Nuisances extérieures

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RESEARCH

OUTCOME RÉA

ihfb INSTITUT HOSPITALIER FRANCO-BRITANNIQUE

Au-delà du soin, vous comprendre

Réseau 92 Nord

Aucun conflit d’intérêt

Sources d'inconforts

Inconforts intrinsèques liés au patient et à sa pathologie

- Soif
- Douleurs liées à la ventilation mécanique, procédures thérapeutiques et diagnostiques (cathéter, sonde gastrique, ponctions veineuses et artérielles…..)
- Douleurs liées à la mobilisation

Inconforts liés à l'environnement

- Bruit, lumière

Inconforts liés à l'organisation du travail

- Temps de présence des proches auprès du patient
- Surveillance trop rapprochée lors des périodes de nuit
- Information insuffisante du patient
- Isolement du patient

Kalfon, réanimation 2011

Consensus mieux vivre en réanimation 2009

Il faut réduire le niveau de bruit en appliquant une politique systématique

Il est logique de moduler l'intensité des alarmes

Il faut favoriser l'alternance de la lumière entre le jour et la nuit

Les chambres et les locaux de travail doivent bénéficier de la lumière naturelle

Sedation and Delirium in the Intensive Care Unit

N Engl J Med 2014;370:444-54.

Michael C. Reade, M.B., B.S., D.Phil., and Simon Finfer, M.D.

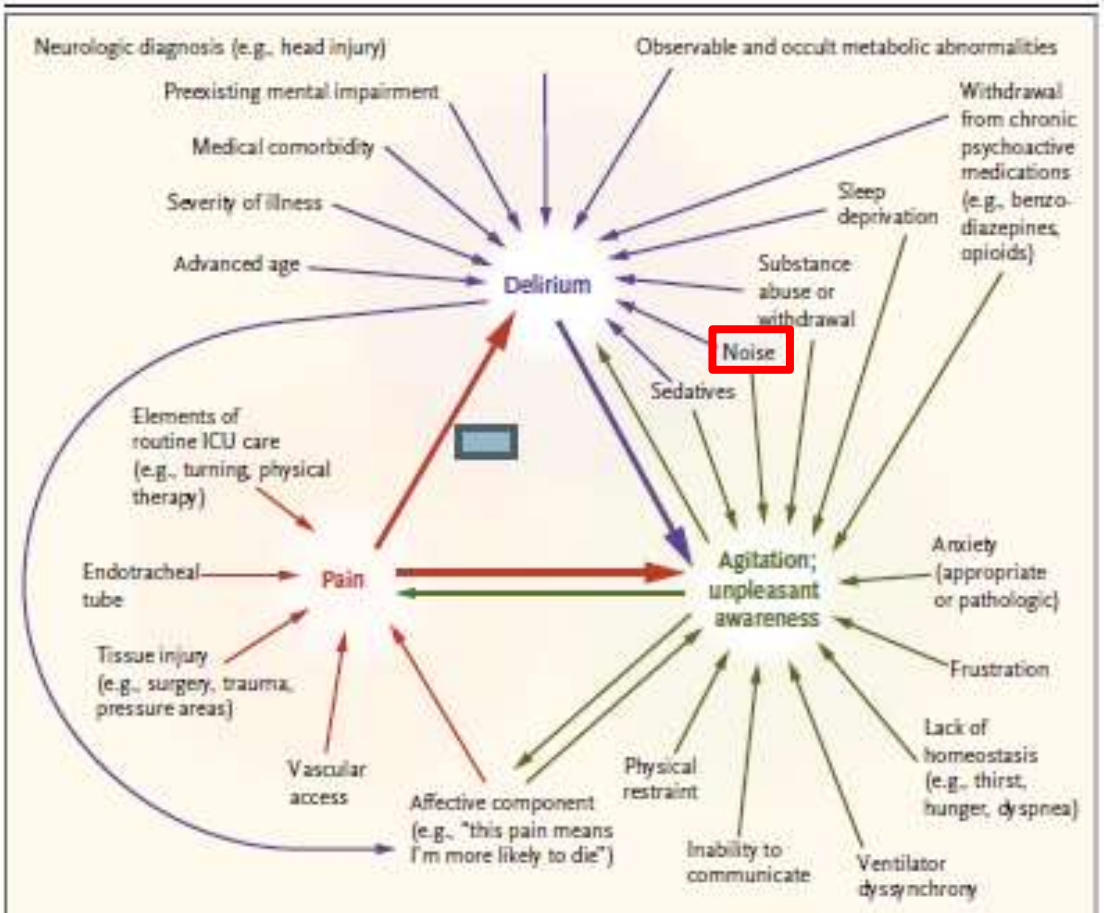


Figure 1. Causes and Interactions of Pain, Agitation, and Delirium.

Drugs and other treatments for pain, agitation, and delirium form an "ICU triad" cognitive management analogous to the "triad of anesthesia," which highlights interactions among hypnotics, analgesics, and muscle relaxants to encourage balanced anesthesia. The "ICU triad" concept highlights that changing one element is unlikely to be as effective as a coordinated approach.

Table 1 Ranking of stressors

Ranking	Description	Mean	Standard deviation
01	Have pain	3.36	1.01
02	Not being able to sleep	3.34	0.98
03	Having tubes in your nose or mouth	3.26	1.01
04	Not being in control of yourself	3.10	1.11
05	Being tied down by tubes	3.02	1.12
06	Not having treatments explained to you	3.02	1.22
07	Not being able to move your hands because of i.v. line	2.90	1.15
08	Not knowing when to expect things will be done to you	2.84	1.06
09	Being stuck with needles	2.80	1.18
10	Being thirsty	2.76	1.22
11	Having lights on constantly	2.72	1.25
12	Seeing family and friends for only a few minutes each day	2.66	1.22
13	Uncomfortable bed and/or pillow	2.64	1.26
14	Having no privacy	2.64	1.24
15	Nurses and doctors talking too loudly	2.54	1.15
16	Being bothered	2.52	1.15
17	Having to wear oxygen	2.50	1.20
18	Hearing other patients cry out	2.46	1.23
19	Being in a room that is too hot or too cold	2.46	1.05
20	Not knowing where you are	2.46	1.33
21	Not knowing what time it is	2.44	1.18
22	Unfamiliar and unusual noises	2.40	1.11
23	Having nurses be in too much of a hurry	2.40	1.14
24	Missing your husband or wife	2.34	1.19
25	Hearing the heart monitor alarm go off	2.26	1.16
26	Not knowing what day it is	2.20	1.21
27	Having the team use words you cannot understand	2.20	1.20
28	Being awakened by nurses	2.14	1.13
29	Having to look at the pattern of holes in the ceiling	2.14	1.25
30	Feeling the nurses are watching the machines closer than they are watching you	2.08	1.08
31	Having nurses constantly doing things around your bed	2.06	1.08
32	Hearing buzzers and alarms from machinery	2.02	0.91
33	Being cared for by unfamiliar doctors	1.96	1.18
34	Constantly being examined by doctors and nurses	1.96	1.11
35	Hearing the telephone ring	1.92	1.12
36	Being aware of unusual smells around you	1.92	1.07
37	Having strange machines around you	1.90	1.16
38	Having your blood pressure taken often each day	1.74	0.90
39	Not having the nurses introduce themselves	1.64	0.88
40	Seeing i.v. bags hanging over your head	1.58	0.91

Gérald Chanques
Judith Nelson
Kathleen Puntillo

Five patient symptoms that you should evaluate every day

Intensive Care Med 2015

Table 1 Assessment, diagnosis, and treatment of five common stressful symptoms in ICU patients able to communicate

Symptom	Patient's self-assessment		Possible causes			Treatment	
	General assessment	ICU specific tools	Common causes	Major diagnoses	Iatrogenic causes	Nonpharmacological	Pharmacological
1. Pain	▪ NRS ▪ VAS ▪ VDS OR "Yes/No" question if patient is poorly communicant but able to answer by nodding	Visually enlarged NRS	▪ Trauma/surgery ▪ Back and limbs	▪ Surgical complication ▪ Phlebitis, infarction…	▪ Tube & catheters ▪ Care procedures ▪ Immobilisation	▪ Distraction, music, reassurance ▪ Positioning	▪ Opioids ▪ Nonopioids ± opioids
2. Thirst			▪ No oral fluids	▪ GI diagnosis ▪ Hypovolemia	▪ MV ▪ Furosemide, anti-hypertensive drugs, opioids	▪ Oral swab wipes + ice-cold water sprays + lip moisturizer ▪ Rehydratation	▪ Switch opioids to nonopioids
3. Anxiety		Face anxiety scale	▪ ICU environment	▪ Dyspnea	▪ Care procedures	▪ See pain	▪ Sedatives
4. Dyspnea		Modified Borg scale		▪ Heart & Lung ▪ Acidosis, sepsis… ▪ Pain, anxiety	▪ Inappropriate MV setting ▪ ET suctioning	▪ Adjusted MV setting ▪ See pain	▪ Opioids*
5. Poor sleep		Richards-Campbell Sleep Questionnaire	▪ ICU environment	▪ Pain, anxiety, dyspnea ▪ Delirium	▪ Inappropriate MV setting ▪ Steroids, opioids, sedatives	▪ Adjusted MV setting ▪ Adjusted light, noise, alarms ▪ Ear plugs, eye masks	▪ Sedatives**

NRS numeric rating scale, *VAS* visual analogue scale, *VDS* verbal descriptor scale, *ICU* intensive care unit, *MV* mechanical ventilation, *GI* gastrointestinal, *ET* endotracheal

* If ventilator adjustment and correction of other causes are insufficient

** If non-pharmacological treatment is insufficient and patient clearly asking for sleep

Noise in hospital intensive care units—a critical review of a critical topic

Avinash Konkani*, Barbara Oakley

Journal of Critical Care

Journal of Critical Care (2012) 27, 522.e1–522.e9

Operational sounds

- Conversations between the ICU staff, medical professionals, and visitors
- Medical equipment alarms
- Caregiving activities such as hand washing, opening

disposable equipment packages, and storage drawers

- Telephones, pagers, and televisions
- Closing doors and falling objects

Structural sounds generated by the building,

- Ventilation, airconditioning systems
- Doors

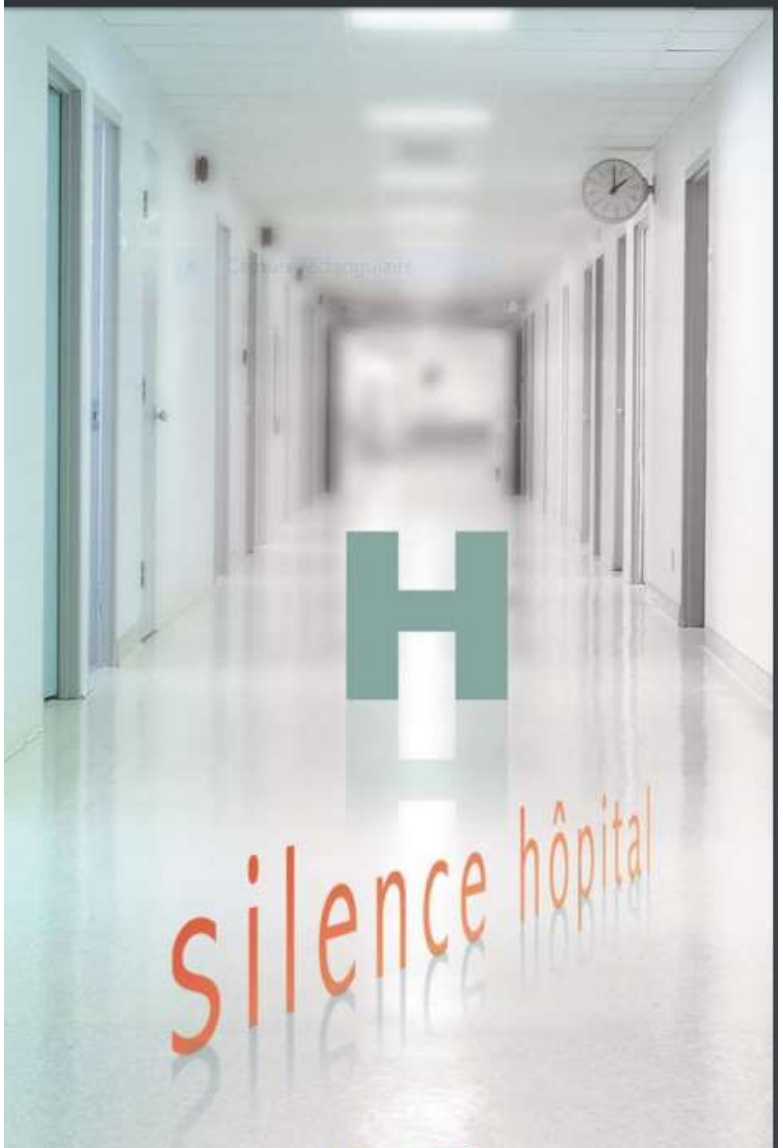

Db
140
Réacteur d'avion à 100 m
130
Coup de tonnerre
120
Coup de feu
DANGER
Perte
irréversible
110
Concert de rock
100
Marteau piqueur
RISQUE
SERIEUX
90
Tondeuse, tronçonneuse
80
Restaurant bruyant, circulation intense
INCOMFORT
70
Grand magasin, cantine
60
Environnement de travail
FATIGUE
50
Conversation à voix normale
40
Chambre calme
30
Chuchotement
20
Seuil de perception
10
Désert
AUCUN
RISQUE

Évaluation du bruit dans une unité de réanimation polyvalente et mise en place d'une stratégie visant à limiter les nuisances sonores *C. Charra , M. Direz , H. Jallu , F. Zeni , M. Darmon , E. Fortier , S. Mondiere*

	Jour		Nuit	
	Pic	Moyenne	Pic	Moyenne
Unité centrale	124,4 dB	88,1 dB	102,6 dB	76,2 dB
Chambre patient	84,5 dB	68,1 dB	88,1 dB	64,1 dB

Air conditionning	Door open	Door closed
Without patient		
Maximum	50 dB	47 dB
Minimum	43 dB	41 dB

Adapted from Lau N, SRLF 2014



silence hôpital

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE
MINISTÈRE DE LA SANTÉ, DE LA JEUNESSE ET DES SPORTS

Direction régionale et départementale des affaires sanitaires et sociales
de Champagne-Ardenne et de la Marne

Document préparé par Dominique FRANÇOIS,
Ingénieur régional du génie sanitaire, Service santé-environnement.

Les recommandations

ARS: Arrêté du 25 avril 2003 relatif à la limitation du bruit dans les établissement de santé

Article 4

Le niveau de pression acoustique normalisé, du bruit transmis par le fonctionnement d'un équipement collectif du bâtiment ne doit pas dépasser les valeurs suivantes:

Locaux de soins: **40 dB**

Salles opération, obstétrique, salles de travail: **40 dB**

World Health Organization: below 30 dB not exceeding **40 dB**

Environnemental Protection Agency (EPA): **35-45 dB night**

Occupational Safety and Health Organization:

< 90 dB pour une durée max de 8 heures

Noise Levels in Surgical ICUs Are Consistently Above Recommended Standards

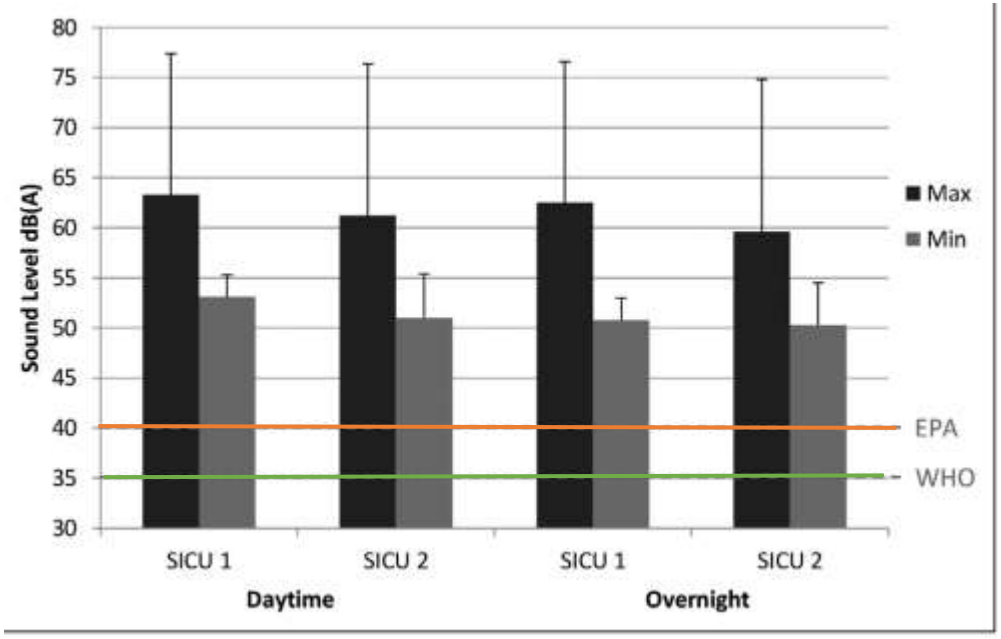
Christopher R. Tainter, MD[1]; Alexander R. Levine, PharmD[2]; Sadeq A. Quraishi, MD, MHA[3]; Arielle D. Butterly, MD[3]; David L. Stahl, MD[4]; Matthias Eikermann, MD, PhD[3]; Haytham M. Kaafarani, MD, MPH[5]; Jarone Lee, MD, MPH[6]

Critical Care Medicine

Crit Care Med 2016; 44:147–152

2 identical ICUs, same staff
Prospective observational cohort
Quiet protocol (11am-5pm): turning down lights, traffic light signal, in persons reminders.
No modification of alarms
Samplings at the same time, at the same location
No randomization of timing, of order of ICU

Doors opening/closing:	55-82 DB
Monitor alarm:	55-68
Pneumatic tube system:	65-75
ICU staff conversation:	50-80
Nursing call bells:	60-65
Ventilation system:	50-55
Refrigerator:	60-65



An investigation of sound levels on intensive care units with reference to the WHO guidelines

Julie L Darbyshire[1*†] and J Duncan Young[1,2†]

CRITICAL CARE

Critical Care 2013, **17**:R187

CENTRAL STATION

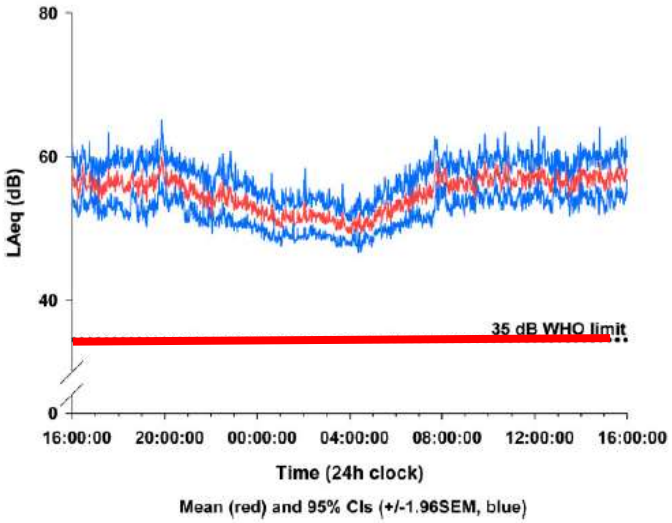


Figure 2 Average sound levels for centrally sited recording device. Average sound levels at one-minute intervals (L_{Aeq}) throughout the day measured by a recording device on a central station in the ICU. dB, decibel; WHO, World Health Organisation.

PATIENT HEAD

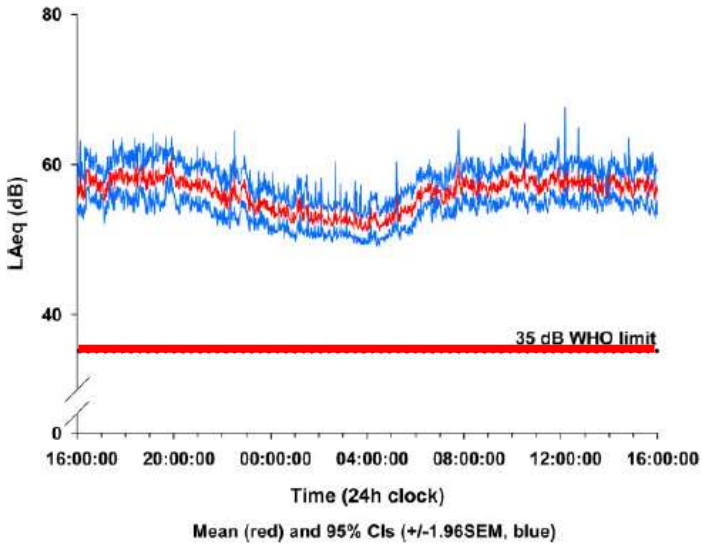


Figure 1 Average sound levels for patient sited recording device. Average sound levels at one-minute intervals (L_{Aeq}) throughout the day with recording device positioned adjacent to the patient. dB, decibel; WHO, World Health Organisation.

An investigation of sound levels on intensive care units with reference to the WHO guidelines

CRITICAL CARE

Critical Care 2013, **17**:R187

Julie L Darbyshire[1*†] and J Duncan Young[1,2†]

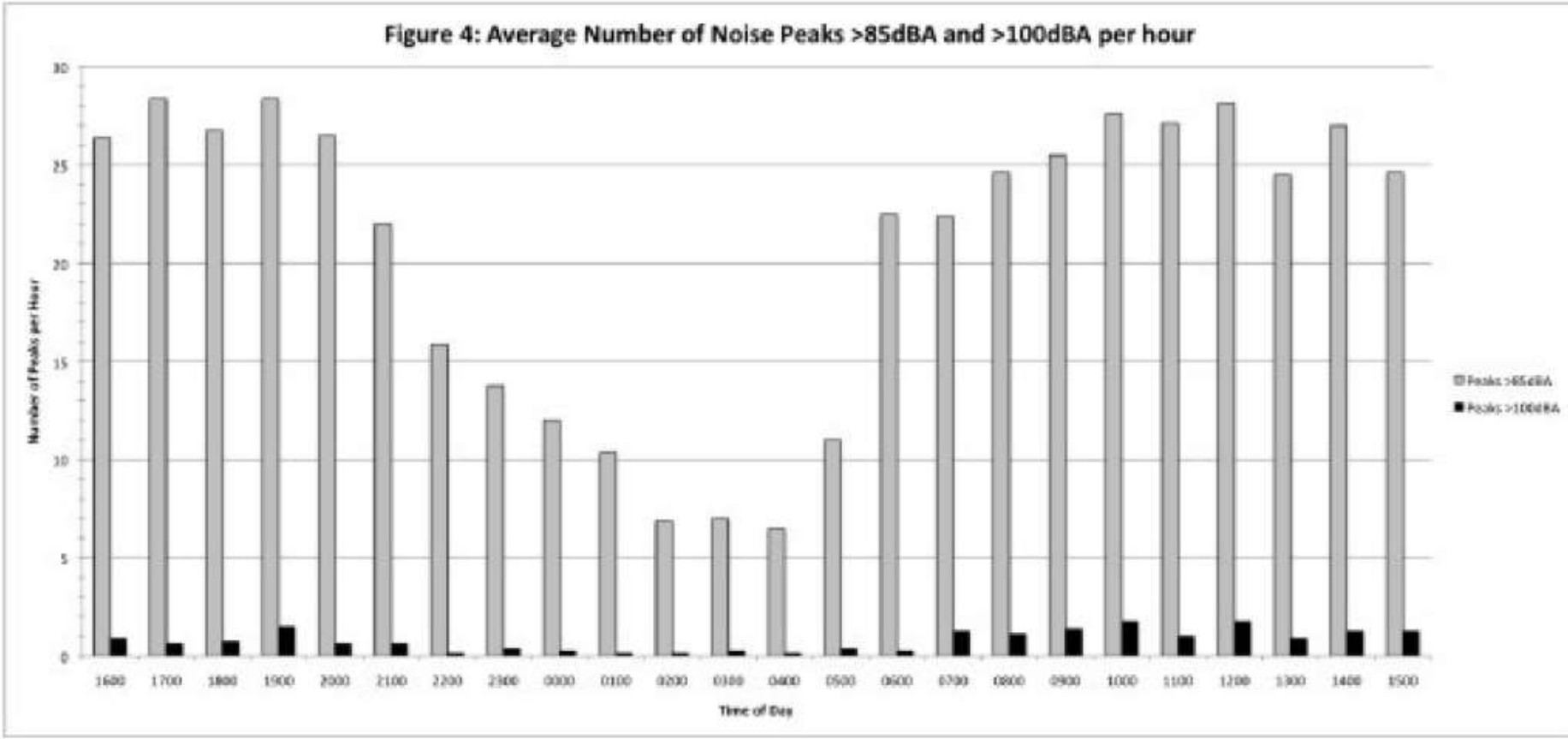


Figure 4 Average number of peak values per hour for patient-sited recording device. Average number of minutes per hour when peak values above 85 A-weighted decibels (dBA) and above 100 dBA were recorded with the recording device positioned adjacent to the patient.

Effects of earplugs and eye masks on nocturnal sleep, melatonin and cortisol in a simulated intensive care unit environment

CRITICAL CARE

Hu et al. Critical Care 2010, 14:R66

Rong-fang Hu[1], Xiao-ying Jiang[1*], Yi-ming Zeng[2], Xiao-yang Chen[2], You-hua Zhang[3]

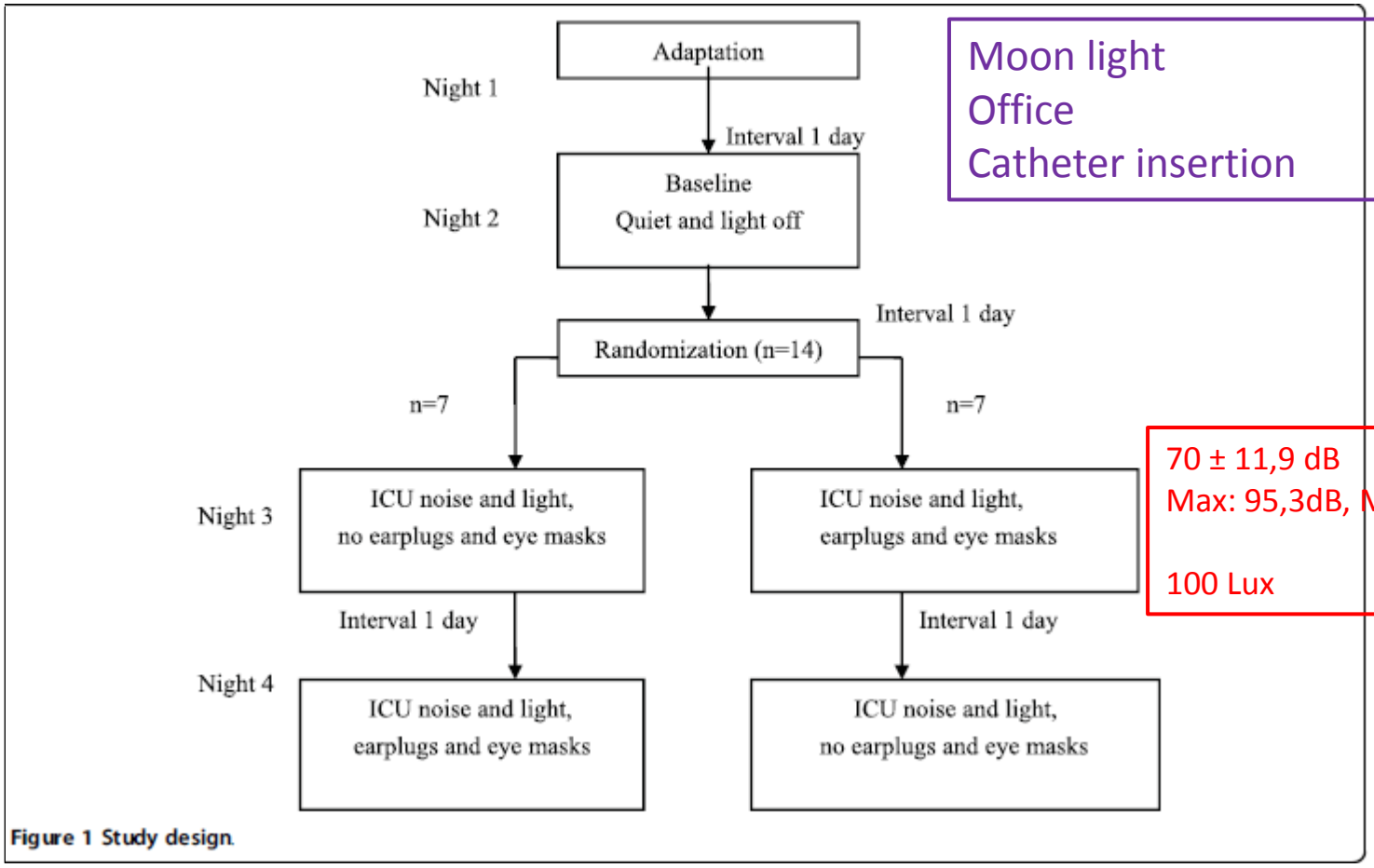


Figure 1 Study design.

Moon light	1 lux
Office	100-200
Catheter insertion	10 000

70 ± 11,9 dB
Max: 95,3dB, Min 51,4 dB

100 Lux

Effects of earplugs and eye masks on nocturnal sleep, melatonin and cortisol in a simulated intensive care unit environment

CRITICAL CARE

Hu *et al. Critical Care* 2010, **14**:R66

Rong-fang Hu[1], Xiao-ying Jiang[1*], Yi-ming Zeng[2], Xiao-yang Chen[2], You-hua Zhang[3]

Melatonin

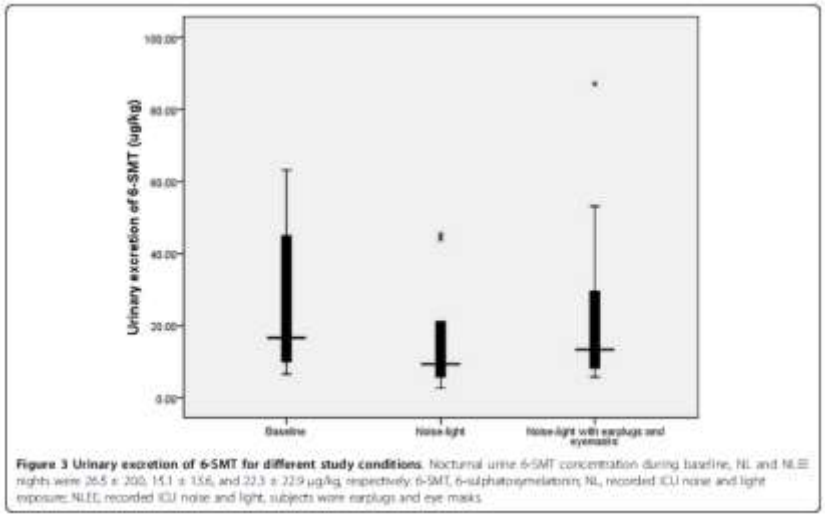


Figure 3 Urinary excretion of 6-SMT for different study conditions. Nocturnal urine 6-SMT concentration during baseline, NL and NLE nights were 26.5 ± 20.0, 15.1 ± 13.6, and 22.3 ± 22.9 μg/kg, respectively. 6-SMT, 6-sulphatoxymelatonin; NL, recorded ICU noise and light exposure; NLEE, recorded ICU noise and light, subjects wore earplugs and eye masks.

Cortisol

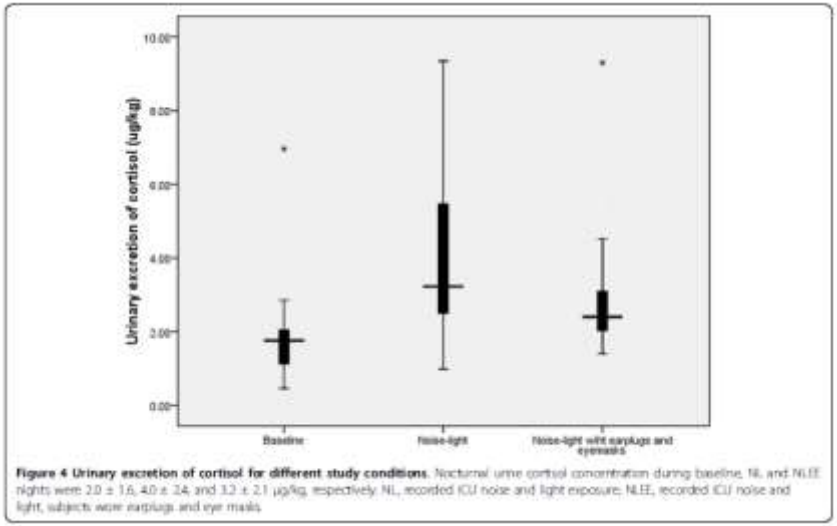


Figure 4 Urinary excretion of cortisol for different study conditions. Nocturnal urine cortisol concentration during baseline, NL and NLEE nights were 2.0 ± 1.6, 4.0 ± 2.4, and 3.2 ± 2.1 μg/kg, respectively. NL, recorded ICU noise and light exposure; NLEE, recorded ICU noise and light, subjects wore earplugs and eye masks.

26,5 ± 20
15,1 ± 13,6
22,3 ± 22,9 p=0,007

2,0 ± 1,6
4,0 ± 2,4
3,2 ± 2,1 p=0,004

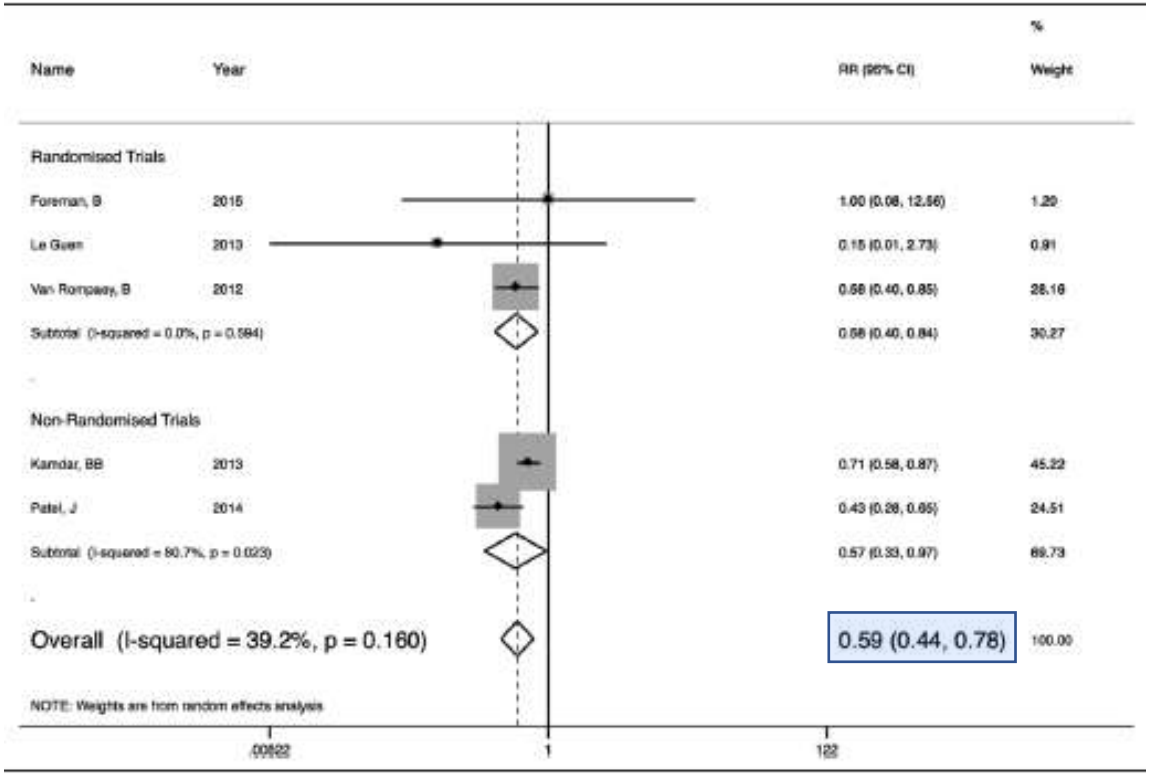
The Efficacy of Earplugs as a Sleep Hygiene Strategy for Reducing Delirium in the ICU: A Systematic Review and Meta-Analysis*

Edward Litton, MBChB, FCICM, MSc[1,2]; Vanessa Carnegie, MBBS[3]; Rosalind Elliott, RN, PhD[4]; Steve A. R. Webb, MBBS, FRACP, FCICM, MPH, PhD[5,6]

Critical Care Medicine

May 2016 • Volume 44 • Number 5

9/57 studies with 1455 pts (2009-2015)



Delirium and use of earplugs

Kalfon et al. Trials (2016) 17:87
DOI 10.1186/s13063-016-1211-x

Trials

STUDY PROTOCOL Open Access

Reduction of self-perceived discomforts in critically ill patients in French intensive care units: study protocol for a cluster-randomized controlled trial

Pierre Kalfon[1*], Olivier Mimoz[2], Anderson Loundou[3], Marie-Agnès Geantot[4], Nathalie Revel[5], Isabelle Villard[6], Julien Amour[7], Elie Azoulay[8], Maïté Garrouste-Orgeas[9], Claude Martin[10], Tarek Sharshar[11], Karine Baumstarck[3] and Pascal Auquier[3]

Results: Program effect on IPREA scores accounting clustering

	Experimental (n=398)	Control (n=360)	Program effect adjusted on clusters		Program effect adjusted on *a priori* covariates*	
Outcome measure	M (SE)**	M (SE)**	**D (95 % CI)*** **	**p-value**	**β (SE)**** **	**p-value**
Overall discomfort score	16.67 (1.00)	23.67 (1.02)	-7.00 (-9.89;-4.11)	<0.001	-6.35 (1.23)	**<0.001**
Noise	2.54 (0.26)	3.41 (0.27)	-0.87 [0.12-1.64]	<0.003	-0.82 (0.35)	0.027
Excessive light	1.39 (0.17)	2.04 (0.17)	-0.65 [0.16-1.16]	<0.001	-0.60 (0.22)	0.013
Bed-related discomfort	1.84 (0.23)	2.53 (0.23)	-0.69 [0.03-1.34]	<0.001	-0.62 (0.31)	0.054
Sleep deprivation	3.18 (0.24)	3.95 (0.25)	-0.77 [0.06-1.48]	0.008	-0.71 (0.34)	0.047
Thirst	2.32 (0.23)	3.40 (0.23)	-1.08 [0.42-1.74]	<0.001	-1.00 (0.33)	0.004
Hunger	0.85 (0.17)	1.62 (0.17)	-0.77 [0.29-1.25]	<0.001	-0.73 (0.23)	0.003
Feeling of cold	1.33 (0.24)	2.04 (0.24)	-0.71 [0.01-1.41]	<0.001	-0.65 (0.32)	0.052
Feeling of heat	1.05 (0.20)	1.84 (0.20)	-0.79 [0.22-1.36]	<0.001	-0.71 (0.26)	0.010
Pain	2.85 (0.20)	2.88 (0.21)	-0.03 [-0.56-0.63]	0.868	0.02 (0.30)	0.950
Perfusion lines, etc.	2.77 (0.23)	3.50 (0.23)	-0.73 [0.07-1.39]	<0.001	-0.65 (0.31)	0.044
Lack of privacy	0.53 (0.14)	1.61 (0.14)	-1.08 [0.67-1.49]	<0.001	-1.00 (0.18)	0.000
Anxiety	2.12 (0.21)	3.08 (0.21)	-0.96 [0.36-1.57]	<0.001	-0.82 (0.28)	0.006
Isolation	0.91 (0.14)	1.65 (0.15)	-0.74 [0.33-1.17]	<0.001	-0.63 (0.18)	0.002
Limiting visiting hours	0.70 (0.16)	1.01 (0.16)	-0.31 [-0.14-0.77]	0.024	-0.25 (0.22)	0.263
Absence of phone	0.88 (0.15)	1.39 (0.16)	-0.51 [0.07-0.96]	0.013	-0.46 (0.22)	0.041
Lack of information	1.29 (0.17)	1.96 (0.17)	-0.67 [0.17-1.16]	<0.001	-0.63 (0.22)	0.009

Noise in hospital intensive care units—a critical review of a critical topic

Avinash Konkani*, Barbara Oakley

Journal of Critical Care

Journal of Critical Care (2012) 27, 522.e1–522.e9

Educational staff reduction programs

Behavioural modification using sound detection equipments

Implementing quiet time protocols

Posting signs boards to help ensure silence

Never 45 dB

Lumière naturelle ou artificielle

Reappraisal of visiting policies and procedures of patient's family information in 188 French ICUs: a report of the Outcomerea Research Group

Maité Garrouste-Orgeas[1,2,8*], Isabelle Vinatier[3], Alexis Tabah[4,5], Benoit Misset[6] and Jean-François Timsit[1,2,7]

Annals of Intensive Care

Ann. Intensive Care (2016) 6:82

Table 2 Architectural characteristics of the 188 intensive care units

Variables	Data
Rate of single-bed room	71.4 [60–100]
Units with rooms closed with a door	175 (93)
Room with natural light	161 (85.6)
Presence of a waiting room	118 (62.7)
Equipped with drinks dispenser	37 (19.6)
Availability of toilets for families	165 (87.7)
Room dedicated to family conferences	152 (80.8)
Family on-site sleep	89 (47.3)
Dedicated room available	10 (5.3)
Possible into the patient room	30 (15.9)
Chair in the waiting room	28 (14.8)
Other possibility	13 (6.9)

Data are expressed as median [interquartile range] for continuous variables and number (%) for categorical variables

The effect of light on critical illness

Ricardo Castro[1]*, Derek C Angus[2], Matt R Rosengart[3]

CRITICAL CARE

Critical Care 2011, 15:218

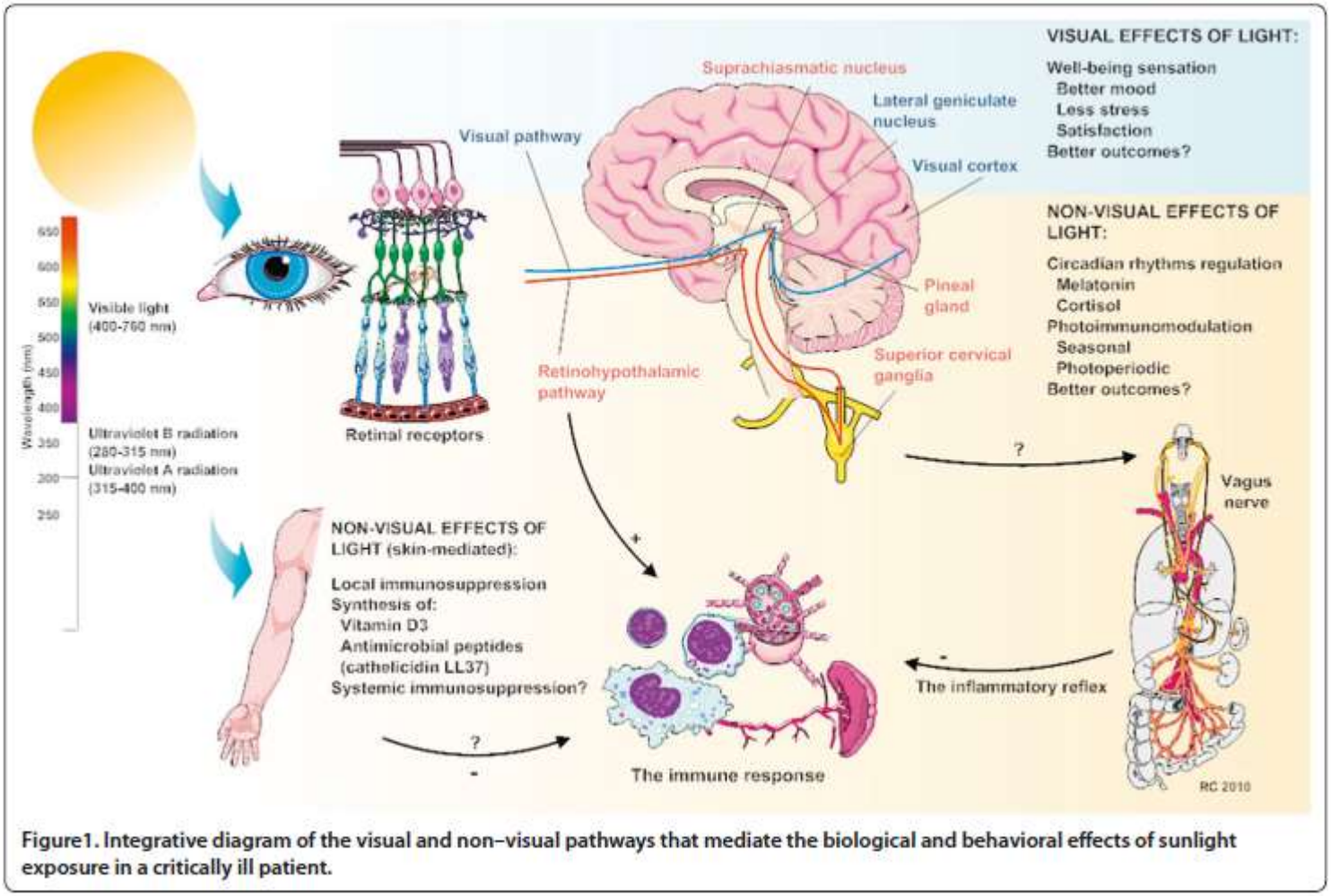


Figure1. Integrative diagram of the visual and non–visual pathways that mediate the biological and behavioral effects of sunlight exposure in a critically ill patient.

Do Windows or Natural Views Affect Outcomes or Costs Among Patients in ICUs?

Rachel Kohn, MD[1]; Michael O. Harhay, MPH, MBE[2,3]; Elizabeth Cooney, MPH[2,3]; Dylan S. Small, PhD[4]; Scott D. Halpern, MD, PhD[2,3,5,6]

Critical Care Medicine

Crit Care Med 2013, 41:1645

2006-2012, 12 996 medical-surgical patients,

Same results with surgical patients

Medical patients

Variables	Window	No Window	Instrumental Variable Analysis[4] Unadjusted Instrumental Variable[4] Intention-to-Treat	Instrumental Variable Analysis[4] Adjusted 2 Instrumental Variable[4] Intention-to-Treat
n	4,093	2,243	6,336	6,288
In-hospital mortality[1]	853 (21%)	467 (21%)	0.00 (−0.02, 0.02) $p = 0.98$	0.00 (−0.02, 0.02) $p = 0.93$
ICU mortality[1]	576 (14%)	339 (15%)	−0.01 (−0.03, 0.01) $p = 0.26$	0.00 (−0.03, 0.01) $p = 0.24$
Readmission within 72 hr[1]	154 (4%)	73 (3%)	0.01 (0.00, 0.02) $p = 0.30$	0.00 (−0.01, 0.01) $p = 0.38$
ICU-acquired delirium	156 (4%)	78 (3%)	0.00 (−0.01, 0.01) $p = 0.50$	0.00 (−0.01, 0.01) $p = 0.56$
Hospital length of stay (hr)[2]	347.6	326.4	21.98 (−2.63, 46.6) $p = 0.08$	21.36 (−3.04, 45.77) $p = 0.09$
ICU length of stay (hr)[2]	105.8	95.2	11.05 (−0.98, 23.09) $p = 0.07$	11.13 (−0.88, 23.15) $p = 0.07$
Median fixed costs (interquartile range)[3a]	7,282 (3,755–15,499)	6,909 (3,560–14,554)	1122.26 (−113.31, 2357.83) $p = 0.08$	1087.35 (−140.06, 2314.77) $p = 0.08$
Median variable costs (interquartile range)[3b]	3,008 (1,325–7,630)	2,784 (1,249–7,344)	622.12 (−388.70, 1632.93) $p = 0.23$	657.71 (−344.36, 1659.79) $p = 0.20$
Median total costs (interquartile range)[3c]	10,482 (5,243–23,414)	9,946 (5,044–22,268)	1744.38 (−412.23, 3900.99) $p = 0.11$	1745.07 (−394.83, 3884.96) $p = 0.11$

Adjustment: Age, Sex, Race, Apache IV, at least 12 hrs sunlight

Conclusions

Une réflexion de plus en plus importante existe sur la prise en compte de l'environnement du patient pour assurer son bien-être

Les recommandations sonores semblent difficilement atteignables.

Les programmes de prévention ciblés sur l'utilisation de moyens externes semblent être efficaces

L'influence de la lumière naturelle sur le devenir du patient est un axe de recherche à développer.

Merci de votre attention