This Document is Supplementary Material to the Eye Protection Evidence Review

Draft Healthcare Personnel Use of Eye Protection for Protection Against Respiratory Infections: A Systematic Review and Meta-Analysis [PDF – 31 Pages] https://www.cdc.gov/hicpac/pdf/HCP-EyeProtection-SLR-MainAppendix-2023-10-23-Draft-508.pdf

Author Year	Setting	Location	Category of AE	AE Name and Definition	Routine PPE n/N (%)	Eye protection n/N (%)	Measures of Association
						Goggles	
				Skin damage: Participants were asked		Rash: 22/93 (23.7%)	
				face-to-face or through telephonic		Itch: 16/93 (17.2%)	
	Multicenter; University			communication about skin damage		Xerosis (dry skin): 22/93 (23.7%)	
	hospital, postgraduate			such as rash, itch, dry skin, pressure		Pressure Injury: 40/93 (43.0%)	
	medical center, and			injury, urticaria, and erosions after PPE		Urticaria: 1/93 (1.1%)	
Ansari 2022	hospital	Pakistan	Physical	use.		Erosion: 11/93 (11.8%)	
						Fogging	
						Goggles: 32/35 (91.4%)	
						GFS: 11/35 (31.4%)	
						FS: 22/35 (62.9%)	
						Fear of dropping equipment on surgical	
						site	
				Adverse events, Particiannts colf			
				Adverse events: Particiapnts self-		Goggles: 5/35 (14.3%)	
				reported AE such as fogging, fear of		GFS: 10/35 (28.6%)	
				dropping equipment on surgical site,		FS: 18/35 (51.4%)	
				and fear of disruption of sterility due to		Fear of disruption of sterility due to	Fogging: p<0.001
				impact of the surgical team related to		impact of the surgical team	Fear of dropping equipment on surgical site:
	Training and research			the use of goggles (cycling eyeglasses),		Goggles: 8/35 (22.9%)	p=0.001
	hospital operating			goggle-type face shield (GFS), and face		GFS: 11/35 (31.4%)	Fear of disruption of sterility due to impact of the
AriciParlak 2022	room	Turkey	Job Impairment	shield (FS)		FS: 31/35 (88.6%)	surgical team: p<0.001
						Sweating/moisture:	
						Goggles: 22/35 (62.9%)	
						GFS: 8/35 (22.9%)	
						FS: 24/35 (68.6%)	
						Skin Injury:	
						Goggles: 10/35 (28.6%)	
						GFS: 1/35 (2.9%)	
						FS: 10/35 (28.6%)	
						Discomfort	
						Goggles: 28/35 (80.0%)	
						GFS: 16/35 (45.7%)	
						FS: 33/35 (94.3%)	
				Adverse events: Particiapnts self-		Need for adjustment	
				reported AE such as		Goggles: 20/35 (57.1%)	
				Sweating/moisture, skin injury,		GFS: 16/35 (45.7%)	
				discomfort, need for adjustment,		FS: 28/35 (80.0%)	Sweating/moisture: p<0.001
				feeling of restricted mobility related to		Feeling of restricted mobility	Skin injury: p=0.002
	Training and research			the use of goggles (cycling eyeglasses),		Goggles: 9/35 (25.7%)	Discomfort: p<0.001
	hospital operating			goggle-type face shield (GFS), and face		GFS: 5/35 (14.3%)	Need for adjustment: p=0.004
AriciParlak 2022	room	Turkov	Dhusical			FS: 32/35 (91.4%)	Feeling of restricted mobility: p<0.001
AriciPariak 2022	room	Turkey	Physical	shield (FS)		FS: 32/35 (91.4%)	Feeling of restricted mobility: p<0.001
				Fogging: Self-reported fogging with			
				goggle use that interferes to an extent			
				of limiting performance and efficacy			
		Pakistan,		preventing respondent from wearing			
Arif 2021	NR	Australia, India	Job Impairment	eye protection at all			Fogging: p<0.001
				Convenience: Defined as being able to		Face shields and goggles had comparable	
				proceed with the various clinical		low scores regarding convenience and	
				procedures without difficulty, in a state		clarity of various procedures while using	
		Egypt, US, UK,		of physical ease and freedom from pain		them. Face shields were the most	
	Ophthalmology eye	Iraq, Brazil,		or constraints during work was self-		abandoned PPE followed by protective	
Ashour 2022	clinic and OR	Morocco	Job Impairment	reported via anonymous web survey		goggles [38/70 (54.2%) vs. 32/70 (45.7%)]	
A3110UI 2022		WOIDEED	Job Impairment	reported via anonymous web survey		BUBBICS [30/10 (34.2%) VS. 32/10 (45.1%)]	1
	State and university			Sight problem: Solf reported problems		Sight problem:	Sight problem >4 hours us <4 hours (soft);
Atov 2020	State and university	Turkov	tala tanan ing si	Sight problem: Self-reported problems		Sight problem:	Sight problem, >4 hours vs. \leq 4 hours (ref):
Atay 2020	hospitals	Turkey	Job Impairment	with vision captured via questionnaire		147/267 (47.9%)	OR: 1.10 (95% CI: 0.69-1.73), p = 0.680

				Adverse events: Sweating, headaches,			Redness around eyes, >4 vs. ≤4 (ref):
				and redness around the eyes self-		Sweating/moisture: 117/267 (47.6%)	OR: 1.02 (95% CI: 0.72-1.43), p = 0.898
	State and university			reported via questionnaire after goggle		Redness around eyes: 67/267 (27.1%)	Headache, >4 vs. ≤ 4 (ref):
Atay 2020	hospitals	Turkey	Physical	and/or face shield use		Headache: 95/267 (38.0%)	OR: 1.51 (95% CI: 0.99-2.14), p = 0.043
Aldy 2020	nospitais	Turkey	PHYSICal	and/or face shield use		Headache. 53/207 (38.0%)	OK. 1.31 (33% Cl. 0.33-2.14), p = 0.043
				Adverse events: Fogging and visibility			
	Public medical			issues self-reported via questionnaire		Fogging: 63/83 (75.90%)	
Ayub 2022	university hospital	India	Job Impairment	after goggle and/or face shield use		Visibility issues: 32/83 (38.55%)	
1900 2022	aniversity nospital	india	sob impairment				
				Uncomfortable: Participants self-		Uncomfortable:	
	Public medical			reported the most uncomfortable type		Goggles: 33/83 (39.75%)	
Ayub 2022	university hospital	India	Physical	of PPE via guestionnaire		Face shields: 12/83 (14.45%)	
Ayub 2022	university nospital	India	ritysical	Visibility restriction: Self-reported via		Tace sineids. 12/05 (14.45/0)	
				questionnaire with visor and/or glasses			
Baklouti 2022	University hospital	Tunisia	Job Impairment	use		Visibility restriction: 93/NR (31%)	
20110011 2022				Adverse events: Discomfort, pain in		notemet reserverion. 35/ NR (51/0)	
1				pressure areas, facial and/or suborbital		Adverse events: 56/88 (63.6%)	
				friction or maceration, and visibility		Discomfort: 61/NR (20.3%)	
				restriction self-reported via		Pain in pressure areas: 38/NR (12.7%)	Adverse events:
1				questionnaire with visor and/or glasses		Facial and/or suborbital friction or	aOR: 1.84 (95% Cl: 1.1-3.37), p = 0.045
Baklouti 2022	University hospital	Tunisia	Physical	use	Adverse events: 87/212 (41%)	maceration: 62/NR (20.7%)	OR: 2.51 (95% CI: 1.1-3.37), p = 0.045 OR: 2.51 (95% CI: 1.50-4.2), p < 0.001
Bakiouti 2022		Turnsia	Filysical	use	Adverse events: 87/212 (41%)	Device-related pressure injury	OK. 2.31 (33% Cl. 1.30-4.2), p < 0.001
						Goggles: 70.5%	
						Face shield: 76.5%	
						Goggles with face shield: 81.5%	
						Coggres with face shield. 01.576	
						Pain	
				Adverse events: Device-related		Goggles: 93%	Device-related pressure injury: p = 0.05
	COVID-19 ICUs and			pressure injury and pain self-reported		Face shield: 90.6%	bevice related pressure injury. p = 0.05
Bambi 2021	high-dependency units	Italy	Physical	via questionnaire		Goggles with face shield: 95.4%	Pain: p = 0.36
5011151 2021	ingit dependency units	icary	i iiysicai			Makes it hard to do job	
						Strongly agree: 21.2%	
						Agree: 25.7%	
						Not sure: 18.4%	
						Disagree: 20.8%	
						Strongly disagree: 13.9%	
				Convenience: Participants self-reported		121 participants must wear glasses in	
				that protective goggles made it hard to		their daily life, and 70.2% of them	
				do their jobs and made it difficult to		reported that using protective glasses	
				wear their daily eyewear via		cause difficulty in using their daily	
CirisYildiz 2022	Pandemic hospitals	Turkey	Job Impairment	questionnaire		eyewear.	
		,			1	Discomfort	1
						Strongly agree: 22.2%	
						Agree: 31.6%	
						Not sure: 17%	
						Disagree: 14.1%	
						Strongly disagree: 15%	
				Discomfort: Participants self-reported		209/553 participants indicated they do	
				that protective goggles were		not prefer to use protective glasses due	

					1	I
				Anxiety: Self-reported via	Anxiety Total Score, median (IQR):	
1				questionnaire and measured on a	Use when necessary: 0.00 (3.00)	
				Likerty scale of 0-4 by the Coronavirus	Often use: 1.50 (4.00)	
				Anxiety Scale where a high score	Sometime use: 1.00 (7.00)	
Ergin 2021	Hospitals	Turkey	Psychological and emo	indicates high anxiety.	 Rarely use: 1.00 (6.00)	Anxiety Total Score: p = 0.094
				Physical comfort scale: Self-reported		
				and measured by the Nurse Comfort		
				Questionnaire which is scored on a 4-		
				point Likert scale ranging from 1	Physical Comfort Scale Total Score,	
				(strongly disagree) to 4 (strongly	median (IQR):	
				agree). Comfort increases when the	Use when necessary: 28.00 (11.00)	
				scale score increases.	Often use: 26.00 (12.00)	
					Sometime use: 25.00 (8.50)	
				Psycho-spiritual comfort scale: Self-	Rarely use: 25.00 (8.50)	
ł				reported and measured by the Nurse	Develop envirtual Comfact Cools Tate	
1				Comfort Questionnaire which is scored	Psycho-spiritual Comfort Scale Total	
1				on a 4-point Likert scale ranging from 1	Score, median (IQR):	
1				(strongly disagree) to 4 (strongly agree). Comfort increases when the	Use when necessary: 44.00 (9.50) Often use: 43.00 (9.00)	
				scale score increases.	Sometime use: 42.00 (6.00)	
				scale score increases.	Rarely use: 41.00 (12.00)	
				Socio-cultural comfort scale: Self-	narciy use. 41.00 (12.00)	
				reported and measured by the Nurse	Socio-cultural Comfort Scale Total Score,	Physical Comfort Scale Total Score: p = 0.061
				Comfort Questionnaire which is scored	median (IQR):	
				on a 4-point Likert scale ranging from 1	Use when necessary: 30.00 (12.50)	Psycho-spiritual Comfort Scale Total Score: p =
				(strongly disagree) to 4 (strongly	Often use: 29.50 (11.25)	0.650
				agree). Comfort increases when the	Sometime use: 28.00 (7.00)	
Ergin 2021	Hospitals	Turkey	Physical	scale score increases.	Rarely use: 28.00 (10.00)	Socio-cultural Comfort Scale Total Score: p = 0.096
				Headache: Headache was classified	New erset and change of the ovisting	
				according to the Internation	New onset and change of pre-existing headache	New onset and change of pre-existing headache: p
				Classification of Headache Disorders,	Goggles: 16/29 (55.2%)	= 0.001
				3rd edition and self-reported via	Face shield: 46/54 (85.2%)	Headache (face shield vs. eyewear non-users):
Farag 2022	Two hospitals	Egypt	Physical	questionnaire	None: 18/82 (22.0%)	aOR: 15.8 (95% CI: 1.63-23.7), p = 0.017
10105 2022		-8/61	i nysioui	Fogging: Eye protection fogging up		
				Difficulty using microscope:		
				Respondent reported difficulties using		
				the operating microscope while		
				wearing the visor/goggles		
				Removal to use microscope:		
				Respondent reported having to remove	Fogging: 62%	
				eye protection in order to use	Difficulty using microsope: 68%	
Finn 2021	Neurosurgery	UK	Job Impairment	microscope	Removal to use microscope: 82%	
l I					De novo headache stratified by duration	
ł					of wearing eye protection:	Do novo hoodacho stratified hu duration of
ł				Do novo hoodocho: Usadasha	<4 hours: 15/51 (29.4%)	De novo headache stratified by duration of
1				De novo headache: Headache	>4 hours: 36/104 (34.6%)	wearing eye protection: <4 hours vs. >4 hours: p = 0.58
1	1	1		generated by wearing eye protection that was never experienced before	Aggravated headache stratified by	>+ nouis vs. ≥4 nouis. p = 0.30
				-	duration of wearing eye protection:	Aggravated headache stratified by duration of
Į				Aggravated. Aggravation of pre-existing	adiation of wearing eye protection.	
	One tertiary care			Aggravated: Aggravation of pre-existing headache generated by wearing eve	<4 hours: 20/51 (39 2%)	
Hajjij 2020	One tertiary care university hospital	Morocco	Physical	headache generated by wearing eye	<4 hours: 20/51 (39.2%) >4 hours:25/104 (24.0%)	wearing eye protection:
Најјіј 2020	One tertiary care university hospital	Morocco	Physical		 <4 hours: 20/51 (39.2%) >4 hours:25/104 (24.0%)	
Hajjij 2020		Morocco	Physical	headache generated by wearing eye		wearing eye protection:
Hajjij 2020		Morocco	Physical	headache generated by wearing eye protection		wearing eye protection: <4 hours vs. >4 hours: p = 0.06
Hajjij 2020		Morocco	Physical	headache generated by wearing eye protection Dermatosis: Protective eyewear-related	>4 hours:25/104 (24.0%)	wearing eye protection: <4 hours vs. >4 hours: p = 0.06 Dermatosis stratified by duration of use:

	ICU of COVID-19					
Jose 2021	hospital	India	Job Impairment	Fogging: Fogging of goggle	Fogging: 91.7%	
J056 2021	поѕрна	IIIuia	Job impairment	Fogging: Fogging of goggle	Fogging: 91.7%	
				Dry eye symptoms: Questionnaire		
				based on OSDI where scores ≥13		
				indicate symptomatic dry eye, in which		
				13-22, 23-32, and 33-100 indicate mild,		Dry eye symtoms stratified by duration of wearing
		a :	N	moderate, and severe presence of dry		protective glasses (≥6 hours vs. 4-5 hours, ref):
Long 2020	University hospital	China	Physical	eye symptoms		OR: 0.145 (95% CI: 0.038 - 0.560), p < 0.05
	University hospitals,					
	regional hospitals,					
	private clinics,					
	rehabilitation centers,			Skin reactions: Reported after wearing	Skin reactions: 118/202 (58%)	Skin reactions stratified by duration (>2 hours vs.
	emergency medical			goggles, including pressure lesions and	Pressure lesion: 50%	<1, ref):
Marraha 2021	services, and others	Morocco	Physical	erythema	Erythema: 19%	OR: 1.7 (95%CI: 0.98-3.12), p = 0.05
	services, and others	NOTOCCO	ritysical	erythema	Li yulena. 1570	on. 1.7 (55%ci. 0.56-5.12), p = 0.05
				Discomfort: Inconvenience due to		
				discomfort with PPE self-reported via	Discomfort due to goggles: 69 (67.7%)	
Min 2021	Public hospital	South Korea	Physical	questionnaire	Discomfort due to face shield: 37 (36.3%)	
						Headache stratified by duration of protective
					Headache: 66/128 (51.6%)	eyewear use per day:
						OR: 1.60 (95% CI: 1.13 - 2.25), p < 0.001
					Time interval between donning protective	>4 hours: 109/125 (87.2%)
					eyewear to onset of headache was less	1-4 hours: 19/33 (57.6%)
					than 60 minutes for 113/128 (88.3%). The	
					attributed headache resolved	Headache stratified by frequency of protective
					spontaneously within 30 minutes after	eyewear use per month:
				Headache: de novo PPE-associated	removal of protective eyewear in 114/128	
	Tertiary referral			headache self-reported via	(89.1%) and within 60 minutes in 124/128	
Ong 2020	hospital	Singapore	Physical	questionnaire	(97.7%).	3-15 days: 32/47 (68.1%)
		0.1.1.1		Discomfort: Reason reported via		
	Operating rooms of			electronic questionnaire for not using		
Prakash 2020	tertiary care center	India	Physical	face shield	Discomfort: 33%	
			· ·			
				Poor visibility: Reason reported via		
				electronic quesitonnaire for not using		
				face shield		
	Operating rooms of			Fogging: Reason reported via electronic	Poor visibility: 36%	
Prakash 2020	tertiary care center	India	Job Impairment	questionnaire for not using face shield	Fogging: 33%	
		In dia Amani				
		India, America,				
		Bangladesh,				
		Brazil, Burundi,		Headache: Reported with use of eye	Headache: 49/220 (22.2%)	
		Barbados,		protection	Skin irritation: 9/220 (4.1%)	
		Colombia,		Skin irritation: Reported with use of		
	private institutes,	England, Italy,		eye protection	Comfort level of face shield: 80/220	
	NGO/trust hospitals,	Nepal, Spain,		Comfort level: Reported with use of	(36.3%)	
Singh 2021	nursing homes	Uganda, UK	Physical	eye protection	Comfort level of goggles: 84/220 (38.2%)	

		1	1			
					Fogging: 178/220 (80.9%)	
				Fogging: Reported with use of eye	Poor visibility: 122/220 (55.4%)	
		la dia Amanian		protection		
		India, America, Bangladesh,		Poor visibility: Reported with use of eye protection	Level of satisfaction with visibility: Very satisfied: 4/220 (1.8%)	
		Brazil, Burundi,		Level of satisfaction with visibility:	Satisfied: 54/220 (24.5%)	
		Barbados,		Respondents self-reported satisfaction	Dissatisfied: 119/220 (54.1%)	
	Government institutes,			with visibility after wearing eye	Very dissatisfied: 25/220 (11.4%)	
	private institutes,	England, Italy,		protection	very dissublica. 25/220 (11.4/6)	
		Nepal, Spain,		Convenience: Self-reported	Incompatible with loupes and glasses:	
Singh 2021	nursing homes	Uganda, UK	Job Impairment	incompatibility with loupes and glasses	31/220 (14.0%)	
				Discomfort: Reported via electronic	,	
				questionnaire		
	Surgical Oncology of			Headache: Reported via electronic	Discomfort: 6/342 (1.8%)	
Thiagarajan 2021	hospitals	India	Physical	questionnaire	Headache: 7%	
						Goggles and face shields associated with poor
						visibility (p < 0.001) and fogging (p = 0.017) when
						compared to use of routine prescription glasses or
						no glasses
					Very satisfied: 8/342 (2.3%) Satisfied: 68/342 (19.9%)	
				Poor visibility/fogging: Reported via		Factors that contributed to the inability to enjoy
				electronic questionnaire		surgery include poor visibility ($p = 0.04$), fogging (p
	Surgical Oncology of			Inability to enjoy surgery: Due to	Dissatisfied: 117/342 (34.2%)	= 0.174), lack of comfort ($p = 0.06$), incompatibility
Thiagarajan 2021	hospitals	India	Job Impairment	reoutine use of eye protection		with loupes ($p = 0.282$), and headaches ($p = 0.334$)
rinagarajan 2022	noopitalo	india	Job Impaintent			
						Factors that contributed to fatigue include poor
						visibility (p = 0.001), fogging (p = 0.139), lack of
						comfort (p = 0.05), incompatibility with loupes (p =
						0.34), and headaches (p < 0.001)
						Factors that contributed to stress include poor
						visibility (p = 0.028), fogging (p < 0.001), lack of
				Fatigue: Due to routine use of eye		comfort (p = 0.674), incompatibility with loupes (p
				protection		= 0.151), and headaches (p = 0.319)
	Surgical Oncology of			Stress: Due to routine use of eye		Stress due to fogging:
Thiagarajan 2021	hospitals	India	Psychological and em	protection		aOR: 3.61 (95% CI: 1.93-6.77), p < 0.001

Score	Color	Definition
1		Element is present in this study
NA	gray	Element is not applicable to this study design
0		Unclear if this element is present in this study
-1		Element is not present in this study

		AlMohajer 2021	Alraddadi 2016	Belan 2022	Bhaskar 2020	Burke 2020	Chatterjee 202	Chen 2009	Khalil 2020	Kumar 2020	Liu 2009	Park 2004
	OUTCOME	SARS-CoV-2	MERS-CoV	COVID-19	SARS-CoV-2	SARS-CoV-2	COVID-19	SARS	COVID-19	SARS-CoV-2	SARS	SARS
Domain	Signaling question											
	Design appropriate to research question											
	Well described population											
	Well described setting											
Study Elements	Well described intervention/ exposure											
	Well described control/ comparator											
	Well described outcome											
	Clear timeline of exposures/ interventions											
	and outcomes											
Selection Bias:	Randomization appropriately performed Allocation adequately concealed											
Sampling	Population sampling appropriate to study											
	design											
Calastian Di	Attrition not significantly different											
Selection Bias:	between groups											
Attrition	Attrition <10-15% of population											
	Attrition appropriately analyzed											
	Measure of intervention/ exposure is valid											
Information Bias:	Measure of outcome is valid											
Measurement and	Fidelity to intervention is measured											
Misclassification	Fidelity to intervention is valid											
	Prospective study											
	Adequately powered to detect result											
	Outcome assessor blinded											
	Study participant blinded											
	Investigator/ data analyst blinded											
Information Bias:	Data collection methods described in											
Performance &	sufficient detail											
Detection	Data collection methods appropriate											
	Sufficient follow up to detect outcome											
	Appropriate statistical analyses for											
Information Bias:	collected data Appropriate statistical analyses are											
Analytic	conducted correctly											
	Confidence interval is narrow											
	Potential confounders identified											
Confounding	Adjustment for confounders in study design phase											
	Adjustment for confounders in data											
	analysis phase All pre-specified outcomes are adequately											
Reporting Bias	reported											
Other Bias	No other sources of bias											
COI	Funding sources disclosed and no obvious											
COI	conflict of interest											

	Author Year	Ansari 2022	AriciParla k 2022	Arif 2021	Ashour 2022	Atay 2020	Ayub 2022	Baklouti 2022	Bambi 2021	CirisYildiz 2022	Ergin 2021	Farag 2022	Finn 2021	Hajjij 2020	Ho 2022	Jose 2021	Long 2020	Marraha 2021	Min 2021	Ong 2020	Prakash 2020	Singh 2021	Thiagaraj an 2021
Domain	Signaling question	2022	N LULL		2022		-022	2022	2021	2022	2021	-044	2021	2020	.10 2022	JJJC 2021	2020	2021	.4 2021	511 <u>6</u> 2020	2020	2021	511 2021
	Design appropriate to research																						
	question																						
	Well described population																						
	Well described setting																						
Study Elements	Well described intervention/																						
Study Elements	exposure Well described control/																						
	comparator																						
	Well described outcome																						
	Clear timeline of exposures/																						
	interventions and outcomes																						
	Randomization appropriately																						
	performed																						
Selection Bias: Sampling	Allocation adequately concealed																						
	Population sampling appropriate																						
	to study design																						
	Attrition not significantly different between groups																						
	sectore groups																						
Selection Bias: Attrition	Attrition <10-15% of population																						
	Attrition appropriately analyzed																						
	Measure of intervention/ exposure																						
	is valid																						
Information Bias:	Measure of outcome is valid Fidelity to intervention is																						
Measurement and	measured																						
Misclassification	Fidelity to intervention is valid																						
	Prospective study																						
	Adequately powered to detect result																						
	Outcome assessor blinded																						
	Study participant blinded																						
Information Bias:	Investigator/ data analyst blinded Data collection methods described																						
Performance & Detection																							
	Data collection methods																						
	appropriate Sufficient follow up to detect																						
	outcome																						
	Appropriate statistical analyses for collected data																						
Information Bias:																							
Analytic	Appropriate statistical analyses are																						
	conducted correctly Confidence interval is narrow																						
	comfuence interval IS fiditow																						
	Potential confounders identified																						
Confounding	Adjustment for confounders in study design phase																						
	Adjustment for confounders in data analysis phase																						
Reporting Bias	All pre-specified outcomes are																						
Other Bias	adequately reported No other sources of bias																						
	Funding sources disclosed and no																						
COI	obvious conflict of interest																						