# Association Between Perceived EHR Usability and Professional Burnout Among US Physicians

Edward R. Melnick, MD, MHS; Liselotte N. Dyrbye, MD, MHPE;
Christine A. Sinsky, MD; Mickey Trockel, MD, PhD; Colin P. West, MD, PhD;
Laurence Nedelec, PhD; Michael A. Tutty, PhD; and Tait Shanafelt, MD

## HL7 Reducing Clinician Burden Project

David Schlossman, MD and Gary Dickinson, FHL7, Co-Facilitators

11-18-2019

# EHRs' Unfulfilled Promises

- Decreased efficiency: EHRs add 1-2 hours to the average MD workday
- Disconnect from patients: providers spending 50% or more of their time in the EHR
- Disruption of clinician work-life balance and an epidemic of burnout
- Modest improvement in care process metrics and guideline adherence
- <u>No</u> significant change in large scale health outcomes
- Annual US healthcare expenditures increased from $2 trillion in 2005 to over $3.5 trillion in 2017

# Why Do So Many Promises Remain Unfulfilled?



- Poor usability and poor support for clinical workflow are major factors—*possibly the most important factors*—preventing health IT from achieving its goals
- Suboptimal human factors engineering and a challenging user experience have a strong, often direct connection to decreased clinical productivity, increased cognitive load, increased error rates, increased user fatigue, and decreased user satisfaction—i.e. a connection to clinician burden

# Physician Burnout

Burnout is a syndrome characterized by

- Emotional exhaustion
- Feelings of cynicism and detachment from work
- Sense of low personal accomplishment

- 54-68% of US physicians report at least one symptom of burnout (twice the rate of the general population)
- 70 % of US physicians report symptoms of health IT-related stress
- 53% of self-reported physician stress and burnout is correlated with EHRs and clinical process design highly impacted by EHRs

1. Gardner, RL et al. (2019) Physician stress and burnout: the impact of health IT. *JAMIA 26*(2): 106-114.
2. Kroth, PJ et al. (2019) Association of EHR design and use factors with clinician stress and burnout. JAMA Network Open 2(8):e199609

# The Association Between Perceived Electronic Health Record Usability and Professional Burnout Among US Physicians

Edward R. Melnick, MD, MHS; Liselotte N. Dyrbye, MD, MHPE;
Christine A. Sinsky, MD; Mickey Trockel, MD, PhD; Colin P. West, MD, PhD;
Laurence Nedelec, PhD; Michael A. Tutty, PhD; and Tait Shanafelt, MD

Yale University School of Medicine, Mayo Clinic, AMA

*Mayo Clinic Proceedings* published online ahead of print

# Cross Sectional Survey of US Physicians from All Specialty Disciplines

- 30,456 invited physicians from AMA Physician Masterfile

- 5197 (17.1%) completed the survey

- A random 25% of responders received a usability subsurvey

- 870 (69.6%) completed it

- Extensive controls applied to confirm sample was representative at all stages

# Participants

| Characteristic | EHR Usability Subsurvey Responders (N=870) | Full Survey Responders (N=5445) | All US Physicians, 2017 (N=890,083) |
|---|---|---|---|
| **Sex** | | | |
| Male, n (%) | 509 (58.5) | 2907 (55.1) | 577,339 (64.9) |
| Female, n (%) | 353 (40.6) | 1785 (33.8) | 311,776 (35.0) |
| Other, n (%) | 1 (0.1) | 13 (0.2) | NA |
| Missing, n (%) | 7 (0.8) | 571 (10.8) | 968 (0.0) |
| **Age (y)** | | | |
| Median (IQR) | 53 (42-61) | 53 (42-62) | 52 |
| <35, n (%) | 66 (7.4) | 305 (5.7) | 80,780 (9.1) |
| 35-44, n (%) | 206 (23.7) | 1117 (21.2) | 224,341 (25.2) |
| 45-54, n (%) | 184 (21.1) | 1095 (20.8) | 227,421 (25.6) |
| 55-64, n (%) | 264 (30.3) | 1343 (25.5) | 221,199 (24.9) |
| ≥65, n (%) | 130 (14.9) | 799 (15.1) | 135,596 (15.2) |
| Missing, n (%) | 22 (2.5) | 619 (11.7) | 746 (0.1) |
| **Primary care** | | | |
| Yes | 222 (25.5) | 1243 (23.6) | 349,597 (39.3) |
| No | 647 (74.4) | 3973 (75.3) | 540,486 (60.7) |
| Missing | 1 (0.1) | 60 (1.1) | — |

TABLE. Demographic Characteristics of Survey Responders and All US Physicians

# System Usability Scale

*Think about the current electronic health record (EHR) you use most and indicate your response to the following statements.*
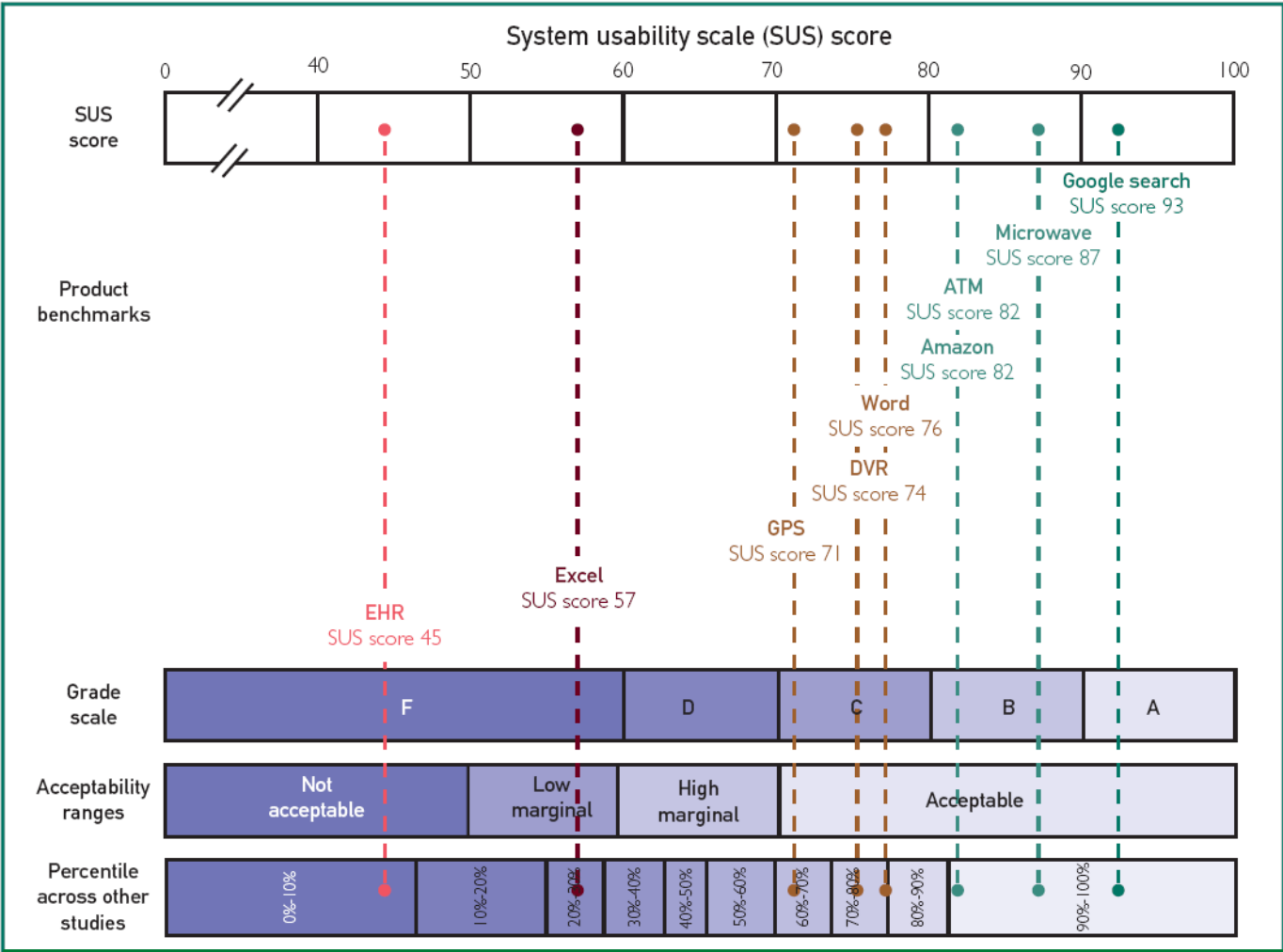
| Strongly Disagree | | | | Strongly Agree |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

1. I like to use my EHR.

2. I find my EHR unnecessarily complex.

3. I think my EHR is easy to use.

4. I think that I would need the support of technical personnel to use my EHR better.

5. I find the various functions in my EHR are well integrated.

6. I think there is too much inconsistency in my EHR.

7. I would imagine that most people (in my specialty) would learn to use my EHR quickly.

8. I find my EHR very cumbersome to use.

9. I feel very confident using my EHR.

10. I needed to learn a lot of things before I could get going with my EHR.

System usability scale (SUS) score

SUS score

Product benchmarks

Google search
SUS score 93

Microwave
SUS score 87

ATM
SUS score 82

Amazon
SUS score 82

Word
SUS score 76

DVR
SUS score 74

GPS
SUS score 71

Excel
SUS score 57

EHR
SUS score 45

Grade scale: F  D  C  B  A

Acceptability ranges: Not acceptable  Low marginal  High marginal  Acceptable

Percentile across other studies: 0%-10%  10%-20%  20%-30%  30%-40%  40%-50%  50%-60%  60%-70%  70%-80%  80%-90%  90%-100%

# Maslach Burnout Inventory

- Leading measure of burnout

- Adapted and optimized for multiple professions

- Designed to assess three aspects of the burnout syndrome: Emotional Exhaustion, Depersonalization and Feeling of Low Personal Accomplishment

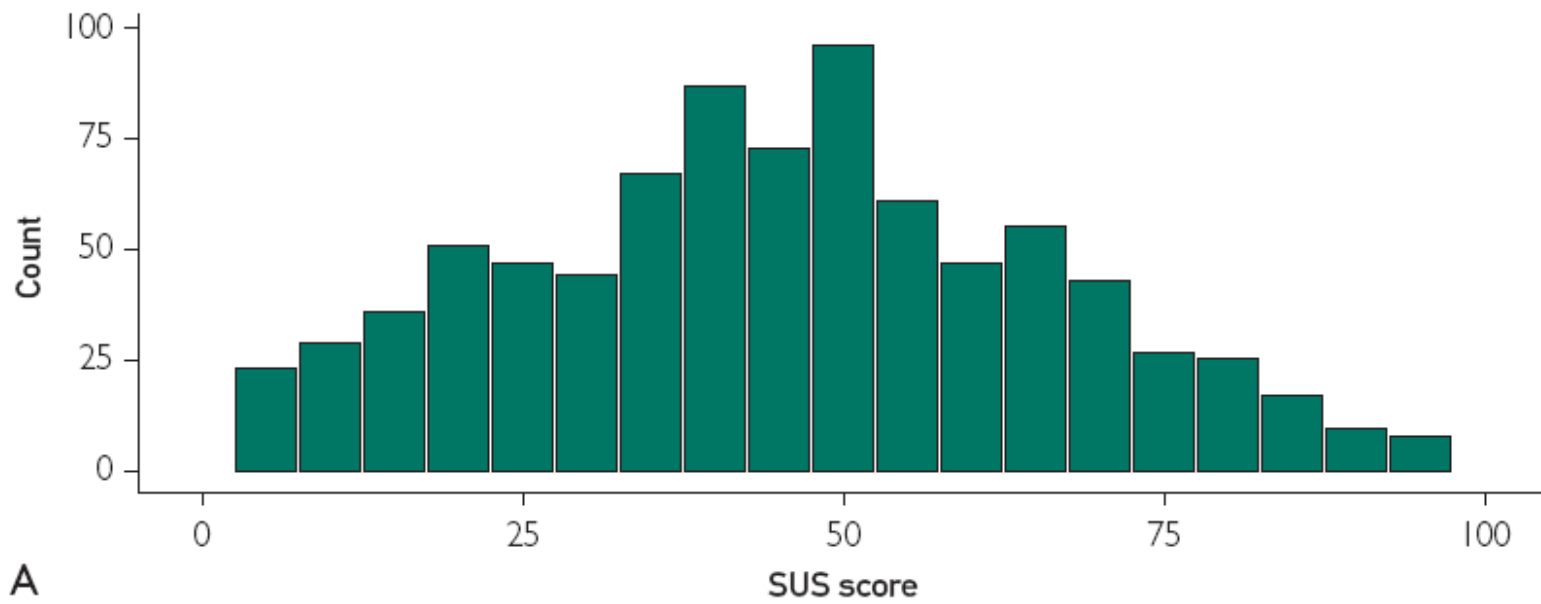# Examples of Questions

EE - "I feel burned out from my work"

DP - "I don't really care what happens to some recipients"

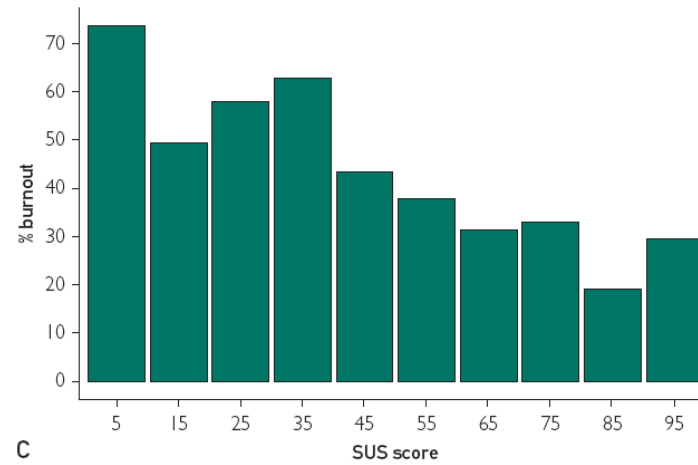PA - "I have accomplished many worthwhile things in this job"
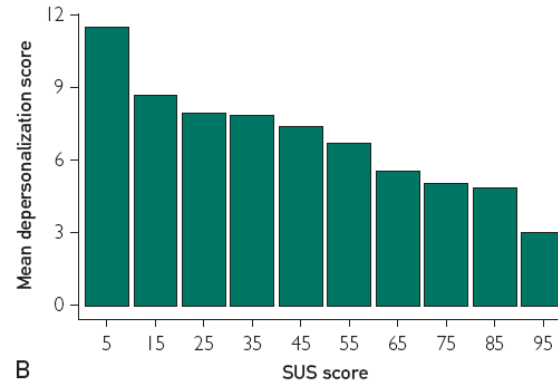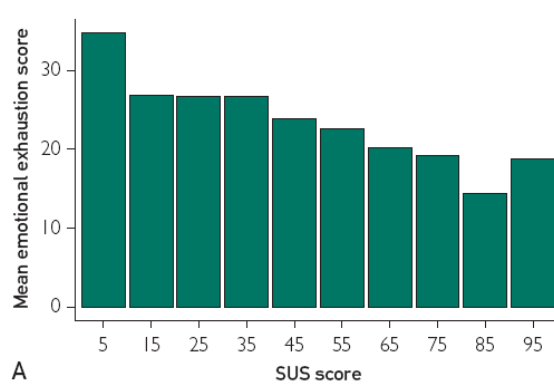
# Scale

- The frequency with which the respondent experiences feelings related to each subscale is assessed using a seven- point response format:
  - 0  Never
  - 1  A few times a year
  - 2  Once a month
  - 3  A few times a month
  - 4  Once a week
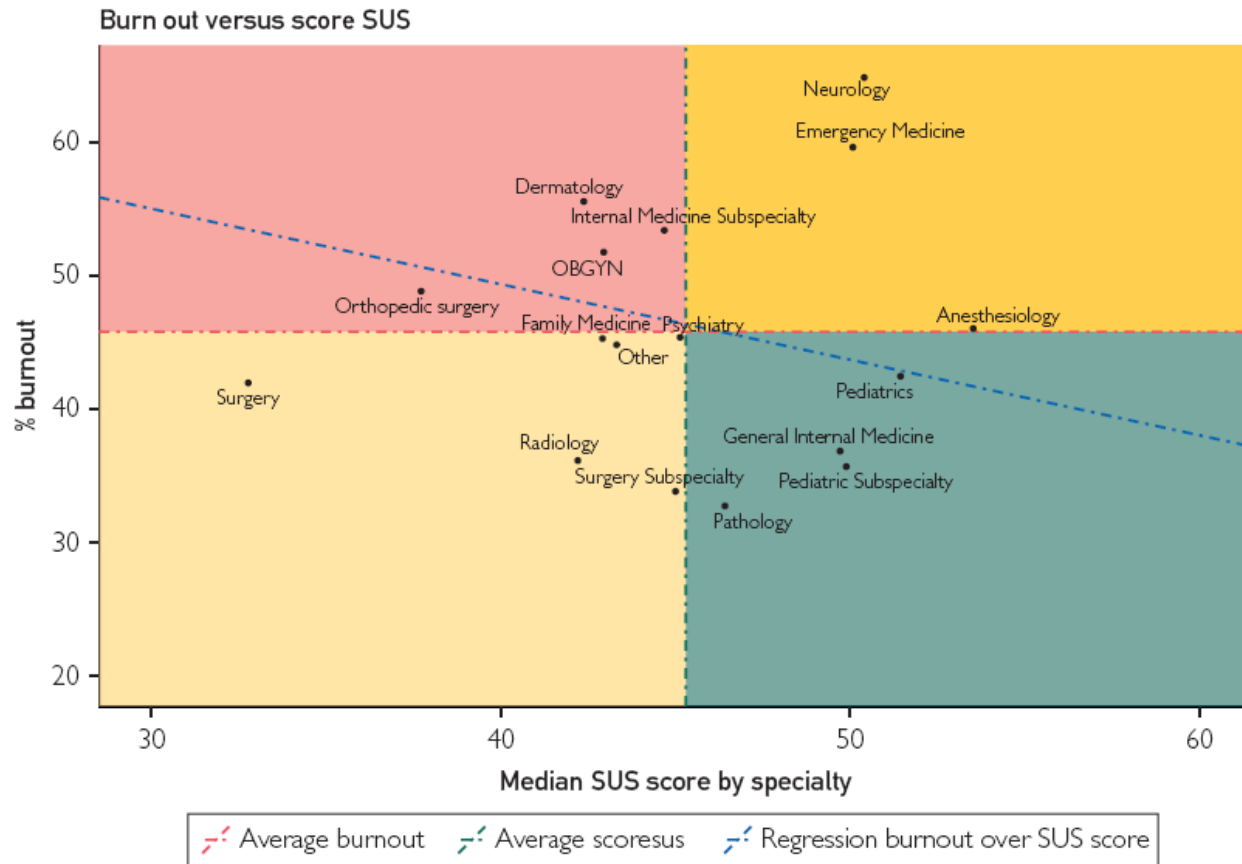  - 5  A few times a week
  - 6  Every Day

# SUS Scores



A

# Correlation of SUS and Burnout

# Burnout vs SUS Score Regression



Burn out versus score SUS

# Conclusions

- The usability of current EHR systems received a grade of F by a representative panel of physician users when evaluated by a well validated standardized metric of technology usability.

- A strong linear regression response relationship was observed between perceived EHR usability and odds of burnout.

# Comments and Questions