DIAGNOSTICS IN EVOLVING CARE MODELS for Emergency Medicine

PROF RICK BODY
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OUR NHS DYING

HOSPITALS GO INTO MELTDOWN
Nurses are crying, doctors are quiting, and we don't have beds for patients.

$9.8bn NHS BUDGET BUT...
10 hospitals in crisis
Worst wait in 10yrs
Car park caretent

HOSPITALS JUST CAN'T COPE
A&E crisis is the worst in a decade

Most inspiring Fast Diet success stories ever

11-hour wait for 999 ambulance
Helplin blunde led to melto
CHEST PAIN
The most common reason for emergency hospital admission
Just 1 in 5 admitted for investigation actually has ACS
YESTERDAY'S DIAGNOSTICS ADMIT FOR TESTS
HS-TROPOIN ON ARRIVAL: PROBABILITY OF AMI

NEGATIVE: 4%

POSITIVE: 52%

Ref: Body, JACC 2011; 58(13): 1132-9
Version 1.1
Test for 1-3 hours
NICE

Rule out ACS if hs-cTn < 99th% at 0 & 3h

NICE CG95, 2016

VERSION 1.1

TEST FOR 1-3 HOURS
VERSION 1.2
ONE TEST RULE OUT!
@richardbody
HS-cTnT < 5 ng/L
& no ECG ischaemia

37% ruled out
SENSITIVITY 99.1%, NPV 99.6%

VERSION 1.2
ONE TEST RULE OUT!

What should future diagnostics look like?
FAST

"I sometimes worry about my short attention span, but not for long"

- Herb Caen
ACCURATE
Minimizing false negatives AND false positives
"As simple as possible, but no simpler"

- Albert Einstein
MACS

Algorithm:
History + ECG + Biomarkers

Calculates each patient's probability of ACS
p = 1 / (1 + \exp
-(0.068a + 0.17b + 1.75c
+ 1.85d + 1.72e + 1.46f +
0.92g + 0.87h - 4.83))
HS-TROTONIN ON ARRIVAL: PROBABILITY OF AMI

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HS-TROTONIN ON ARRIVAL:
PROBABILITY OF AMI

< 3 ng/L: 0%
3 - 14 ng/L: 6%
14 - 50 ng/L: 27%
50 - 100 ng/L: 92%
> 100 ng/L: 100%
MACHINE LEARNING

Kong et al, Eur J Operat Res 2012; 219; 564-73
UNCERTAINTY
How much risk is too much?
JUST

4 IN 10 DOCTORS

would accept a 1% risk of missing ACS

Than et al, Int J Cardiol 2013; 166(3): 752-4
SHARED DECISIONS
Of every 100 people like you who come to the Emergency Department:

On average 1 person has a heart attack or will develop a heart complication within 30 days.

99 people do not.
POINT OF CARE
CARE AT THE POINT OF NEED
We can apply this method to other conditions.
When you change the way you look at things, the things you look at change.

- WAYNE DYER