More signal, less noise: echo training for acute care

Marcus Peck, Frimley Park
More signal, less noise: echo training for acute care

Marcus Peck, Frimley Park
Diagnostic noise
A is for aphorisms
“Common things are common”
“If it looks like a duck, swims like a duck, and quacks like a duck, then it is a duck”
“When you hear hooves, think of *horses*, not *zebras*!”
“A careful history will lead to the right diagnosis 80% of the time”
Medical Education

Relative Contributions of History-taking, Physical Examination, and Laboratory Investigation to Diagnosis and Management of Medical Outpatients

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Summary
To evaluate the relative importance of the medical history, the physical examination, and laboratory investigations in the diagnosis and management of medical outpatients some physicians recorded their diagnosis and a prediction of the method of management after reading the patient's referral letter, again after taking the history, and again after performing the physical examination. These diagnoses and predictions were compared with the diagnosis and method of management which had been adopted two months after the patient's initial attendance. A diagnosis that agreed with the one finally accepted was made after reading the referral letter and taking the history in 66 out of 80 new patients; the physical examination was useful in only seven patients, and the laboratory investigations in a further seven.

In only one of six patients in whom the physician was unable to make any diagnosis after taking the history and examining the patient did laboratory investigations lead to a positive diagnosis.

diagnosis in a medical outpatient clinic. We asked physicians to record their diagnosis after taking the patient's history and to record it again after making a physical examination. By comparing these diagnoses with the ultimate one reached after laboratory investigations we have been able to show just how important the history is.

It is, of course, obvious that a final diagnosis cannot always be made with certainty even after detailed laboratory studies. Of more importance is what happens to the patient, and we have therefore also attempted to find out to what extent the management of the patient, as opposed to the making of a diagnosis, depends on the history, the examination, and the laboratory investigations.

Methods
During a four-month period each physician working in a weekly general medical clinic completed a standard form for each new patient he saw. The following questions were answered at set stages of the interview and examination.

1. General Practitioner's diagnosis
B is for Bias
Dysrationalia = "the inability to think rationally despite adequate intelligence"
Overconfidence

Anchoring

Availability

... associated with diagnostic error in 37 to 77% of case studies

Saposnik 2016 - Cognitive biases associated with medical decisions: a systematic review

BMC Medical Informatics and Decision Making 16:138
C is for Clinical examination
LRs = Diagnostic Weights

Decrease
-45%  -30%  -15%

Increase
+15%  +30%  +45%

LRs
0.1  0.2  0.5  1  2  5  10  LRs
Valve disease
CHARACTERISTIC SYSTOLIC MURMUR

**Probability**

- **Decrease**
  - 45% -30% -15%
- **Increase**
  - +15% +30% +45%

**LRs**

- 0.1
- 0.2
- 0.5
- 1
- 2
- 5
- 10

**Absence of characteristic murmur, arguing against aortic stenosis**

**Absence of characteristic murmur, arguing against moderate-to-severe mitral regurgitation**

**Detecting ventricular septal defect**

**Detecting tricuspid regurgitation**

**Detecting mitral valve prolapse**

**Detecting aortic stenosis**

**Detecting mitral regurgitation**

CHARACTERISTIC DIASTOLIC MURMUR

**Probability**

- **Decrease**
  - 45% -30% -15%
- **Increase**
  - +15% +30% +45%

**LRs**

- 0.1
- 0.2
- 0.5
- 1
- 2
- 5
- 10

**Absence of characteristic murmur, arguing against moderate-to-severe aortic regurgitation**

**Detecting pulmonary regurgitation**

**Detecting aortic regurgitation**
Elevated left heart filling pressure
Lung crackles, peripheral oedema, S4 = NS
Low ejection fraction
Lung crackles, peripheral oedema, hepatomegaly, S4 = NS
Lung US
Chain Of Benefit for a diagnostic procedure

Diagnosable illness
Reasonable likelihood of a disease which is diagnosable via the procedure.

Safety
Procedure is performed without causing significant harm.

Correct results
Procedure is technically successful and yields results which are accurate.

Right Diagnosis
Results are correctly integrated into clinical context to yield the appropriate diagnosis.

Improved Therapy
The diagnosis is treatable & correct treatment is instituted. This treatment is substantially superior to empiric therapy.

Clinical Response
Disease responds to treatment, leading to clinical improvement.

by @PulmCrit
Accessible
Achievable
Meaningful
FEEL
Pre-Learning: Mentor
Course: Supervisor
50 cases
24 months
Assessment: Cost £250
FICE
Course
Mentor
50 cases
24 months

e-Learning
Supervisor
Assessment
Cost £250
Is the LV dilated or severely impaired?
Is the RV dilated or severely impaired?
Is there any pericardial fluid?
Is there evidence of severe hypovolaemia?
Is there any pleural fluid?
Database analysis: Oct 18
2012 - 2018:

2020 Registered
766 Accredited
682 Mentors

Database analysis: Oct 18
BSE Level 1
Seven day services in the NHS

Ensuring patients admitted as an emergency, receive high quality consistent care, whatever day they enter hospital.
The four priority standards

With the support of the AoMRC, four of the 10 clinical standards were identified as priorities on the basis of their potential to positively affect patient outcomes. These are:

- Standard 2 – Time to first consultant review
- **Standard 5 – Access to diagnostic tests**
- Standard 6 – Access to consultant-directed interventions
- Standard 8 – Ongoing review by consultant twice daily if high dependency patients, daily for others
<table>
<thead>
<tr>
<th>Diagnostics</th>
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| **Standard:**
5. Hospital inpatients must have scheduled seven-day access to diagnostic services, typically ultrasound, computerised tomography (CT), magnetic resonance imaging (MRI), echocardiography, endoscopy, and microbiology. Consultant-directed diagnostic tests and completed reporting will be available seven days a week:
   - Within 1 hour for critical patients
   - Within 12 hours for urgent patients
   - Within 24 hours for non-urgent patients

**Supporting information:**

- Critical patients are considered those for whom the test will alter their management at the time; urgent patients are considered those for whom the test will alter their management but not necessarily that day.
6 DOPS
<table>
<thead>
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<th>e-Learning</th>
<th>Course</th>
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<tbody>
<tr>
<td>Mentor</td>
<td>Supervisor</td>
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<tr>
<td>75 cases</td>
<td>Examination</td>
</tr>
<tr>
<td>24 months</td>
<td>Cost £250</td>
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</tbody>
</table>
Normal
Hypovolaemia
Severe aortic stenosis
Aortic regurgitation
Disrupted or dysfunctional mitral valve
Dilated aortic root
Left ventricular dysfunction
Right heart strain and dysfunction
Pericardial fluid, TTE signs of tamponade
Pressure
Flow
Resistance
BSE Emergency Echo Standards
BSE Level 2
e-Learning Course
Mentor Supervisor
250 cases Examination
24 months Cost £320
4 hours per week
ACCE
2012 - 2019:

62 Registered
17 Accredited

ACCE
Deliverability
Trainees
Mentors
Governance

Deliver-ability
Governance
The NHSmail Skype for Business service enables secure communication and collaboration within, between, and outside of federated NHS organisations and is accessible via mobile and desktop applications.

**INSTANT MESSAGING & PRESENCE**
- View availability based on a user’s diary
- Send Instant Messages to other users of Skype for Business (NHSmail and federated organisations)
- Manage contacts from one screen and view their location

**DIAL-IN CONFERENCING**
- Schedule a dial-in conference with a unique entry pin to enable your participants to join by phone
- Collaborate with up to 250 people via audio or video conference
- Quickly schedule meetings with flexible access management for additional security control
- Work collaboratively on documents through desktop and application sharing
- Draft ideas together using a shared whiteboarding space

**PEER-TO-PEER AUDIO & VIDEO CALLS AND WEB CONFERENCING**
- Connect with peers one-to-one via audio or video call
- Collaborate with up to 250 people via audio or video conference
- Quickly schedule meetings with flexible access management for additional security control
- Work collaboratively on documents through desktop and application sharing
- Draft ideas together using a shared whiteboarding space

**BENEFITS OF NHSMAIL SKYPE FOR BUSINESS**
- Skype for Business is easy and intuitive to use with a similar look to the consumer version of Skype, allowing users to get up and running quickly with a small amount of training.
- Virtual teams working from where they are, whenever they need it. Stay in touch, share information, and make clinical decisions quicker by enabling teams to connect remotely through the free mobile application.
- Improved quality of care through real-time access to expertise. Use video calls to enable coaching and consultation via video link.
- Improved efficiency and ways of working. Use Skype for Business Meetings to improve communication and collaboration between team, departments and across organisational boundaries.
- NHSmail is the national collaboration platform designed for health and care, delivering a unified, scalable infrastructure across the NHS. The service is approved for clinical use.

**GETTING ON-BOARD**
- Skype for Business Instant Messaging and Presence is a core (nationally funded) capability accessible for all users. NHS organisations simply need to provide the Skype for Business client to their users. Users sign-in with their NHSmail username and password.
- Skype for Business Audio and Video Conferencing is a top-up service (locally funded) capability. Organisations can call these services off under the NHSmail Additional Services Catalogue available from nhsmail.development@accenture.com

To find out more please visit [https://portal.nhs.net/Help/](https://portal.nhs.net/Help/)
Remember your ABCs

Look before you leap

Invest in training and governance