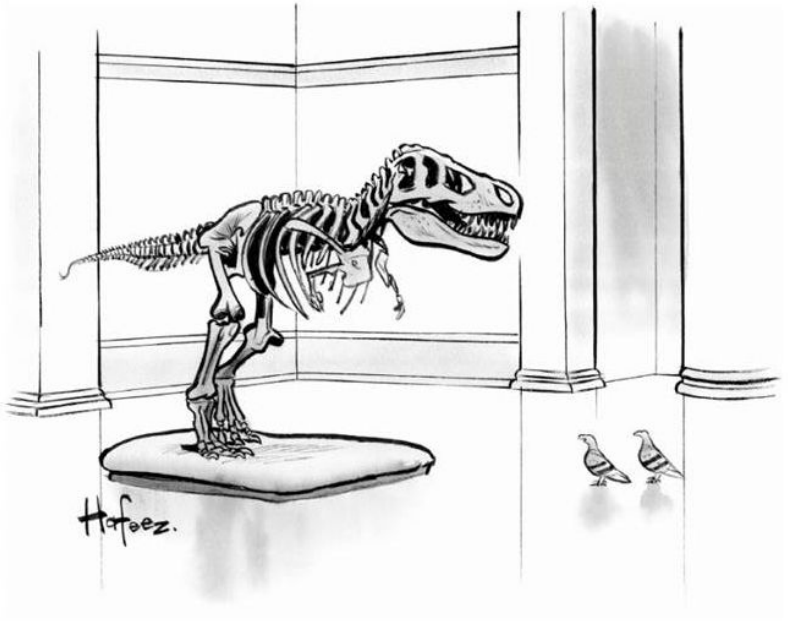
What medicine can teach us about being on-call

Daniel Turner



Medicine is relevant to SRE / DevOps / ProdEng

- Structure
  - Teams with specialized knowledge
  - All working to support a bigger picture
- Service Level Objectives
  - Serious consequences for violations



"Frankly, I don't see the resemblance."

Medicine Evolves

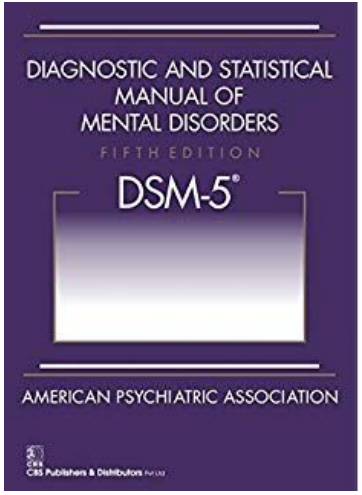
- Medicine has been around longer than you or your company

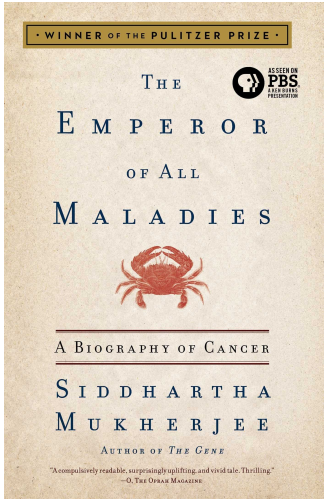




Medicine Evolves

- Medicine has been around longer than you or your company
- Medicine constantly experimenting and validating changes
  - Quality Improvement Projects
  - Books
  - Research topics include: call schedules, time to treatment, ...



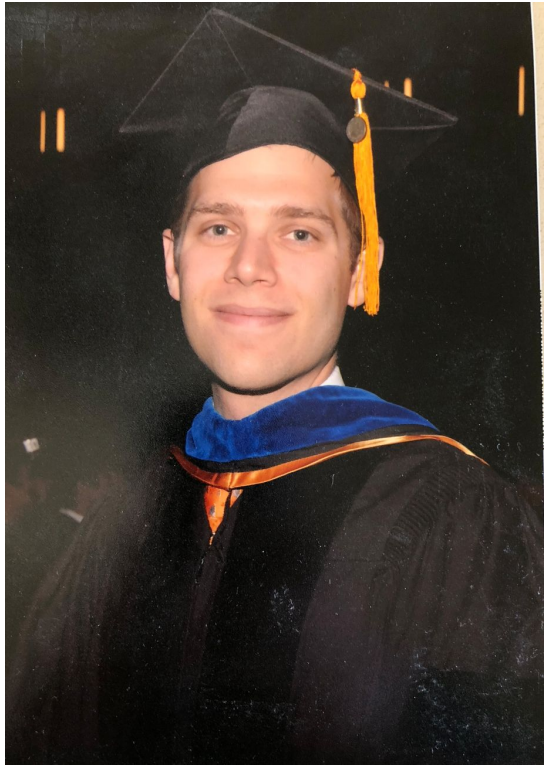


Outline

- Why is medicine relevant to production engineering / SRE / Dev-Ops?
- Reducing incidents
- Dealing with being oncall
- Words of warning

About me

- No medical background
  - Shopify is an e-commerce company
- I do have PhD



My Inspiration

- I’m married to a doctor
  - General surgery intern
  - 1st year or post-medical school training
  - Intern year == pgy-1 == residency
- She also carries a pager
- I’ve got a great second hand view



Reducing Incidents

Reducing critical incidents

- Stop them before they become critical
- Rapid Response Team
  - Decreased ICU deaths by 12%
- Anyone can page the rapid response team
  - Have criteria for when you should page as well
  - There are no negative repercussions



Dashboards with instructions

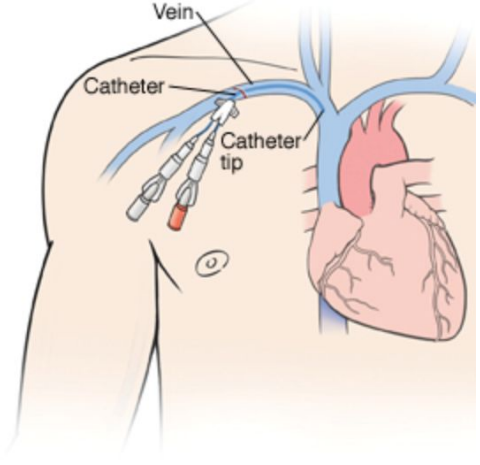


Reducing self-inflicted incidents

- Right command, wrong server?
- Easy to forget steps in routine activity
- Makes all-or-none processes error prone

Central Line

- All of the materials you *might* need
- Has a checklist





Checklists

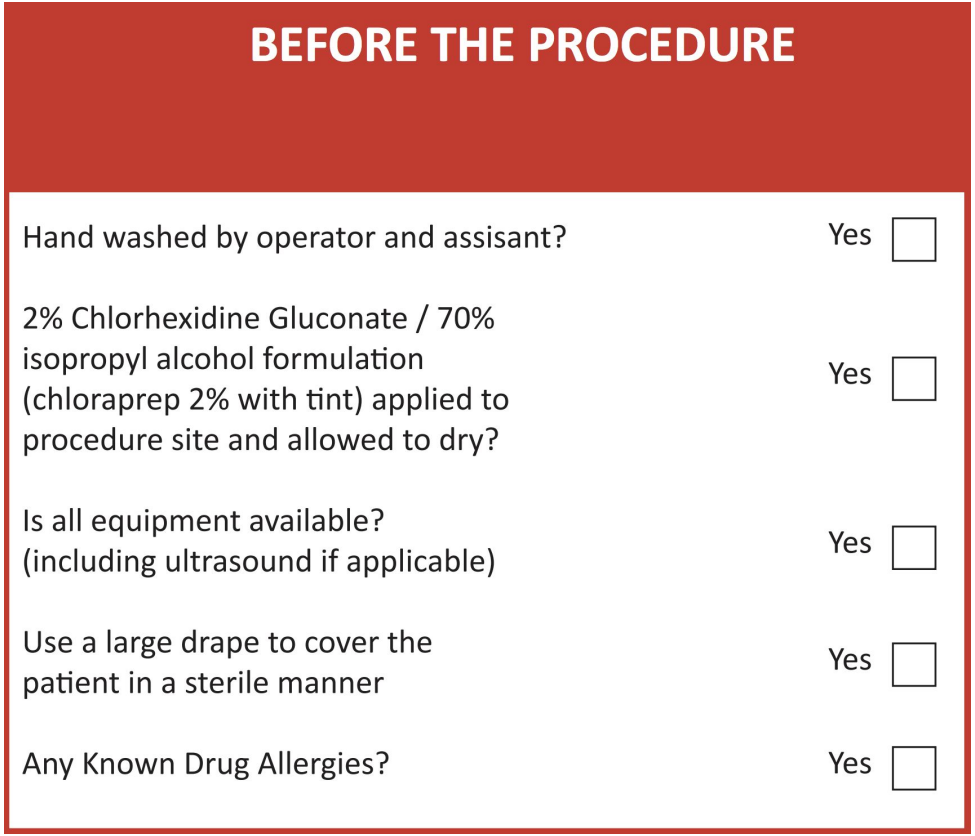
- Not an instruction manual

BEFORE THE PROCEDURE

Hand washed by operator and assisant?	Yes ☐
2% Chlorhexidine Gluconate / 70% isopropyl alcohol formulation (chloraprep 2% with tint) applied to procedure site and allowed to dry?	Yes ☐
Is all equipment available? (including ultrasound if applicable)	Yes ☐
Use a large drape to cover the patient in a sterile manner	Yes ☐
Any Known Drug Allergies?	Yes ☐

Checklists

- Not an instruction manual
- 5 step dropped infection rate from 11% to 0%
  - Prevented 8 deaths over 16 months in 1 hospital
  - Nurses, not doctors, enforce the checklist
- Medicine can't automate problems away



Server Maintenance Checklist

- I am holding the relevant pagers
- I know how to abort

- I’m logged into the correct host
- Host isn’t serving requests

- Success confirmed
- Unexpected events documented

Prepare for uncommon cases

- Vial of lidocaine is ~$10
- Kit ~$130
- 72% had placement while unconscious



Prepare for uncommon cases

- Vial of lidocaine is ~$10
- Kit ~$130
- 72% had placement while unconscious
- You'd never run out of soap…
- Correctness vs. Efficiency
  - Backups
  - Replication factor
  - Error Budgets



Oncall hand-offs

I	Illness Severity	• Stable, "watcher," unstable
P	Patient Summary	• Summary statement • Events leading up to admission • Hospital course • Ongoing assessment • Plan
A	Action List	• To do list • Time line and ownership
S	Situation Awareness and Contingency Planning	• Know what's going on • Plan for what might happen
S	Synthesis by Receiver	• Receiver summarizes what was heard • Asks questions • Restates key action/to do items

Oncall hand-offs

- Prevent unexpected events that were anticipatable
- I-PASS
  - Helped in 66% sites
- Problem classes:
  - Simple, complex, and complicated
  - Checklists won't help you with complicated

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Oncall hand-offs

For each active or likely to reoccur issue:

- Severity
- Summary
  - What's been done
- Action List
  - What's in progress
  - What needs to be done
- Contingency planning
  - What to do if it comes back
- Active Listening
  - Receiver summarizes information above

Dealing with being oncall

So you got paged

- Doctors are individually responsible for a patient
  - Ever wonder why you have to repeat your history or issue every time?
  - The other person said “x” isn’t an excuse
  - Catches mistakes or misinterpretations
  - Also a trip-wire
- Trust but verify
  - Ask to the data not just the conclusion

Getting help

- Escalation chain
  - Nurse -> intern -> sr. resident -> Attending physician -> department chair -> Chief medical officer
  - What would it take for you to page a C level position in the middle of the night?

Work-life balance

- Post call days
  - Acknowledge that after being oncall rest is needed
  - Depends on pager load
- Cross-coverage
  - Requires the ability to escalate, can prevent pages in the middle of the night
- Sometimes the easy solution or even stalling till the rest of the team wakes up
  - Can you temporarily through resources at a problem?
  - Nothing to be ashamed of

Words of Warning

Thinking like a doctor

- The problem with being on-call every other night is you ____ ?
  - Have no social life
  - Miss half the good cases
  - Are sleep deprived
  - Will gain weight

Thinking like a doctor

- The problem with being on-call every other night is you ____ ?
  - Have no social life
  - **Miss half the good cases**
  - Are sleep deprived
  - Will gain weight

- Being oncall is a great way to learn
- It’s also a great way to burn out
- If call is too onerous people will change jobs, even take pay cut
  - 20% of median neurosurgeon’s compensation is for being on-call
  - High because many refused to take call for less

Summary

- Establish procedures to help oncalls
- Question everything when you get paged
- Acknowledge being oncall is stressful

Shopify Talks @ SRECon



Know Your Kubernetes Deploys
Felix Glaser, Infrastructure Security
Thursday, 09:55–10:30, Track 2



What Medicine Can Teach Us about Being On-Call
Daniel Turner, Production Engineering
Friday, 12:15–12:40, Track 1



Keep Building Fresh: Shopify's Journey to Kubernetes
Niko Kurtti, Production Engineering
Friday, 14:00–14:50, Track 2

shopify

Citations

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Questions