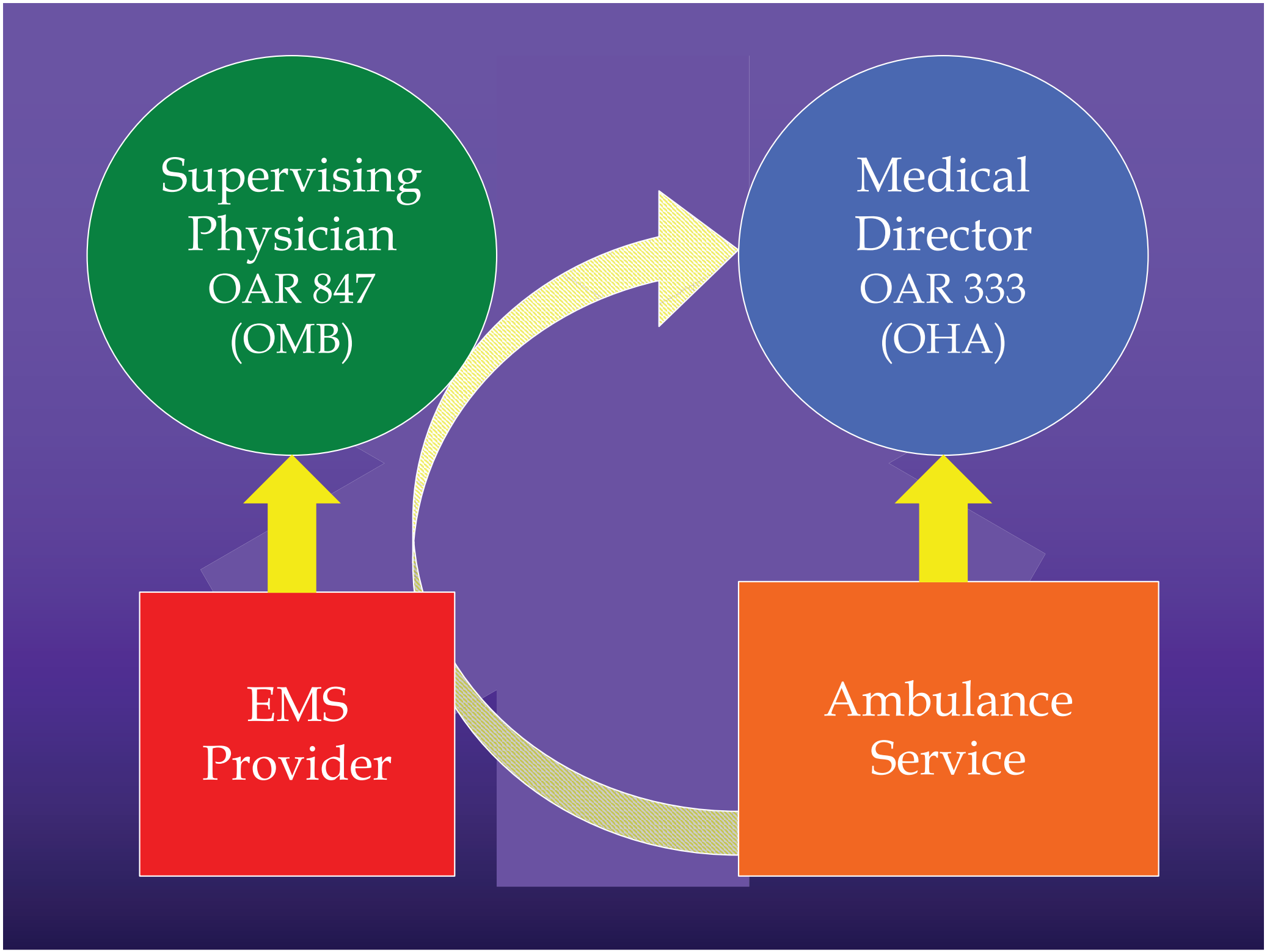
EMS subspeciality

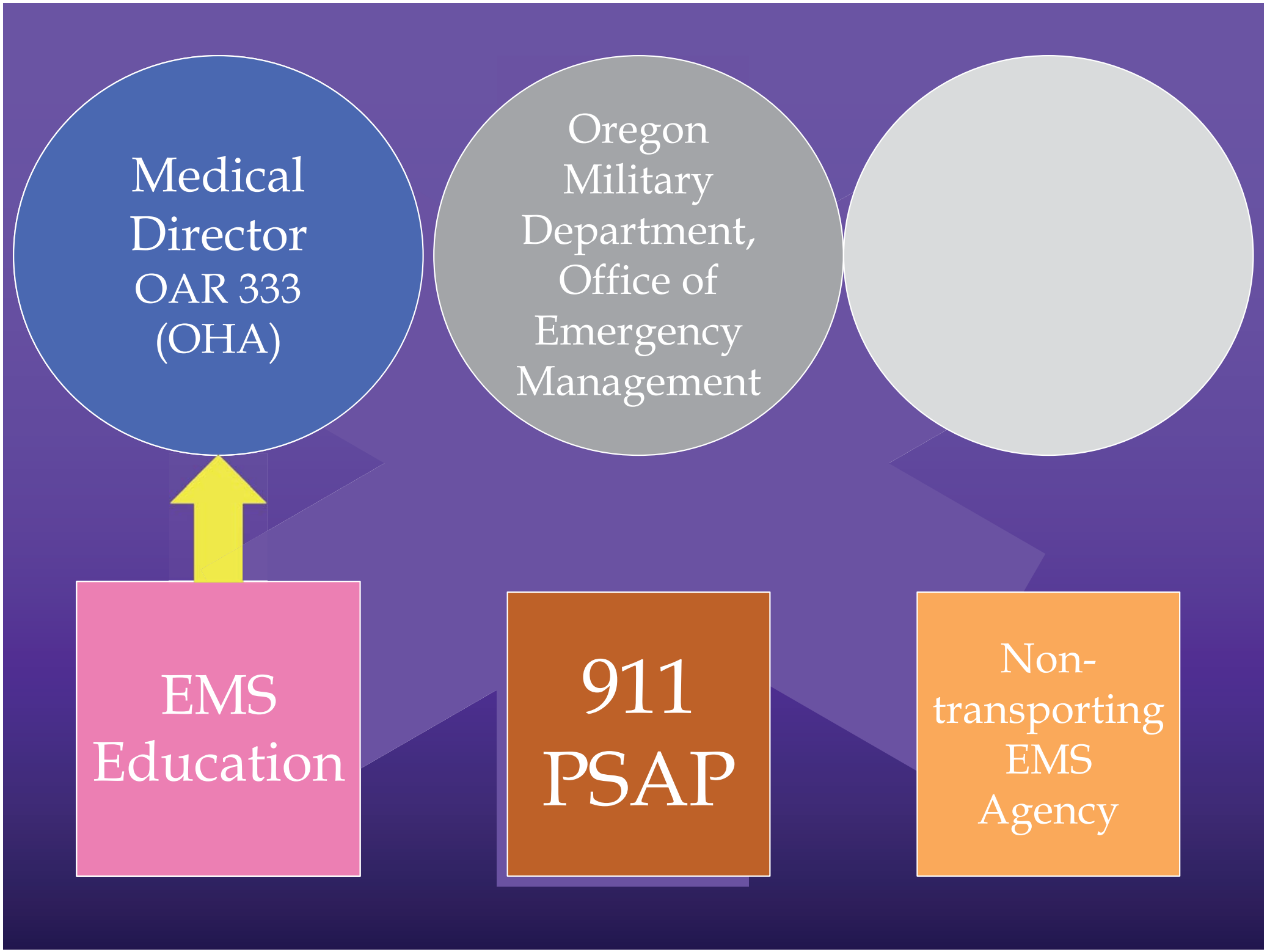
Primary Board Certification	Internal Medicine	Emergency Medicine	Any
Specialty Board Certification	Cardiology	N.A.	EMS
College	American College of Cardiology (ACC)	American College of Emergency Physicians (ACEP)	National Association of EMS Physicians (NAEMSP)
Fellow	Fellow of the American College of Cardiology (FACC)	Fellow of the American College of Emergency Physicians (FACEP)	Fellow of the Academy of EMS (FAEMS)

Oregon EMS Rules

- Oregon Medical Board (OMB) – OAR 847
  - EMS provider → Supervising Physician
  - EMS Scope of Practice – maximum = ceiling
  - EMS Advisory Committee – recommends changes

- EMS & Trauma Office – OAR 333
  - Public Health – Oregon Health Authority
  - EMS Provider licensure & relicensure
  - Education standards
  - EMS Provider discipline
  - Ambulance licensure → Medical Director
  - Trauma care


Supervising Physician
OAR 847
(OMB)
Medical Director
OAR 333
(OHA)
EMS Provider
Ambulance Service


Medical Director OAR 333 (OHA)
Oregon Military Department, Office of Emergency Management
EMS Education
911 PSAP
Non-transporting EMS Agency

Supervising Physician Qualifications

OAR 847-035-0020

- Oregon licensed MD or DO in current practice
- Resident of or actively working in EMS area
- Knowledgeable of EMS skills, ORS & OAR
- < 1 year, complete one of:
  - 3 years as EMS medical director
  - NAEMSP medical director course (1 or 3 day)
  - EMS fellowship
  - EMS subspecialty certification
- Ongoing education every 2 years
  - Attend 1 Oregon EMS Forum
  - 8 hours EMS CME
  - EMS subspecialty maintenance of certification (MOC)

Supervising Physician Duties

OAR 847-035-0025

- Written standing orders (protocols)
- EMS currently licensed and in good standing
- Regular review of practice
  - Direct observation – "ride alongs"
  - Indirect observation
    - Prehospital emergency care report review;
    - Prehospital communications tapes review;
    - Demonstration of technical skills;
- Case reviews & Continuing education
- 2 hours contact with EMS providers/year

EMS Scope of Practice
OAR 847

- ✓ EMS Provider must have:
  - Supervising Physician
  - Written standing orders
- ✓ Not exceed Scope of Practice
- ✓ Provide Pre-hospital Care
- ✓ Honor POLST

Oregon Medical Board
EMS Scope of Practice - OAR 847

Supervising Physician
Written Standing Orders
(Protocols)

EMS Provider Practice

EMS protocols vary

- Pediatric seizure treatment
- Pelvic fracture binding
- Naloxone administration for opioid OD
- Statewide protocols
- CBG in seizure patients
- Hypoglycemia treatment
- Time-dependent emergencies?

Systems of Care

Time-dependent emergencies

Trauma – Oregon law & rule

→ Trauma center & surgeon

STEMI (ST elevation Myocardial Infarction)

→ Cath lab for stent

Stroke

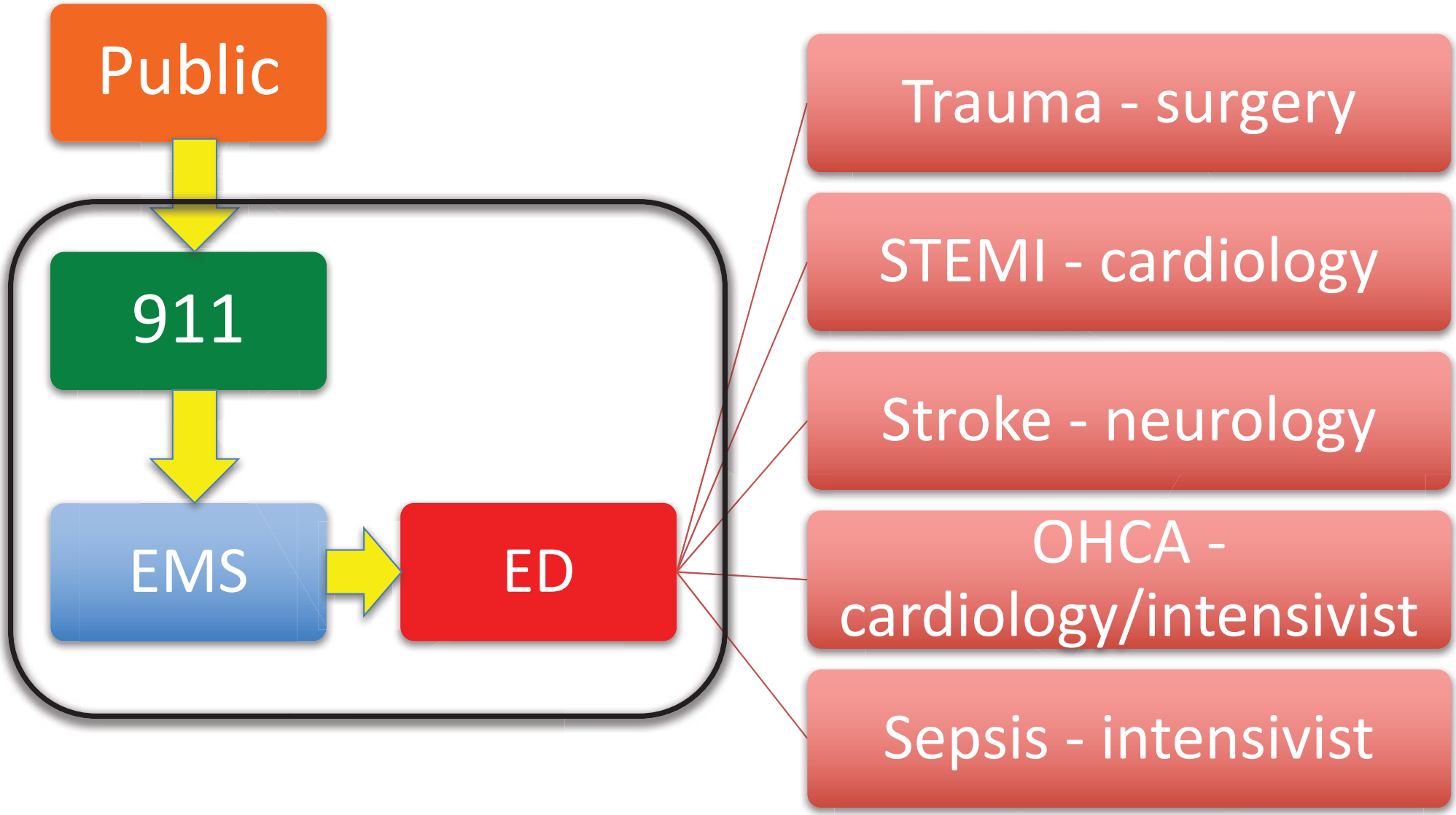
→ CT, TPA or catheter procedure

OHCA (Out of Hospital Cardiac Arrest)

ROSC → Cooling & more

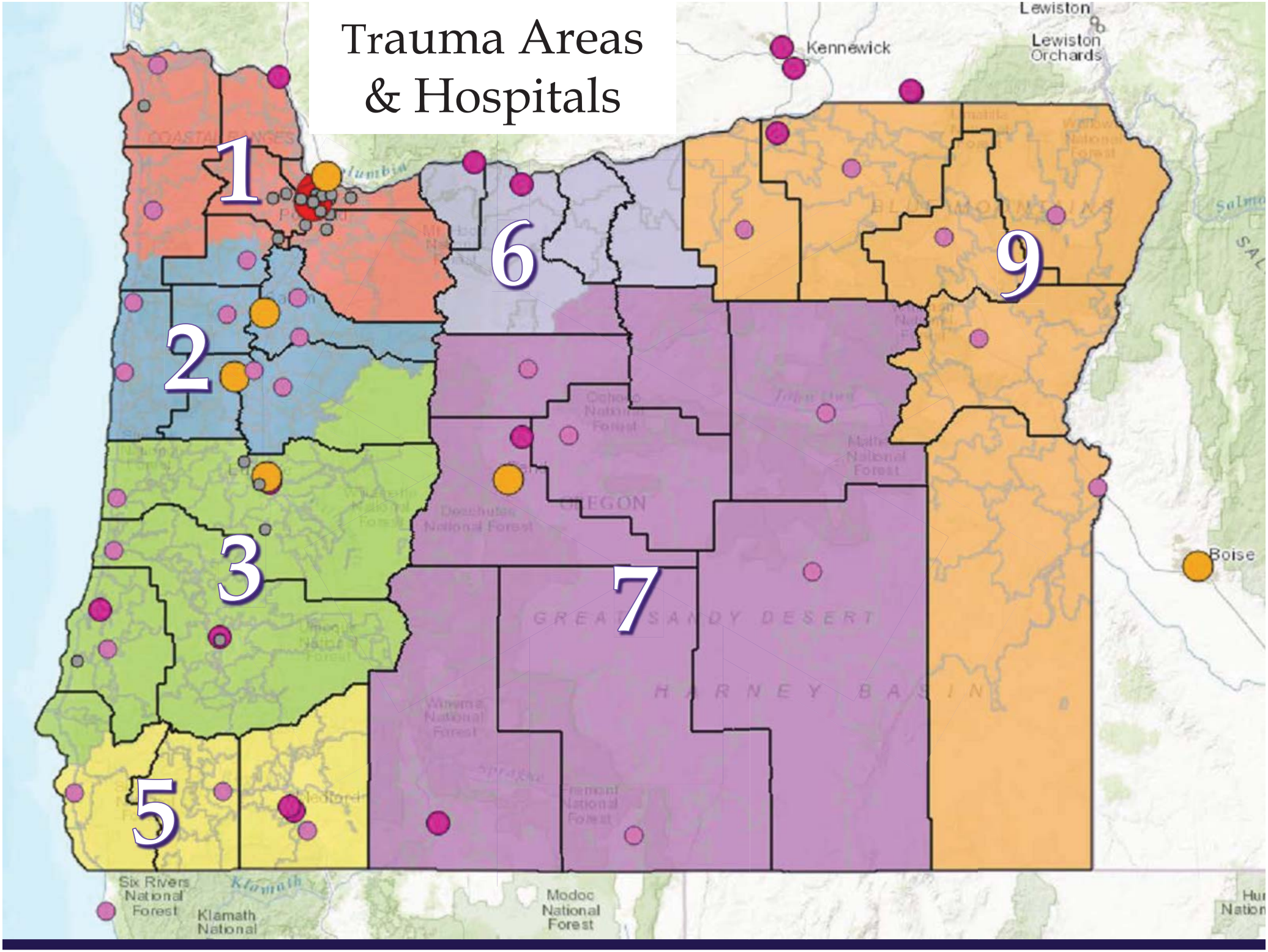
Sepsis?

Systems of Care



Systems of Care

	Trauma	STEMI	Stroke	OHCA	Sepsis
EMS Test	Criteria	ECG	Scale	ROSC	Score
ORS/OAR	✔	X	±✔	X	X
Committee	✔	X	✔	X	X
Regions	✔	±	±	±	?
Data	✔	±	±	±	X
Protocol	✔	±	±	±	?

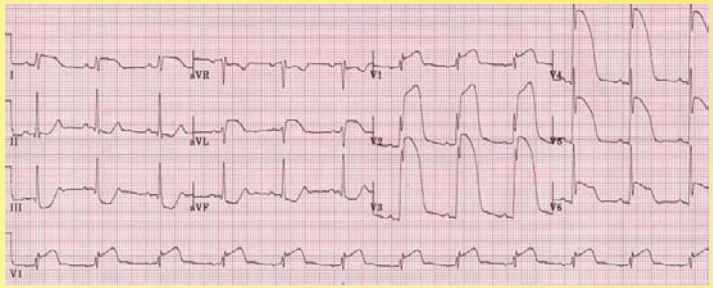

Trauma Areas
& Hospitals
1
2
3
5
6
7
9
Kennewick
Lewiston
Lewiston
Orchards
Boise
Six Rivers
National
Forest
Klamath
National
Modoc
National
Forest
Deschutes
National Forest
Malheur
National Forest
Umatilla
National Forest
Wallowa
National Forest
Fremont
National Forest
Winema
National Forest
GREAT SANDY DESERT
HARNEY BASIN

State of Jefferson STEMI Program

Josephine County	1,640 sq miles
Jackson County	2,802 sq miles
Siskiyou County	6,347 sq miles

Acute STEMI PCI Coverage

Approximately= 5,000 sq miles



30 STEMI Programs
Each covering 5-25 sq. mi.

Adequacy of EMS systems of care protocols for OHCA, STEMI & stroke in Oregon: a structured review

Oregon Health Authority

OREGON ORH OFFICE OF RURAL HEALTH

Disclosure

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This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS or the U.S. Government.

Oregon Office of Rural Health
About
Clinics
Hospitals
Providers
Recruiting
Data
Health Care Shortage
Rural Definitions
Publications
ORH Maps
Resources
Contact Us

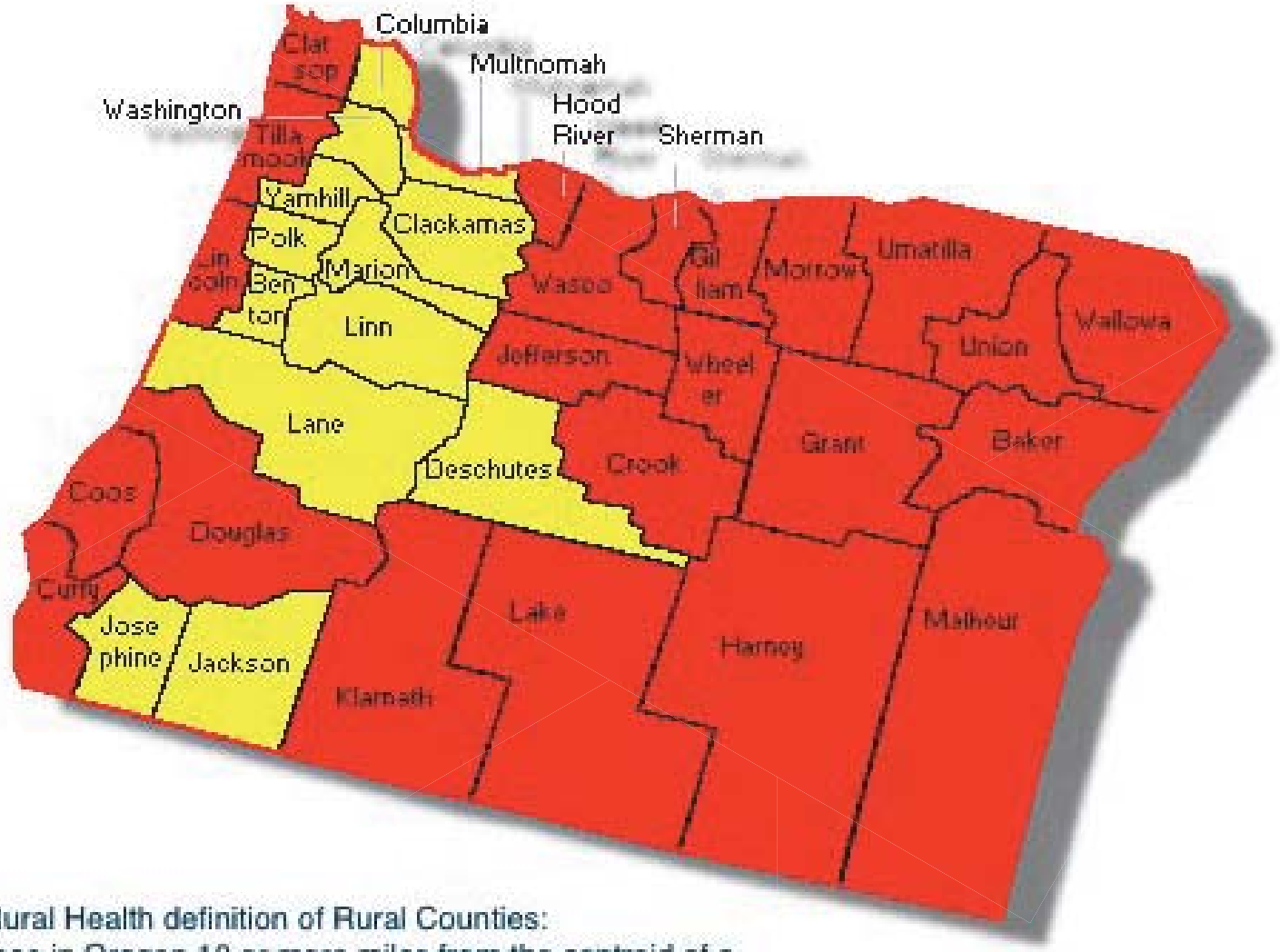
Publications

The Office provides information about rural health to health care providers, legislators and government officials, educators, and members of the public. The following publications are available from the Oregon Office of Rural Health. Many are Portable Document Format (PDF) for you to download. If you would like a hard copy of a publication please include the publication name and date in an e-mail to Robert Duehmig, Deputy Director | duehmigr@ohsu.edu | (503) 494-4450 | toll-free 866-674-4376.

A sampling of some of our publications:

- Oregon's Critical Access Hospitals: Community Benefit Reporting Highlights (2016)
- Aging in Rural and Frontier Oregon
- Review of Oregon Ambulance Agencies' Stroke, STEMI, and Cardiac Arrests Protocols: Executive Report
- Review of Oregon Ambulance Agencies' Stroke, STEMI, and Cardiac Arrests Protocols: Full Report
- 2016 ORH Brochure

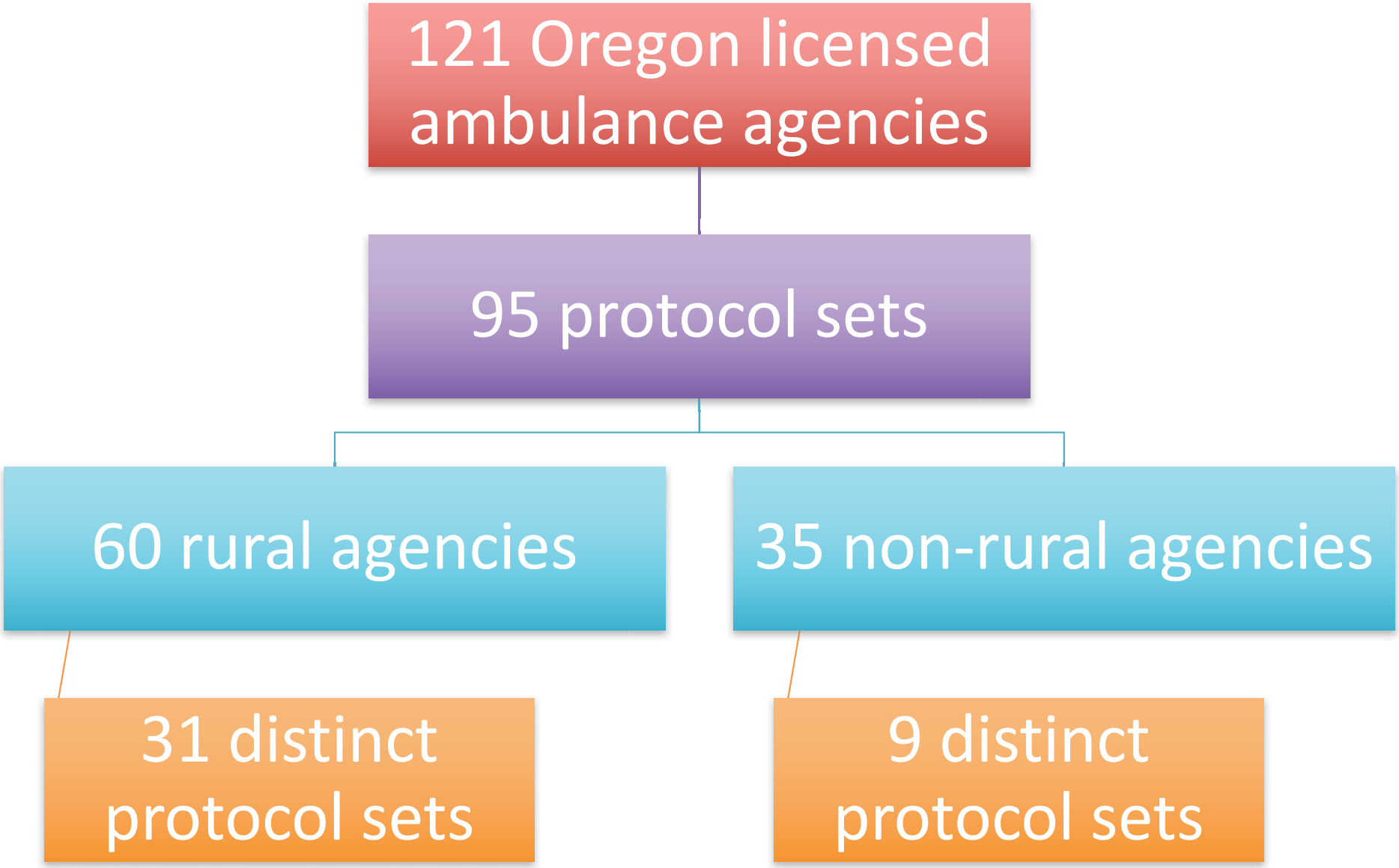
Rural vs Non-rural Counties

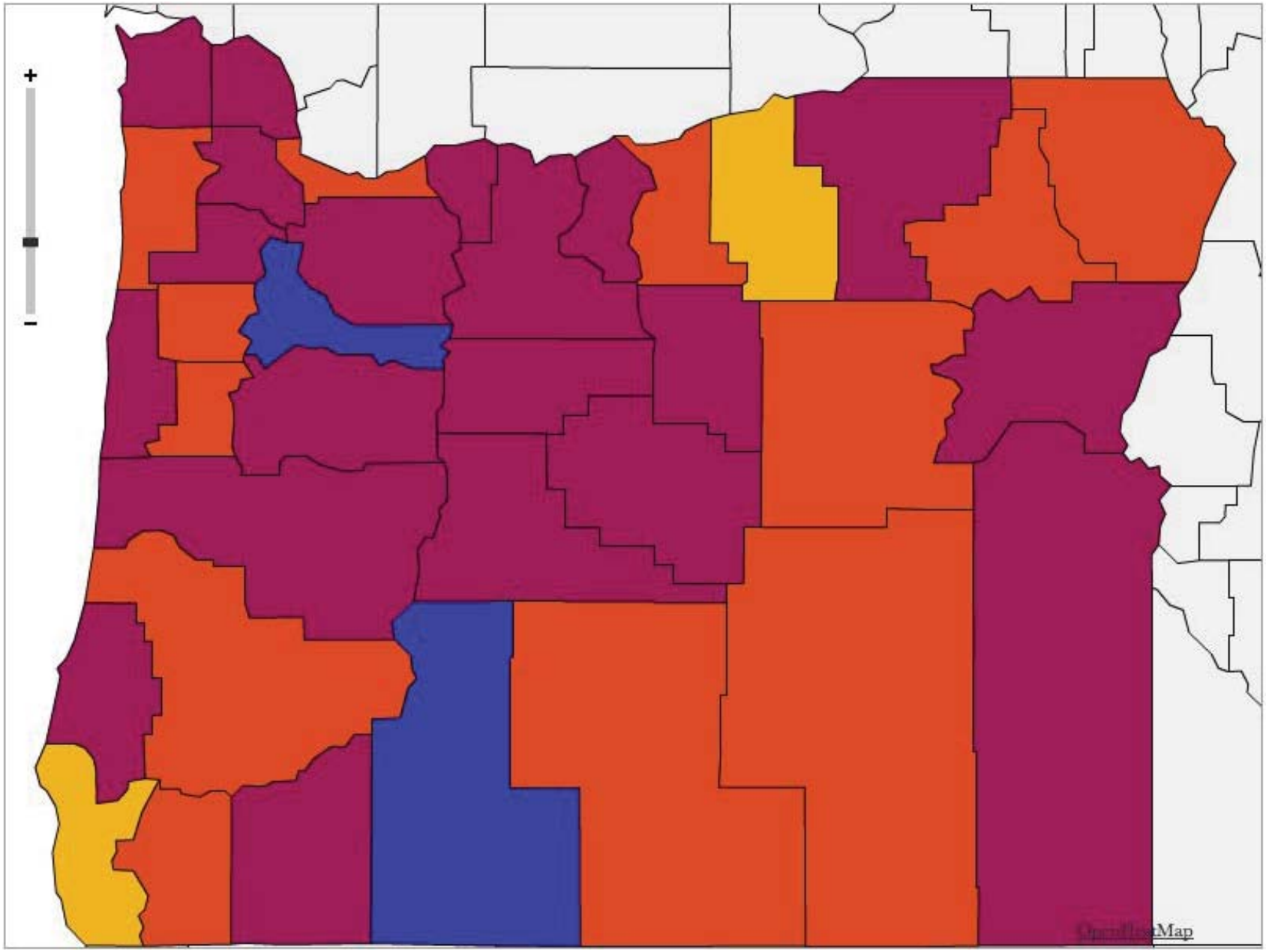


OHSU Office of Rural Health definition of Rural Counties:
All geographic areas in Oregon 10 or more miles from the centroid of a population center of 40,000 people or more AND
Frontier Counties have a population density of six or fewer people per square mile.

Source: diymaps.net (c)

OHCA, STEMI, Stroke protocol review





No protocols received	1 EMS agency	2-5 EMS agencies	6-10 EMS agencies

Care elements

OHCA - 28

STEMI - 21

Stroke - 10

National Association of
State EMS Officials

National Model
EMS Clinical Guidelines

Abstract

These guidelines will be maintained by NASEMSO to facilitate the creation of state and local EMS system clinical guidelines, protocols or operating procedures. System medical directors and other leaders are invited to harvest content as will be useful. These guidelines are either evidence-based or consensus-based and have been formatted for use by field EMS professionals.

NASEMSO Medical Directors Council

www.nasemso.org

Supplement to
Circulation
An American Heart Association Journal

Volume 132 ■ Number 16 ■ Supplement 1
October 20, 2015

2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations

Journal of the American College of Cardiology
Vol. 61, No. 4, 2013

Published by Elsevier Inc.
ISSN 0735-1097/$36.00
http://dx.doi.org/10.1016/j.jacc.2012.11.019

PRACTICE GUIDELINE

2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction

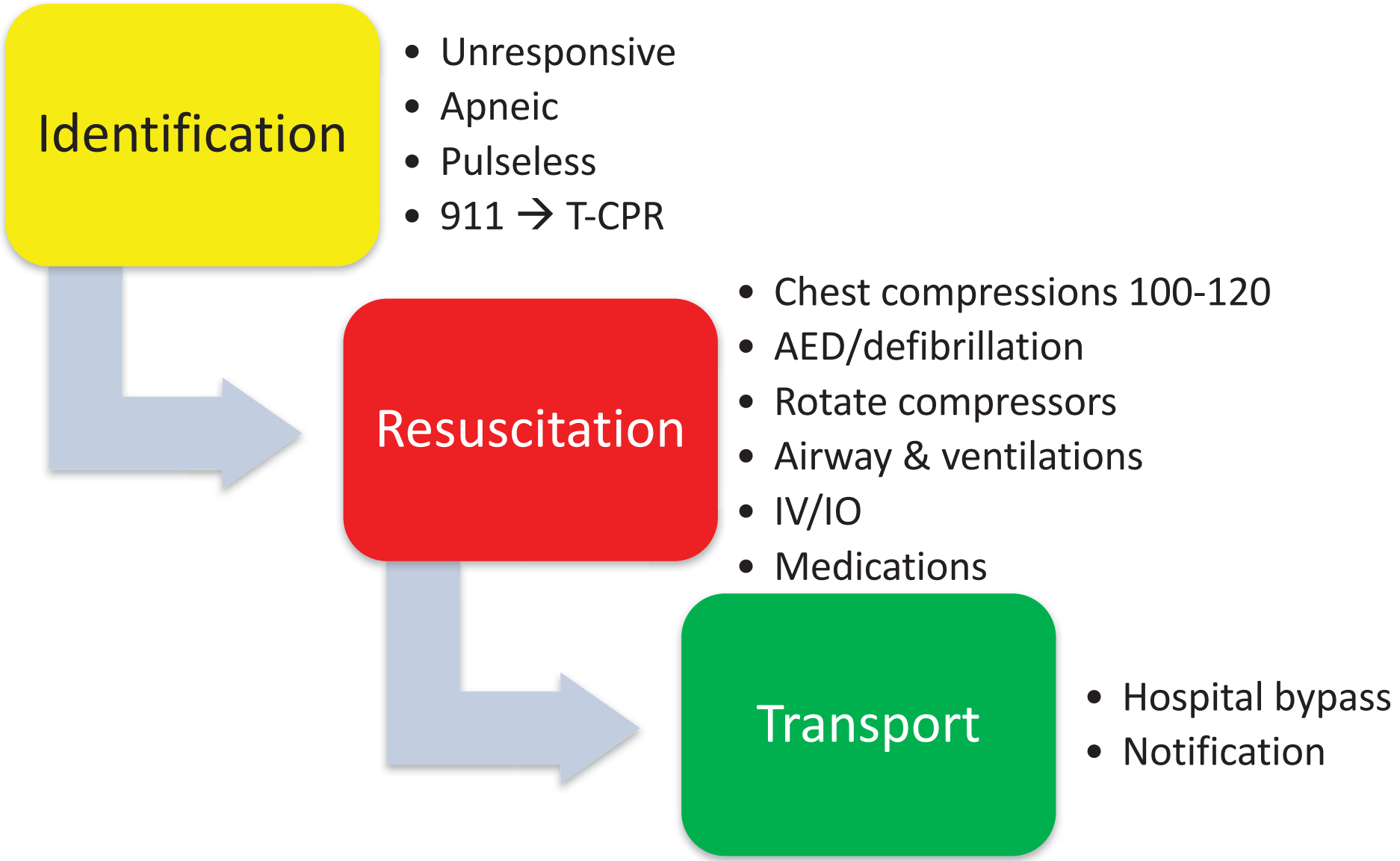
A Report of the American College of Cardiology Foundation/
American Heart Association Task Force on Practice Guidelines

AHA/ASA Guideline

Guidelines for the Early Management of Patients With Acute Ischemic Stroke

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

Out of Hospital Cardiac Arrest



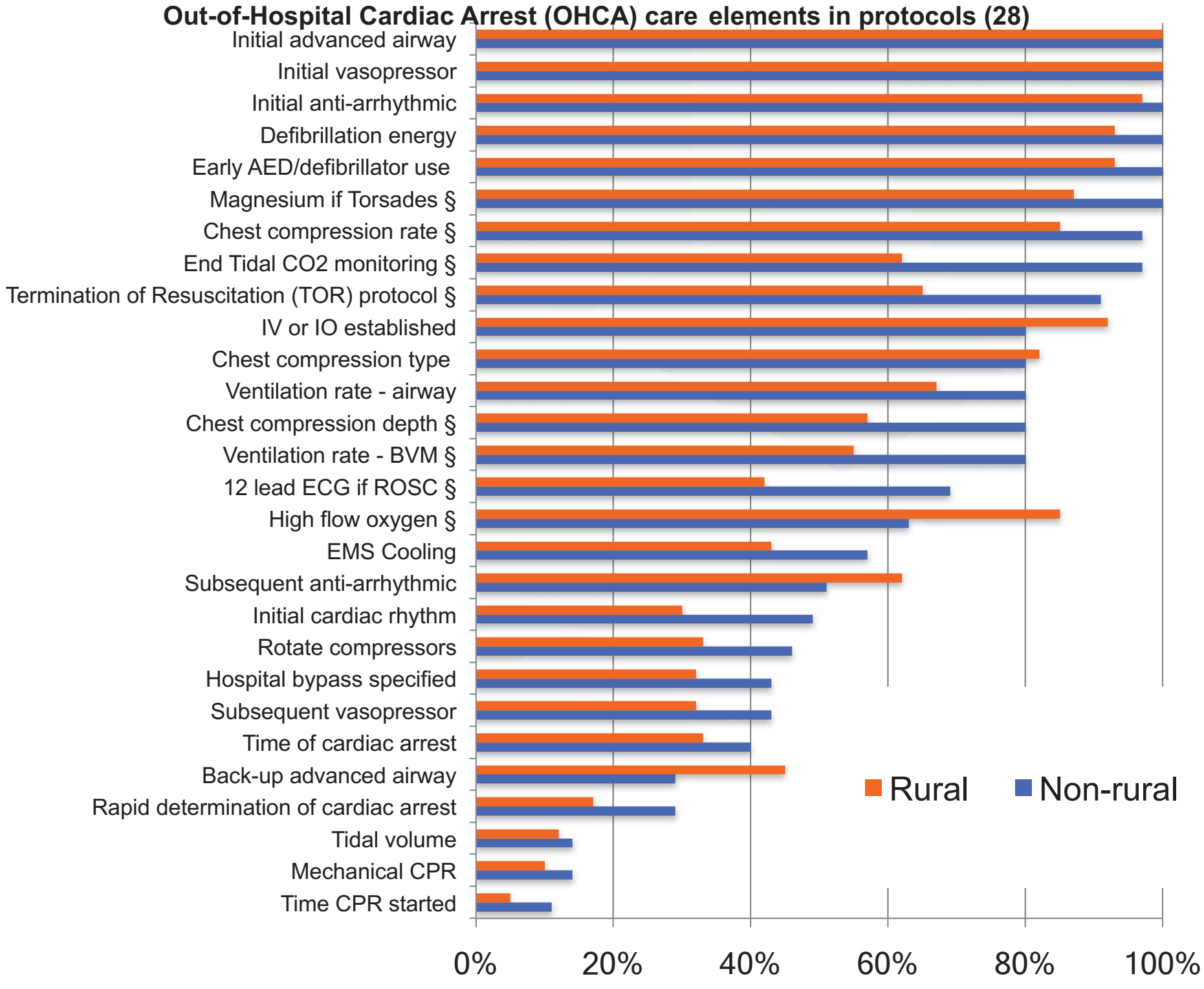
Out of Hospital Cardiac Arrest (28)

Care elements > 90% protocols

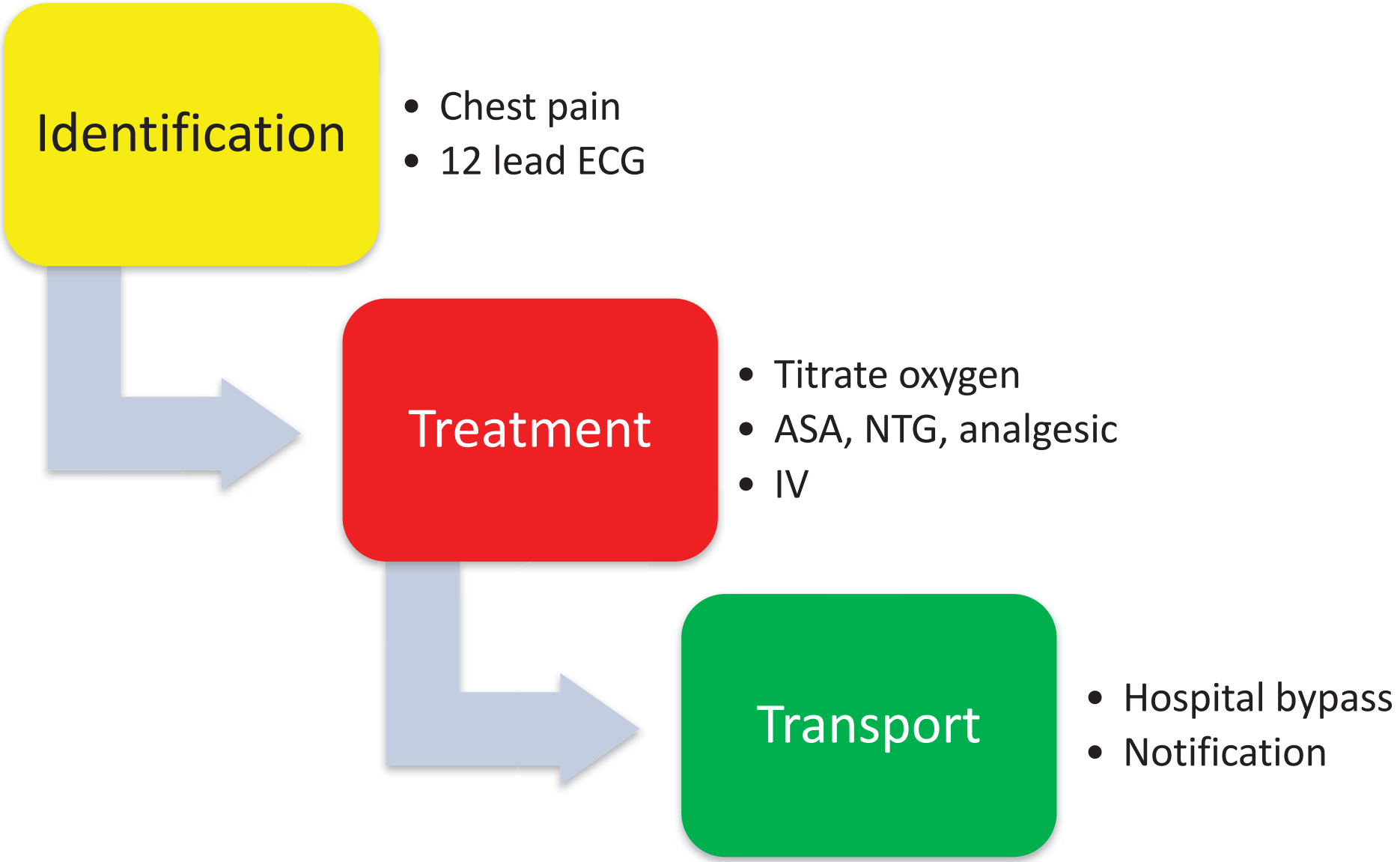
- Initial advanced airway, vasopressor, anti-arrhythmic
- Early AED/defibrillator use
- Defibrillation energy
- Chest compression rate

Care elements < 60% protocols

- Initial cardiac rhythm
- Rotate compressors
- Hospital bypass specified
- Time of cardiac arrest, CPR started
- Tidal volume


Out-of-Hospital Cardiac Arrest (OHCA) care elements in protocols (28)
Initial advanced airway
Initial vasopressor
Initial anti-arrhythmic
Defibrillation energy
Early AED/defibrillator use
Magnesium if Torsades §
Chest compression rate §
End Tidal CO2 monitoring §
Termination of Resuscitation (TOR) protocol §
IV or IO established
Chest compression type
Ventilation rate - airway
Chest compression depth §
Ventilation rate - BVM §
12 lead ECG if ROSC §
High flow oxygen §
EMS Cooling
Subsequent anti-arrhythmic
Initial cardiac rhythm
Rotate compressors
Hospital bypass specified
Subsequent vasopressor
Time of cardiac arrest
Back-up advanced airway
Rapid determination of cardiac arrest
Tidal volume
Mechanical CPR
Time CPR started
Rural
Non-rural
0%
20%
40%
60%
80%
100%

STEMI


Identification
Chest pain
12 lead ECG
Treatment
Titrate oxygen
ASA, NTG, analgesic
IV
Transport
Hospital bypass
Notification

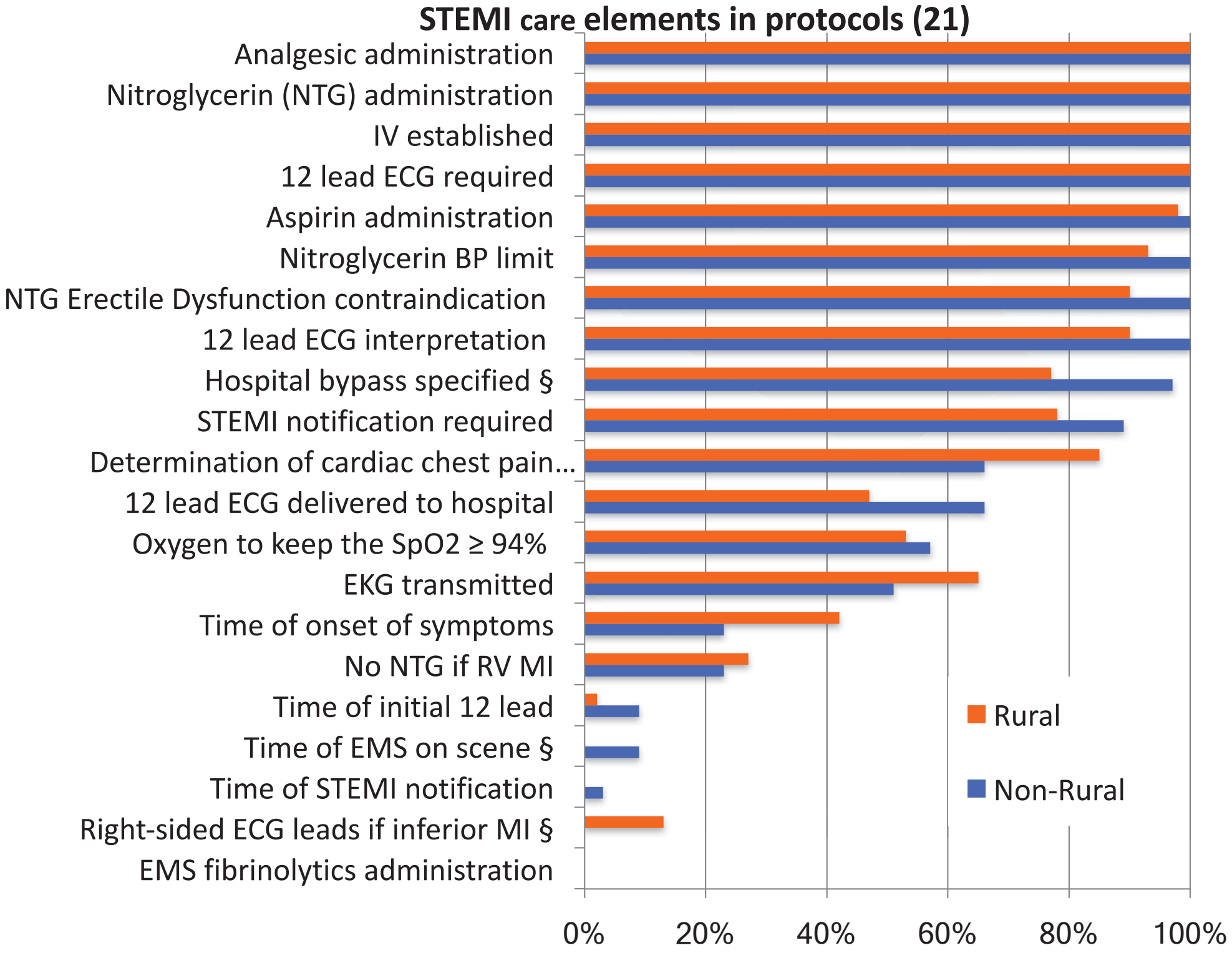
STEMI (21)

Care elements > 90% protocols

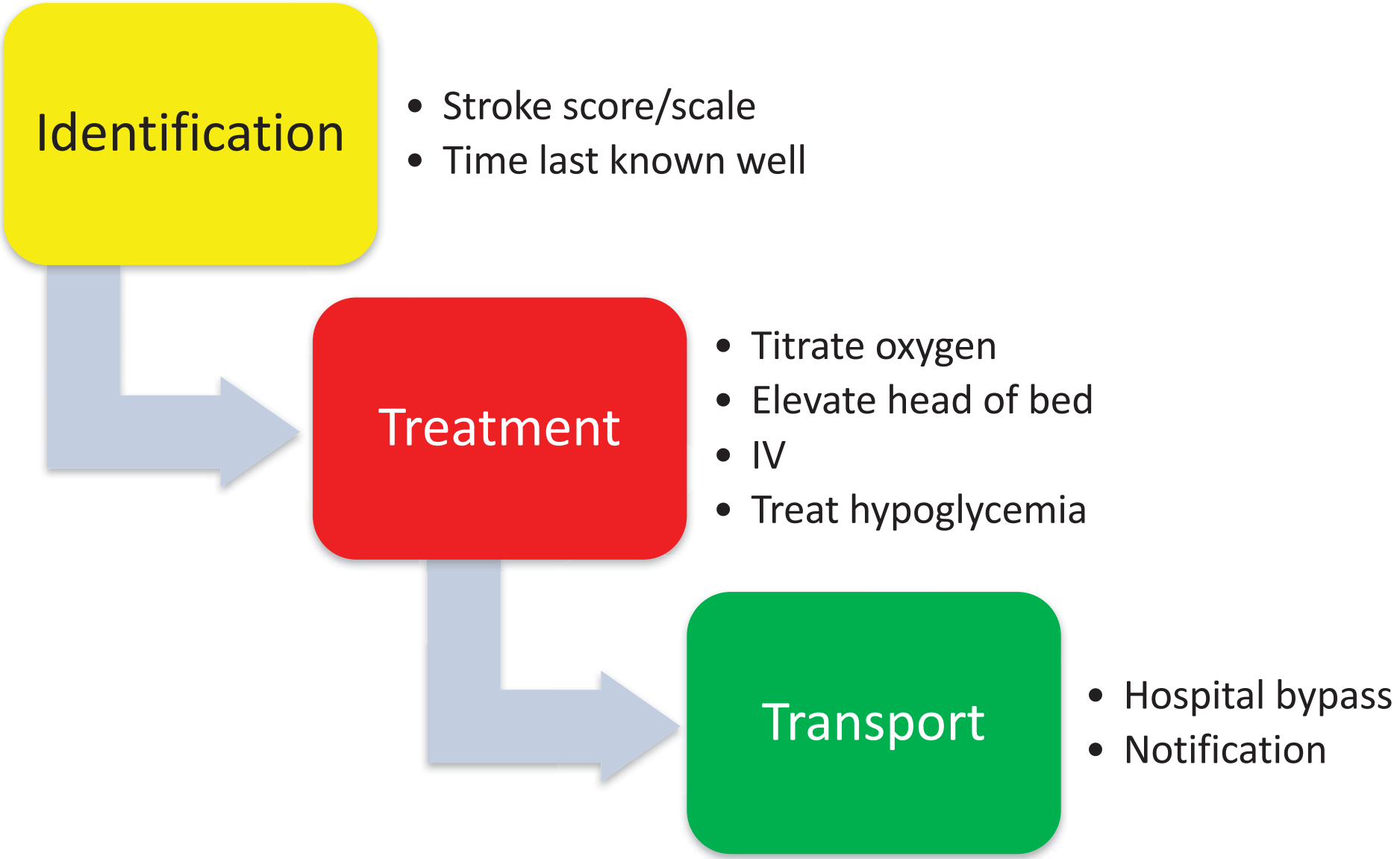
- ASA, NTG, analgesic administration
- IV established
- 12 lead ECG obtained & interpreted

Care elements < 60% protocols

- Titrate oxygen
- Time of symptom onset, EMS on scene, 12 lead ECG
- Time of STEMI notification


STEMI care elements in protocols (21)
Analgesic administration
Nitroglycerin (NTG) administration
IV established
12 lead ECG required
Aspirin administration
Nitroglycerin BP limit
NTG Erectile Dysfunction contraindication
12 lead ECG interpretation
Hospital bypass specified §
STEMI notification required
Determination of cardiac chest pain…
12 lead ECG delivered to hospital
Oxygen to keep the SpO2 ≥ 94%
EKG transmitted
Time of onset of symptoms
No NTG if RV MI
Time of initial 12 lead
Time of EMS on scene §
Time of STEMI notification
Right-sided ECG leads if inferior MI §
EMS fibrinolytics administration
Rural
Non-Rural
0%
20%
40%
60%
80%
100%

Stroke


Identification
Stroke score/scale
Time last known well
Treatment
Titrate oxygen
Elevate head of bed
IV
Treat hypoglycemia
Transport
Hospital bypass
Notification

Stroke (10)

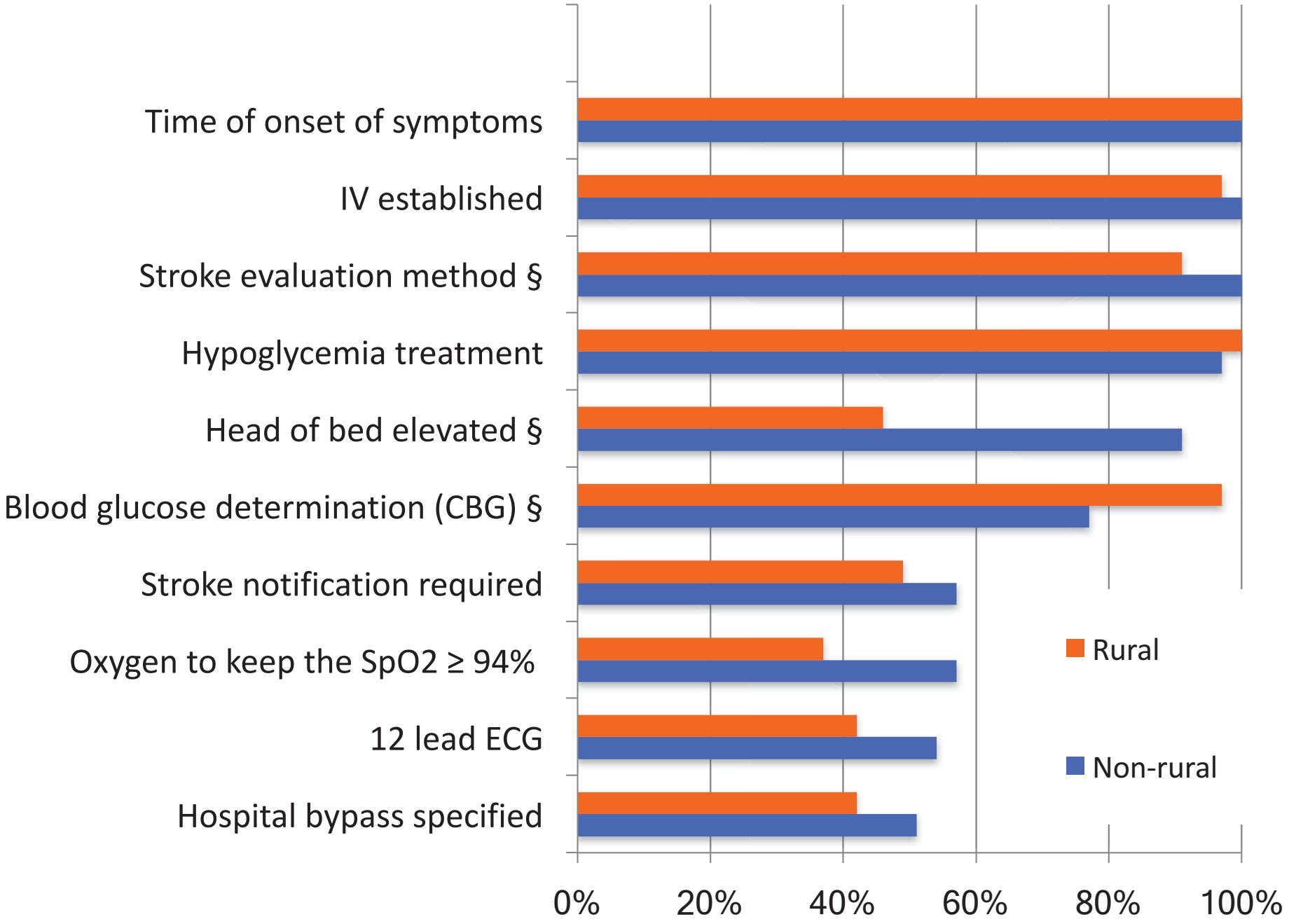
Care elements > 90% protocols

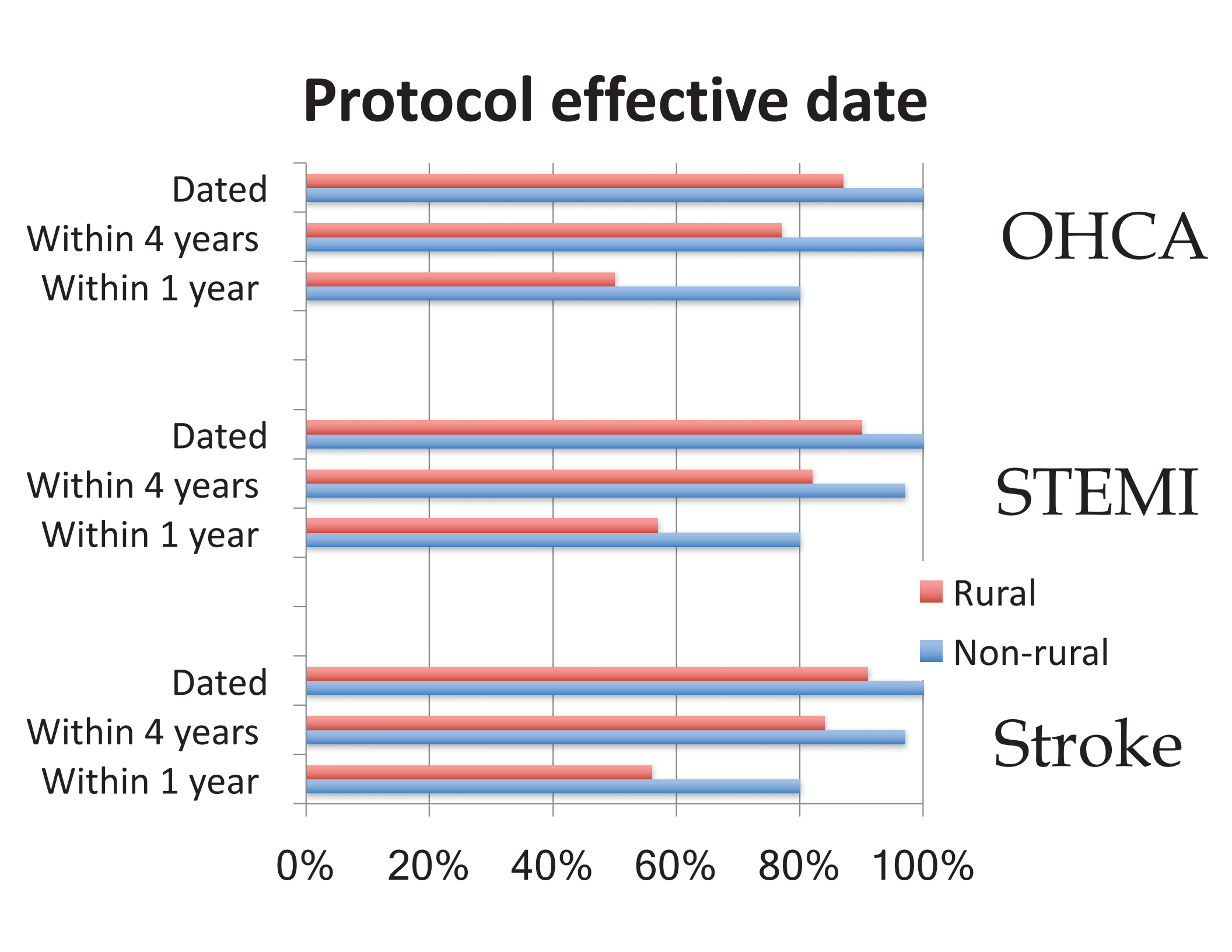
- Time of symptom onset
- IV established
- Stroke scale/score
- Hypoglycemia treatment

Care elements < 60% protocols

- Stroke notification required
- Titrate oxygen
- 12 lead ECG
- Hospital bypass specified

Stroke care elements in protocols (10)




Protocol effective date
Dated
Within 4 years
Within 1 year
OHCA
Dated
Within 4 years
Within 1 year
STEMI
Dated
Within 4 years
Within 1 year
Stroke
Rural
Non-rural
0%
20%
40%
60%
80%
100%

Limitations

Care elements selection

Point-in-time survey

Missing protocols

Denominator
(agencies vs protocol sets)

Data abstraction

Protocols, not practice

Conclusions

Ambulance protocols vary

Rural protocols tended to:

Lack care elements

Be less recent

Be undated

Rural EMS medical directors

Overworked

Underpaid

Lack support

Lack EMS knowledge

Good EMS protocols?

Useful to EMS providers

Best patient care - EBG

Reviewed regularly – annually & ?

Local circumstances

Evidence-based Guidelines

EMS research limited

Time consuming to develop

Changing science

Who develops?

Volume 132, Number 18, Suppl 2, November 3, 2015
ISSN 0009-7322
http://circ.ahajournals.org

American Heart Association®

SUPPLEMENT TO

Circulation

2015 AMERICAN HEART ASSOCIATION GUIDELINES UPDATE FOR CARDIOPULMONARY RESUSCITATION AND EMERGENCY CARDIOVASCULAR CARE

2015 AMERICAN HEART ASSOCIATION AND AMERICAN RED CROSS GUIDELINES UPDATE FOR FIRST AID

National Association of
State EMS Officials

National Model
EMS Clinical Guidelines

PREHOSPITAL EMERGENCY CARE

OFFICIAL JOURNAL OF THE NATIONAL ASSOCIATION OF EMS PHYSICIANS
THE NATIONAL ASSOCIATION OF STATE EMS OFFICIALS
THE NATIONAL ASSOCIATION OF EMS EDUCATORS
THE NATIONAL ASSOCIATION OF EMTs

Evidence-based Prehospital Guideline for:

- Pediatric Seizure Management
- Analgesia in Trauma
- Air Medical Transportation of Trauma Patients
- External Hemorrhage Control


Calendar
MONDAY TUESDAY WEDNESDAY THURSDAY
7

What EMS can do

Follow the literature

PEC, JEMS, AHA, NEJM, JAMA,
AJEM, Annals EM, Prehospital & Disaster Medicine,
NASEMSO, #FOAMems

Review EMS protocols

Work with EMS medical director

EMS medical director support

Next steps?

EMS medical director support

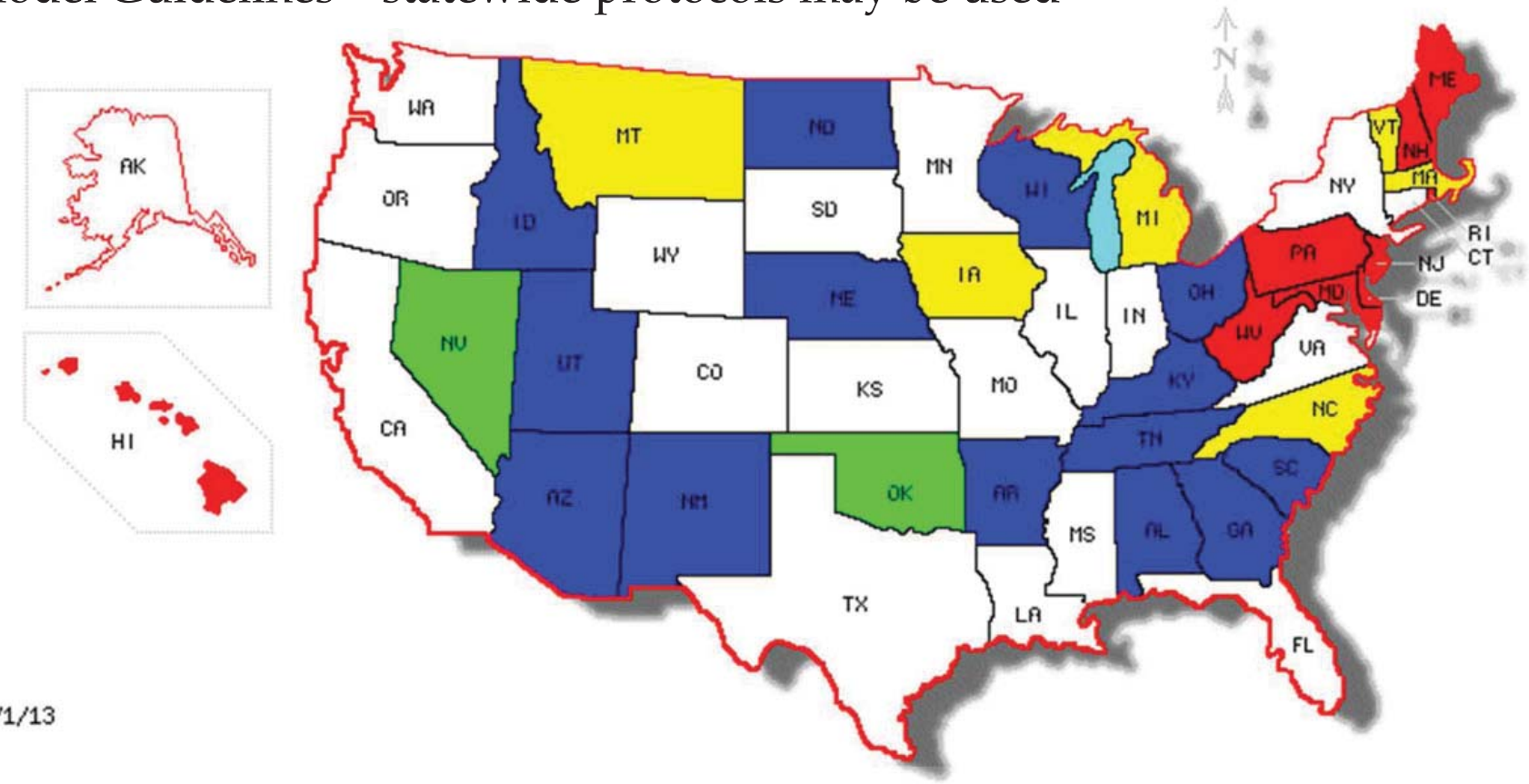
EMS medical director course

Twice yearly EMS Forum

Statewide protocols?

ALS protocols

- Mandatory A – required use
- Mandatory B – required use, may alter protocol
- Mandatory C - required use, may use own protocols
- Model Guidelines – statewide protocols may be used



NOTES:
As of 10/1/13

Kupas DF, Schenk E, Sholl JM, Kamin R. Characteristics of statewide protocols for emergency medical services in the United States. *Prehosp Emerg Care.* 2015;19(2):292-301

Take home

Ambulance protocols vary

What is optimal care?

Improve EMS care

Rural EMS medical directors

Office of Rural Health

Funded this study

$ for twice yearly EMS Forum

Thanks for attending

Questions?

Discussion?

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