



Credit: George McCaa, U. S. Bureau of Mines



Credit: Bailey Mariner / Verywell

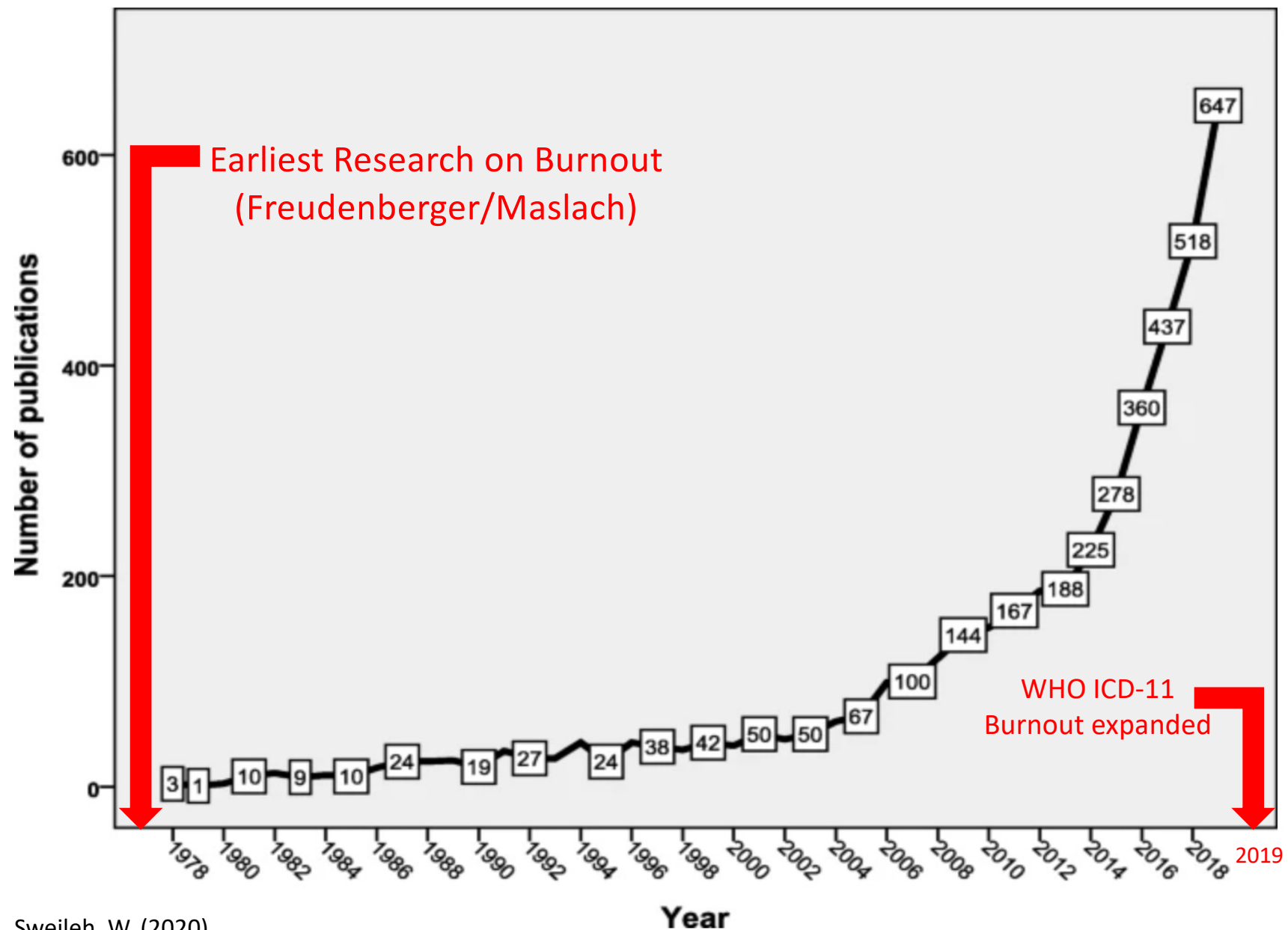


Deborah Schofield, Ph.D.
AAPM National Meeting, 2021

The Toll of the Job: Burnout and the Medical Physicist



Annual Publication Growth of Burnout and Compassion Fatigue Amongst Healthcare Workers

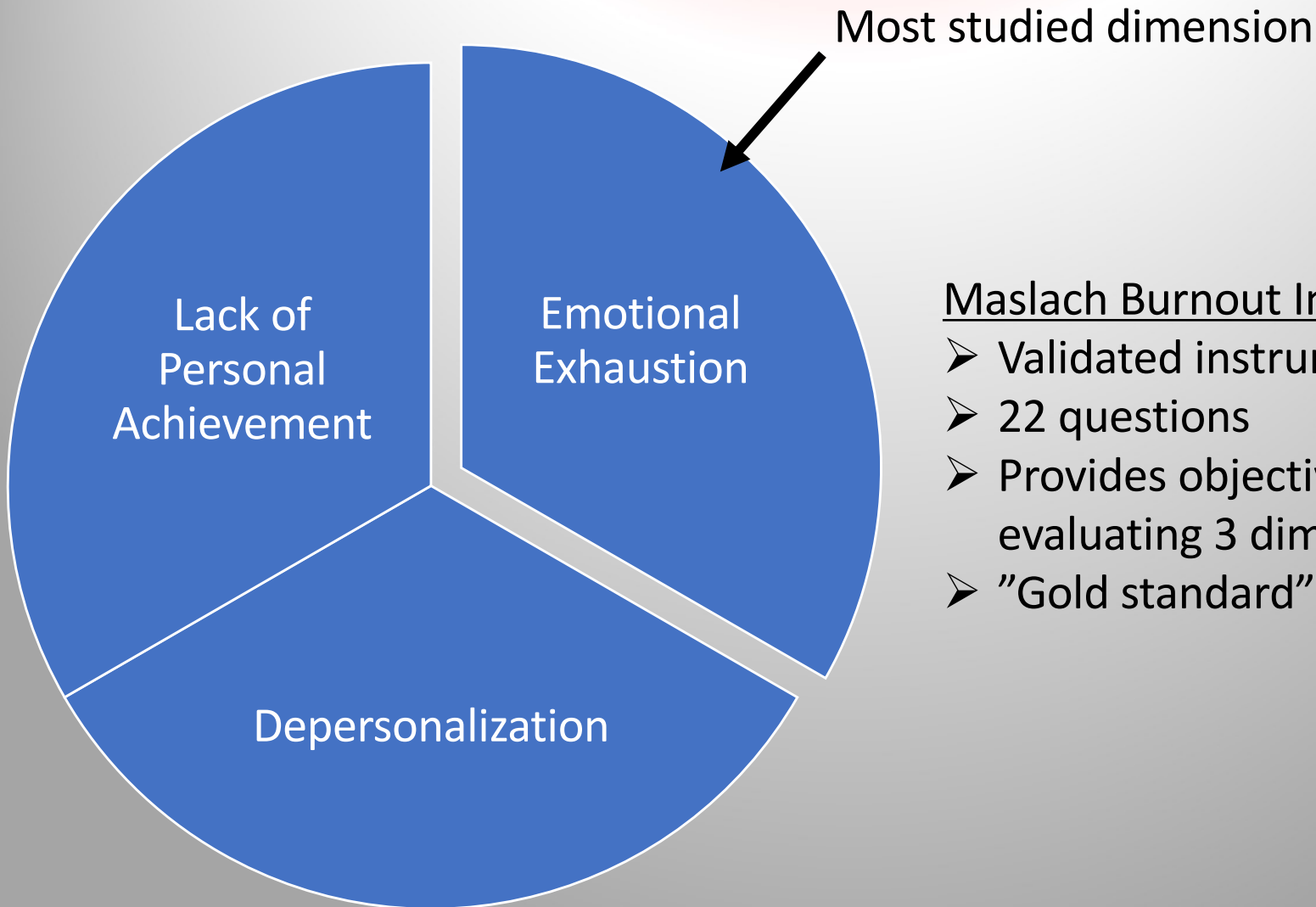


Sweileh, W. (2020)





What is Burnout?

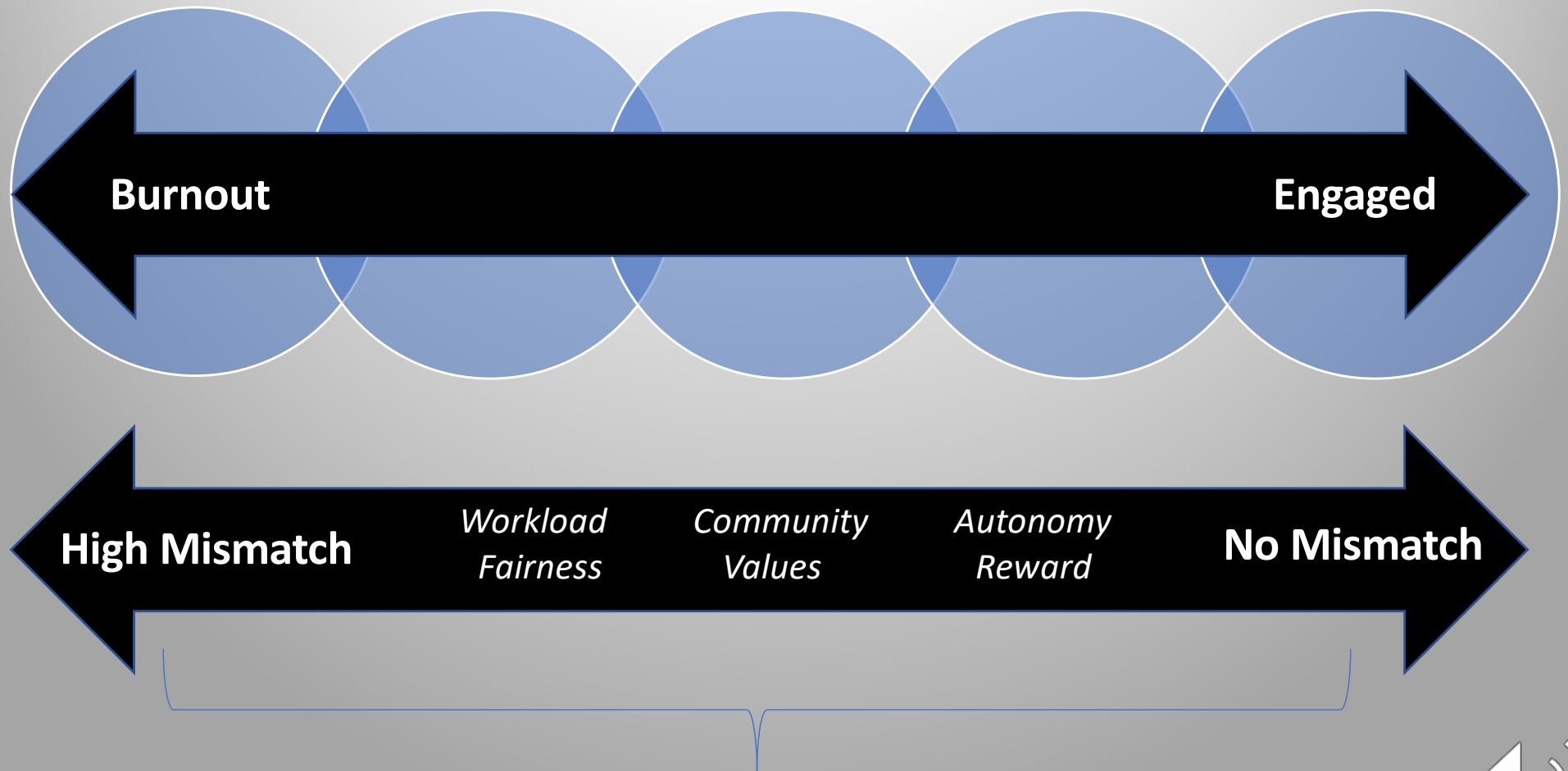


Maslach Burnout Inventory (MBI)

- Validated instrument
- 22 questions
- Provides objective means of evaluating 3 dimensions
- "Gold standard" in burnout research

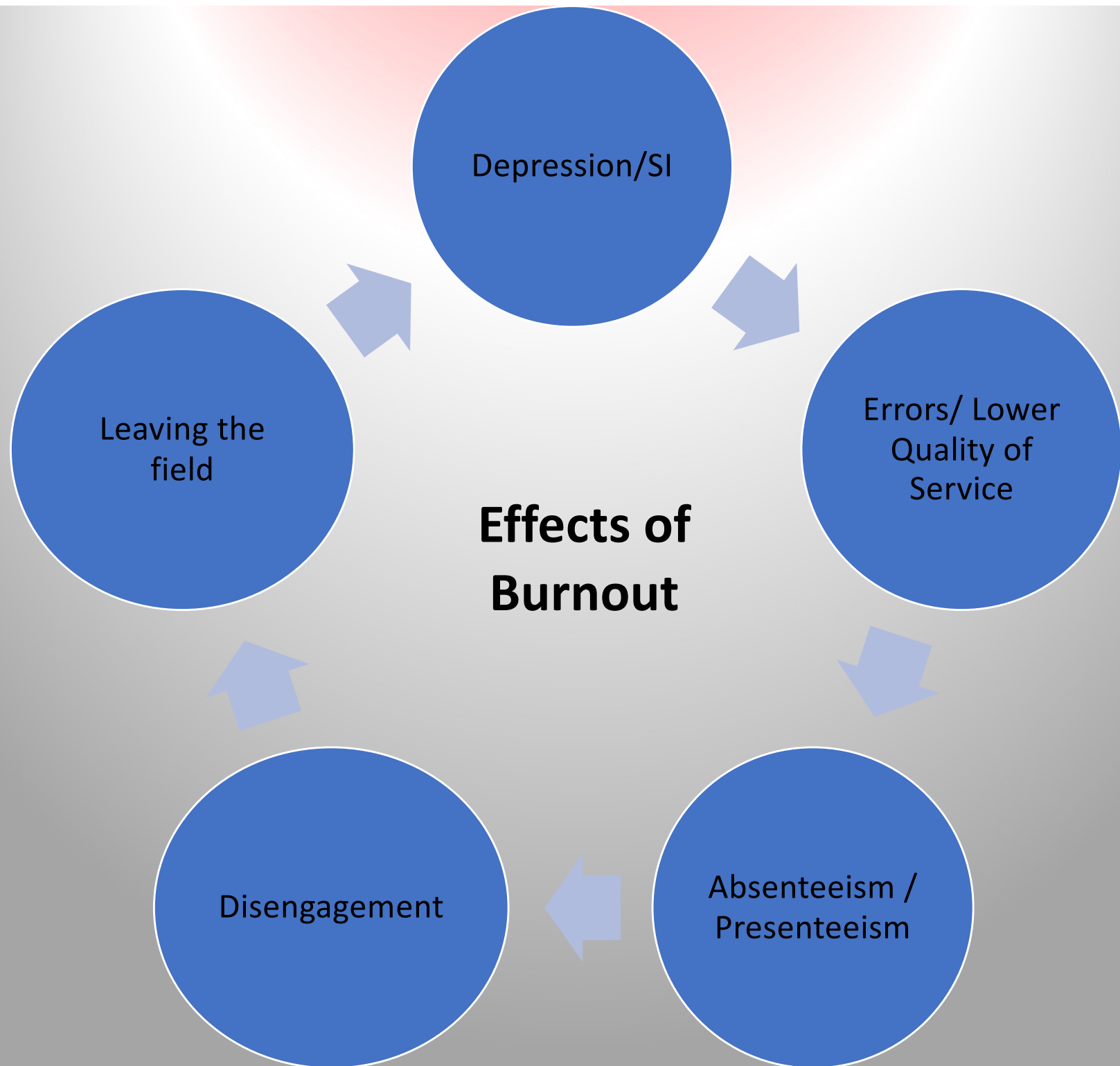


Multi-Dimensional Theory



One solution unlikely to fit all





Impact on the Provider

> [Arch Surg.](#) 2011 Jan;146(1):54-62. doi: 10.1001/archsurg.2010.292.

Special report: suicidal ideation among American surgeons

Tait D Shanafelt ¹, Charles M Balch, Lotte Dyrbye, Gerald Bechamps, Tom Russell, Daniel Satele, Teresa Rummans, Karen Swartz, Paul J Novotny, Jeff Sloan, Michael R Oreskovich

- 501 / 7,905 (6.3%) reported SI in the prior 12 months
- 1.5-3.0x SI rate for general population amongst surgeons 45+
- Large statistically significant relationship between SI & all 3 domains of burnout

[J Appl Clin Med Phys.](#) 2019 Sep; 20(9): 157-162.

Published online 2019 Jul 29. doi: [10.1002/acm2.12675](#)

PMCID: PMC6753865

PMID: [31355990](#)

Peer support: A needs assessment for social support from trained peers in response to stress among medical physicists

Jennifer Johnson, ¹ Eric Ford, ² James Yu, ³ Courtney Buckey, ⁴ Shannon Fogh, ⁵ and Suzanne B. Evans ³

- 4.1% (>1,000 respondents) reported SI
- ~2X SI rate for general population
- ★ ○ 71.1% of all respondents indicated experiencing some form of burnout*
- 32.8% of all respondents indicated frequent or constant burnout*

* Based on a single question

Impact on Patients

West et al., (2006): Used MBI to look at 3 scales of burnout and correlate with perceived errors in resident physicians

1 point increase of EE	➡	7% higher odds of error in next 3 mo
1 point increase of DP	➡	10% higher odds of error in next 3 mo

Shanafelt et al., (2015): Burnout & errors amongst American surgeons

Strongly associated with perceived errors:



- Burnout
- Depression

Not associated with perceived errors:

- Work hours
- Practice Setting
- Nights on call

Those around us (including patients) KNOW

Maslach & Jackson, (1981).

- Subset of staff were administered the MBI
- A behavioral evaluation of a designated co-worker was conducted
- Good agreement between co-worker evaluation and EE score ($r=0.41$, $p<0.01$) and DP ($r=0.57$, $p<0.001$)

Radiologist Burnout According to Surveyed Radiology Practice Leaders

Jay R. Parikh MD, Darcy Wolfman MD, Claire E. Bender MD and Elizabeth Arleo MD

77%: burnout amongst radiologists is a very significant or significant problem

Vahey et al., (2004): Patient satisfaction with nursing care

- Adjusted scores to account for age, severity of illness, race, & gender
- Patients perceived quality of care was negatively correlated with EE of the providers

Our Errors Can Have Significant Consequences...

25 women may have received faulty cancer treatment in Ontario: Ham

Therac-25: It's Neg

Scott Jerome Parks, NYT

Alexandra Jn-Charles, NYT

anager Lisa Nor

orce: Hackaday



Impact of the Workplace on Burnout

Shanafelt et al., (2015): Leadership score of the direct supervisor has a negative relationship with burnout amongst reports

De Simone et al. (2019), Awa et al. (2010): Long-term burnout reduction requires organizational changes such teamwork and reduced documentation burden for MD's

2016 American College of Radiology (ACR) Report: “The ACR Commission on human resources recommends that all radiology leaders and practices consider the following actions to address potential risk factors for radiologist burnout.”

- Adequate staffing & reduce night and weekend call
- Reduce prolonged stress
- Restore a sense of control & restore lifestyle balance
- Improve efficiency
- Develop reasonable financial expectations & goals
- Reduce isolation amongst radiologists

Burnout and Fairness



Mutual respect

Confirmation of self-worth

Builds a sense of community

What happens when there is a lack of fairness/just culture?

- Lose trust in the organization
- Leaders are viewed as untrustworthy – Distrust between management & staff
- Distrust amongst staff - teamwork breaks down
- Honest communication breaks down

What We Know

- Burnout is recognized by WHO
- Work environment, including the lack of a fair and just culture, can promote burnout
- High burnout in health care professionals
- Burnout can have negative effects on staff & patients
- Medical physicists have a clear role in error prevention and ensuring quality care

What do we know about burnout in medical physicists?

Not much.....

Burnout and Medical Physicists

Burnout research in MPs:

- 1) Medical Physicists included amongst other staff
- 2) Single question (often as an aside)
- 3) A single study on burnout in therapeutic MP's

[Di Tella et al., July 2020]

Study of burnout, empathy, & alexithymia	Didn't use the MBI or report burnout via 3 recognized dimensions
308 MPs across Europe	No data on country of origin, facility setting

30% of respondents scored high in burnout

We need to know more...

Aims of the Study

Determine

- Prevalence of burnout amongst medical physicists in the United States



Impact of

- Sub-specialty &
- Clinic type on the rate of burnout

Correlation
between
EE &

- Organizational features, work hours & reported errors amongst therapeutic medical physicists



Materials & Methods

Cross-sectional, correlational study

IRB cleared

Self-funded

Inclusion Criteria	Exclusion Criteria
single employer	Individuals in training (ex. Students, residents, fellows)
Full member of the AAPM (convenience sampling)*	Providing consulting services to multiple facilities simultaneously
Graduate education (MS/PhD)	Employed by a vendor
Based in US	

*AAPM Executive Committee Approved the Request to survey the membership

Instruments

Demographics

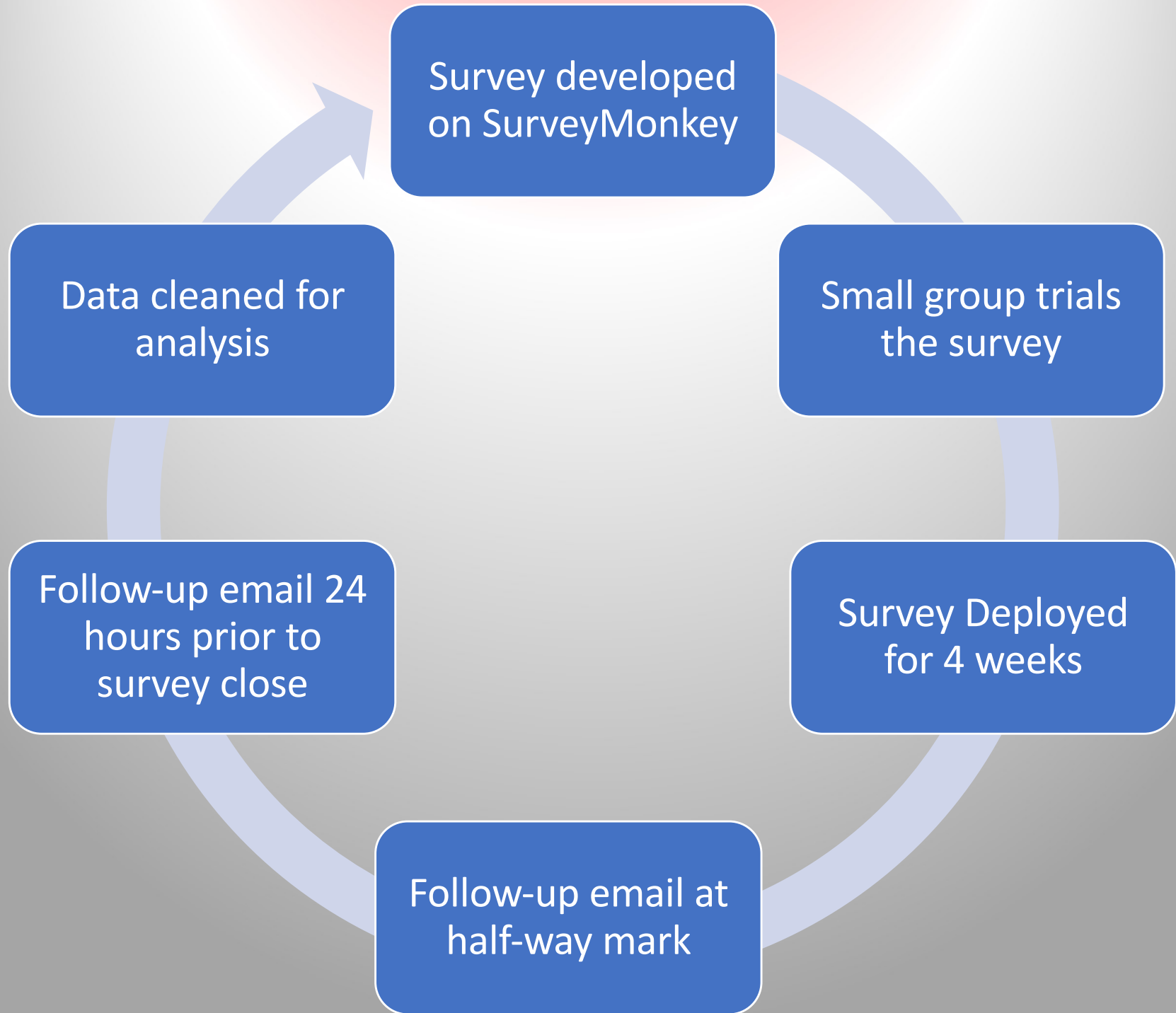
Time in field
Clinic Type
Sub-Specialty

MBI

22 items – Assess 3 burnout dimensions
Cronbach $\alpha > 0.70$

Organizational Survey

Based on AHRQ safety survey (v. 1) – scores on 5 dimensions
Cronbach α : 0.62-0.85 across all dimensions
Modified version used in multiple RO studies: Test/retest reliability



Participation

Invited:	1,962
Invalid Email:	34 (1.7%)
Opted Out:	63 (3.2%)
Unopened:	728 (37.1%)

Responses:	387 (20.1%*)
Demographics only:	40
Invalid practice locale:	3
Invalid role:	7
<hr/>	
Clean Data Set:	337

* Response rate relative to deliverable invitations

Demographics

	%	n		%	n
Practice type			Number of physicists in respondents' practice		
Academic affiliate	36.2	122	1	17.5	59
Community	33.5	113	2-3	29.1	98
Government	3.0	10	4-5	11.9	40
Free-standing	11.6	39	6-10	19.3	65
Consulting	13.1	44	11-20	10.4	35
Other	2.7	9	>20	11.9	40
Years of post-graduate experience*			Primary specialization*		
0-2	3.0	10	Therapy	72.1	243
3-5	4.7	16	Diagnostic	22.0	74
6-10	1.2	4	Health Physics/RSO	1.8	6
11-15	1.2	4	Nuclear Medicine	3.0	10
16-20	15.1	51	Other	0.9	3
21+	74.5	251			
Impact of Covid-19 on job-related feelings			Percentage of life spent in North America*		
None	20.2	68	<25%	1.5	5
Very mild	18.7	63	25% - 50%	3.3	11
Mild	25.8	87	51% - 75%	12.8	43
Moderate	25.8	87	>75%	82.2	277
Significant	9.5	32			

External Validity

AAPM Membership Data

Primary specialization*	%	n
Therapy	72.1	243
Diagnostic	22.0	74
Health Physics/RSO	1.8	6
Nuclear Medicine	3.0	10
Other	0.9	3

What 1770 others said...

	ACADEMIC	COMMUNITY PRACTICE	TOTAL
IMAGING	17.34%	12.43%	29.77%
THERAPY	31.75%	38.47%	70.23%
TOTAL	49.10%	50.90%	

AAPM TG-275 Survey Data - Therapy

Practice type	%	n
Academic affiliate	36.2	122
Community	33.5	113
Government	3.0	10
Free-standing	11.6	39
Consulting	13.1	44
Other	2.7	9

Practice type	%
Academic affiliate	31
Community	39
Government	7
Free-standing	19

MP Burnout Levels via Cut Scores

Medical Physicists				RO Academic Chairs*
	Cut score thresholds	n	%	%
Emotional exhaustion				
High	27+	160	50.8	25
Moderate	17-26	102	32.4	39
Low	0-16	53	16.8	36
Depersonalization				
High	13+	66	20.5	10
Moderate	7-12	153	47.5	18
Low	0-6	103	32	72
Personal achievement				
High	39+	260	83.3	52
Moderate	32-38	42	13.5	33
Low	0-31	10	3.2	15

83.2 % vs 64%

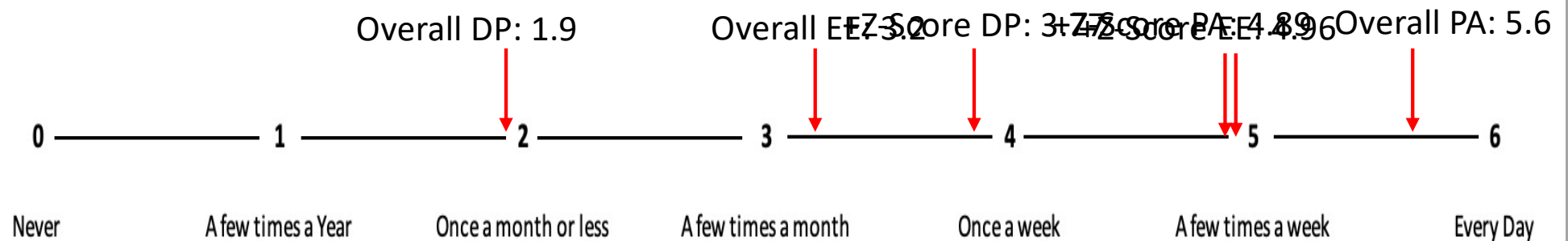
68 % vs 28%

96.8% vs 85%

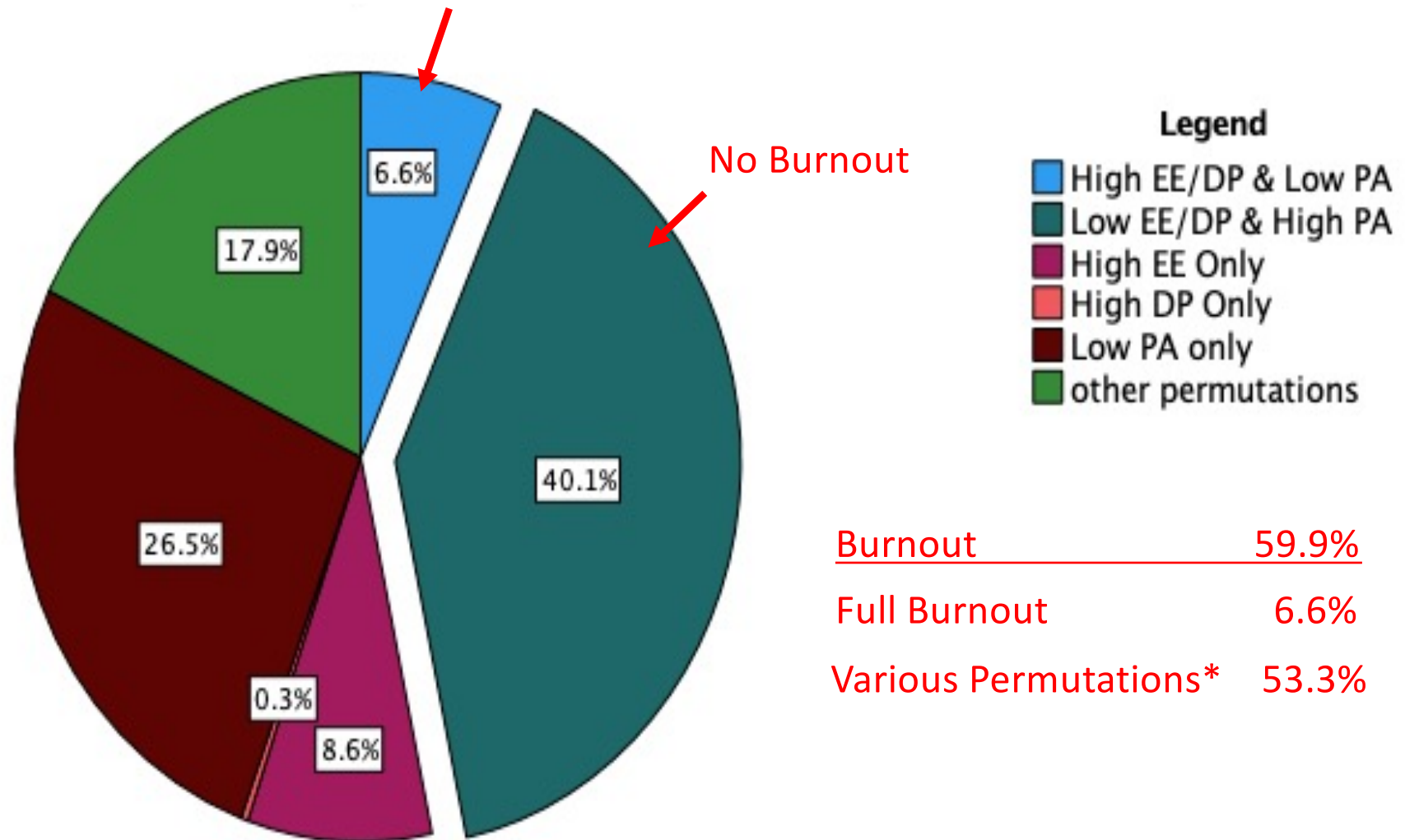
* Kusano et al., 2014

MP Burnout Levels via Z-Scores

	EE	DP	PA
Z-Score threshold	3.89	3.02	5.73
Respondents with a positive z-score	30.1% (n=95)	12.4% (n=40)	46.5% (n=145)
Mean domain score for participants with positive z-scores	4.96	3.77	4.89



Permutations of Burnout Amongst Medical Physicists (Z-Score)



EE and Organizational Features

Open Communication and Punitive Concerns (10 questions)

I'd be more likely to report errors/near misses if it were anonymous	-
Staff feel free to question decisions/actions of those with more authority	+

Experimental Cronbach $\alpha = 0.89$

$$r = -0.34, p < 0.001$$

Significant Moderate Negative Relationship

Explains 12% of observed variation of EE

Teamwork and Staffing (9 questions)

We have enough staff to handle the workload	+
Staff in this unit work longer than is best for patient care	-

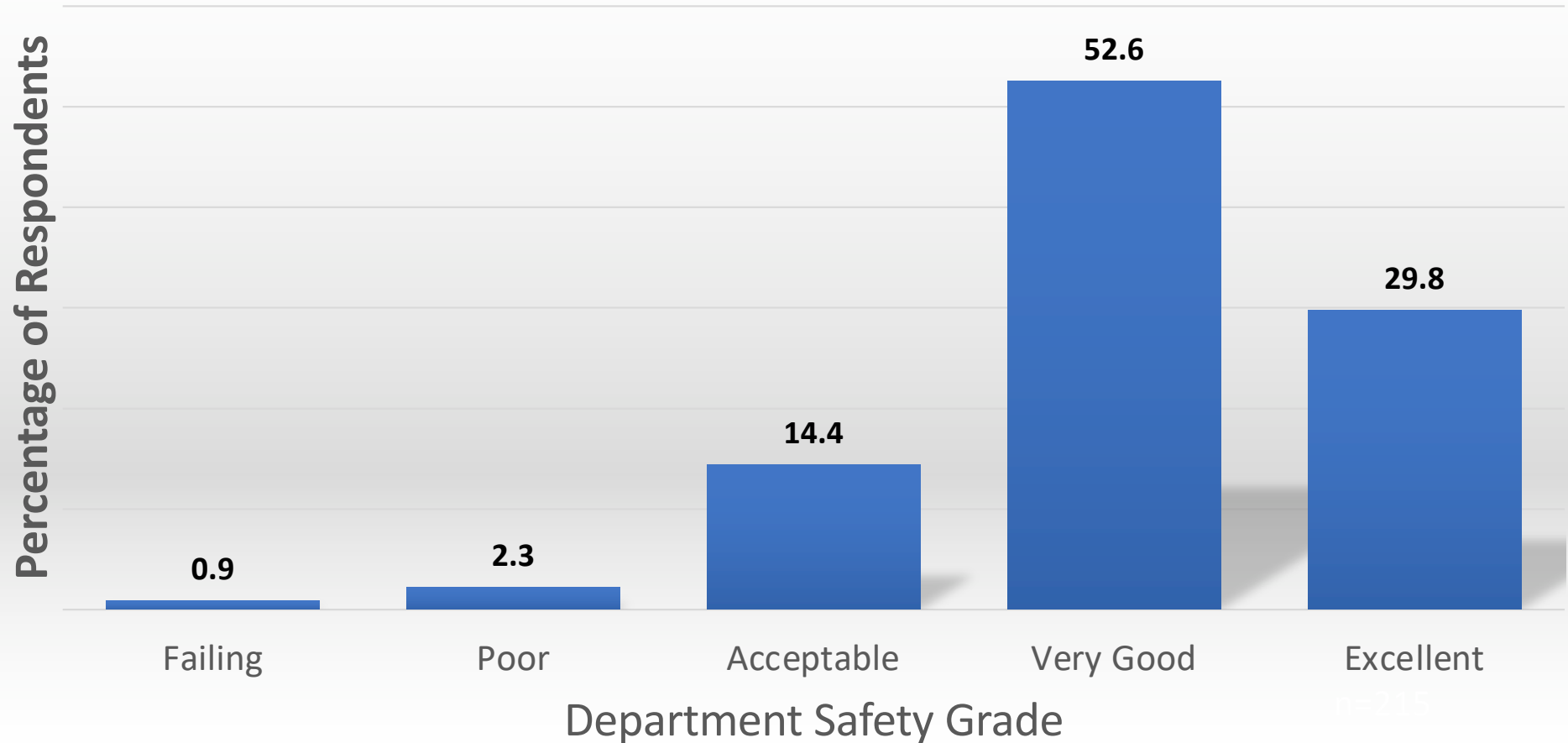
Experimental Cronbach $\alpha = 0.82$

$$r = -0.61, p < 0.001$$

Significant Moderate-Strong Negative Relationship

Explains 37.2% of observed variation of EE

Reported Department Safety Grade Therapy Medical Physicists

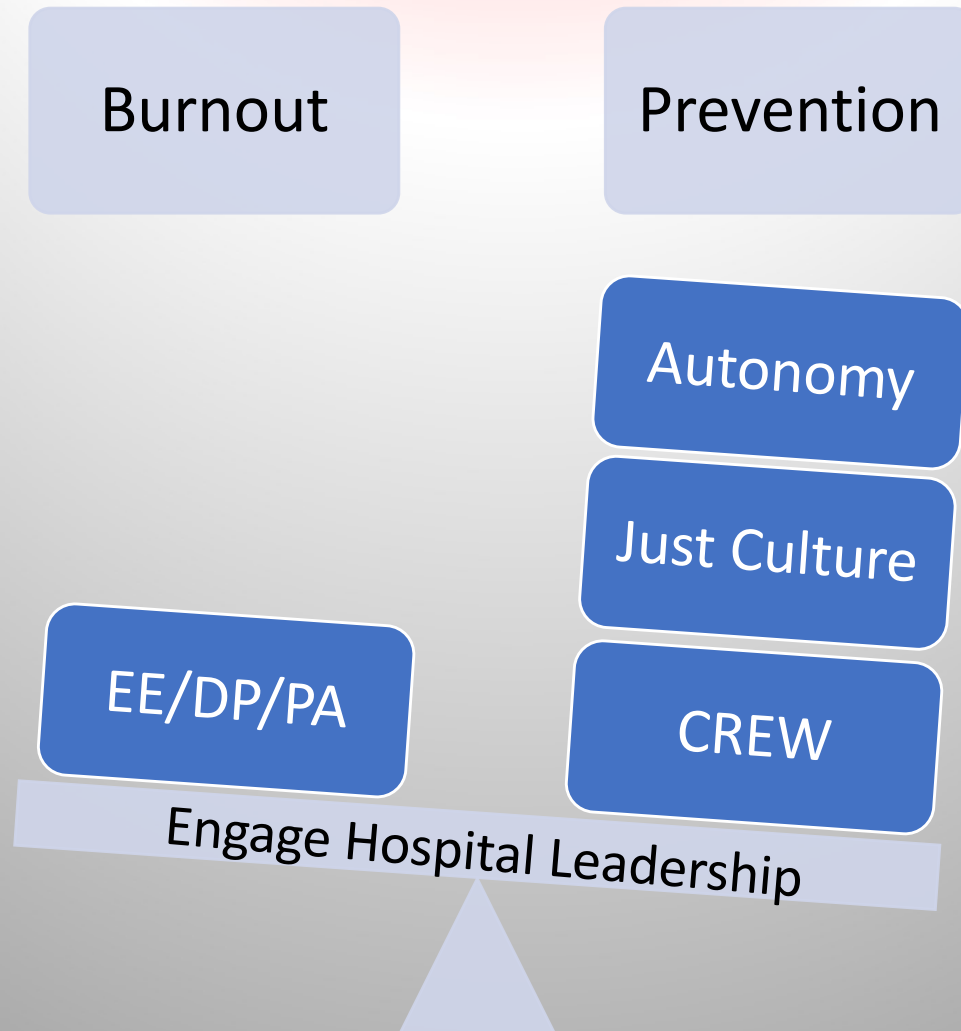


Relationship: EE and Department Safety Grade

Mild Negative Relationship: $\tau_b = -0.20$, $p < 0.001^*$

* Kendall's tau-b, n=205

Implications for Practice



How does the work environment factor into our decisions when interviewing/accepting job offers?

Limitation and Delimitations



Lack of causation
Convenience sampling
Oversampling Larger
Clinics



Excluded groups
Single Time point

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AAPM Executive Committee

AAPM Professional Council

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