House MD: Solving Complex IT Issues Using Differential Diagnosis

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AGENDA

A Brief History Of Medical Diagnosis.
Why & How You Should Prove Yourself Wrong.
Differential Diagnosis.
Diagnostic Approaches.
Diagnostic Thresholds.
Do’s, Don’ts & Application.
Who’s This Guy?
Why...?
Medical Diagnosis
Imhotep - 2600BC
Hippocrates - 460BC

http://www.sculpturegallery.com/two/hippocrates3.jpg
In Summary;
It’s Been Around A Long Time..
Hypothetico-Deductive Model
"No amount of experimentation can ever prove me right; a single experiment can prove me wrong."

Albert Einstein
Hypothetico-deductive model
Something unexplained happens.
Hypothesize.
Plan a test that can *falsify*. Predict the result.
Test.
Hypothesize.
Plan a test that can falsify.
Predict.
Test.
An Example.
I went shopping..
Failed Card
Hypothetico-deductive model
Something unexplained happens.
Hypothesise.
I’ve Spent Too Much On SSD’s

My Wife Has Been Shopping

I Didn’t Pay My Bill In Time

There Is A System Problem

Hypothesise.
Plan a test.
Predict.
Test: I’ll call the credit card company.

Plan a test.
Predict.
Test: I’ll call the credit card company.

Plan a test.
Predict.

Prediction: I have sufficient funds.

(If correct will falsify 3 hypothesis)
Test.
Test.

Result: I have sufficient funds.
Hypothesise.

I’ve Spent Too Much On SSD’s

My Wife Has Been Shopping

There Is A System Problem

I Didn’t Pay My Bill In Time
Hypothesise.

There Is A System Problem
Hypothetico-Deductive Model

Hypothesise.
Plan a test that can **falsify**.
Predict.
Test.
Differential Diagnosis.
Or DDx
What is it?
It’s that thing that House does.
It's a framework for problem diagnosis.
It's best used alongside the hypothetico-deductive model.
Process of elimination.
Assume most obvious.
Until proved otherwise.
"When you hear hoof beats, look for horses, not zebras"
Probability is your friend.
Personalised probability is your best buddy.
Here’s how it works.
Something happens.
Something bad happens.
Something bad and complicated happens.
Gather the facts...
Gather the facts...

Symptoms

32 yo man w/ pharyngitis
- fever
- rash
- malaise, fever, chills, H/A
- pharyngitis, dysphagia
- sore throat, cough
- hands & feet
Gather the facts...

- Symptoms
- Subject history
- Previous test results
- General observations

Saturday, 30 June 12
What else do we know?
Hypothesise.
List Hypotheses.
Immediately discount.
Apply probability.
Prioritise hypothesis based on risk and probability.
Plan tests.
Predict results.
Test.
Or Treat.
Feedback results.
Continue until diagnosis is confirmed.
Differential Diagnosis.

Gather the facts.
Hypothesise.
Apply Probability.
Prioritise.
Test or Treat.
Loop.
Diagnostic Approach
Possibilistic
Possibilistic

All Possibilities Are Equal

Test Everything
Possibilistic

All Possibilities Are Equal

Test Everything
Probablistic
Probabilistic
Selection Based On Probability
Prioritise The Most Likely
Probabilistic

Selection Based On Probability

Prioritise The Most Likely
Prognostic

Selection Based On Most Serious

Prioritise The Most Serious
Prognostic

Selection Based On Most Serious

Prioritise The Most Serious
Pragmatic
Pragmatic
Selection Based On Responsiveness To Treatment
Prioritise The Most Easily Treated
Pragmatic

Selection Based On Responsiveness To Treatment

Prioritise The Most Easily Treated
When do I use each approach..
Do something and do it fast...

Pragmatic.
If it really is that, we are in a world of hurt.

Prognostic.
Default = Probabilistic.
I want more probability...
Pre & Post Test Probability.

Current Probability: 30%

If the result is X;
There is 60% chance of hypothesis being correct.

If the result is Y;
There is 0% chance of hypothesis being correct.
This is easier in medicine.
✅ Differential Diagnosis...
✅ Diagnostic Approach...
Diagnostic Thresholds
Define the point at which something is worth testing.
Mnemonics.
Doctors Love Mnemonics.
Mnemonic for DDx.
Mnemonic for Acute Pancreatitis.
GET SMASH’D

Gallstones
Ethanol
Trauma
Steroids
Mumps
Autoimmune
Scorpion bites
Hyperlipidemia
Drugs (azathioprine, diuretics)
Mnemonic for the web...
These are used to follow a path through trees.
How can this all help me?
It makes you more thorough.
It can help you fix things faster.
By working as a team.
By working more efficiently.
Reduces Thematic Vagabonding.
Reduces Lone Wolf Heroism.
Reduces Encystation
This is what it looks like.
I’ve run out of diagnosis.
You suck.
:-)
Then you’ve missed something.
Question your results, symptoms and observations.
Re-test if in doubt.
Call in a fresh pair of eyes.
Do’s and Don’ts
Assemble a team.
Get the right experts in the room.
Experts and generalists.
The diagnostic lead.
Diagnostic Lead, controls the pen.
Take it in turns to lead.
Culture.
Openness is key.
Encourage people to challenge.
And be challenged.
Collaborate.
Do not immediately dismiss ideas...
Do not immediately dismiss ideas... that were not yours...
Do not immediately dismiss ideas... that were not yours... or your team’s...
There is a time to debate and a time to act.
Get better at making group decisions.
Build a culture that encourages creative suggestions.
Practice makes perfect.
When do I use this..?
Complex Problems.
Active Problems.
Conclusion
Try and prove yourself wrong.
DDx is a framework that YOU can use to resolve & manage your complex problems.
Be aware of the Diagnostic Approach that you are using and why.
Create a Mnemonic for your system.

It acts as a checklist.
Watch House.
Further Reading:
The Process of Diagnosis (AMA) -
http://medicine.ucsf.edu/education/resed/articles/jama6_the_process.pdf

Jessie Robbins - Creating Resiliency Through Destruction-
http://www.slideshare.net/jesserobbins/ameday-creating-resiliency-through-destruction

All of John Allspaw’s presentations-
http://www.slideshare.net/jallspaw

House MD
http://www.fox.com/house/
Thank You.

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