

Using patients' observations to evaluate healthcare workers' alcohol-based hand rub with Pulpe'friction audits: a promising approach?

Berücksichtigung der Patientenerfahrung zur Bewertung der alkoholbasierten Händedesinfektion von Gesundheitspersonal mit dem Pulpe'friction audit: ein vielversprechender Ansatz?

Abstract

Background: Hand hygiene plays an important role in the transmission of nosocomial infections from healthcare workers (HCW) to patients. Patients could play a key role in improving hand hygiene by sharing their experience of the HCW's practices.

Already in 2019, the French national mission of transversal support for actions to prevent healthcare-associated infections proposed the national "Pulpe'friction" audit, to assess HCW's reported practices, social representations, and barriers to using alcohol-based hand rubs (ABHR). This audit consisted of a positive discussion between an auditor and the HCW as well as patients, which led the HCW to declare their real practices and the barriers they faced in the field and the patients to report about the HCW's ABHR practices and the information they received about when they should perform hand hygiene

Objective: To assess whether an association existed between HCW's reported ABHR compliance and patients' declarations about HCW's compliance in the Pulpe'friction audit data.

Methods: Data from Pulpe'friction were collected from 1st January to 31st December 2019, before the COVID-19 pandemic. Mixed linear models were performed to analyze the association between self-reporting by HCW and patients, regarding hand rubs performed by HCW prior to patient care.

Results: There was a positive association between patients' observations and HCW's declared practices regarding the frequency of with which professionals performed hand rubs before patient contact. This indicates that professional and patient statements show the same tendency. The positive association was found in hospitals for patients under 45 and over 64 years old and for paramedics, but not for physicians and not in nursing homes or long-term care facilities. Patients felt more motivated to observe and evaluate HCWs' practices if they had received information about how to correctly wash their hands.

Conclusion: Patients agreed to be involved in the evaluation of professional practices. The patients' observations were positively associated with HCWs reports. New indicators taking patients' observations into account could be interesting.

Keywords: evaluation, hand disinfection, patient observations, alcohol-based hand rub, prevention infection

Zusammenfassung

Hintergrund: Die Händehygiene spielt eine wichtige Rolle bei der Übertragung nosokomialer Erreger vom Gesundheitspersonal auf Patienten. Patienten könnten eine Schlüsselrolle bei der Verbesserung der Händehygiene spielen.

Fanny Velardo¹

Muriel Péfau¹

Raymond Nasso²

Pierre Parneix¹

Anne-Gaëlle Venier¹

1 Center for Prevention of Healthcare Associated Infections of Nouvelle Aquitaine, CPIas Nouvelle-Aquitaine, Bordeaux, France

2 Center for Prevention of Healthcare Associated Infections of Guadeloupe, CPIas Iles de Guadeloupe, Pointe-à-Pitre, France

hygiene spielen, indem sie ihre Erfahrungen mit den Gesundheitspersonal teilen.

Bereits im Jahr 2019 schlug die französische nationale Mission zur transversalen Unterstützung von Maßnahmen zur Prävention Health Care assoziierter Infektionen (HAI) das nationale „Pulpe'friction“-Audit vor, um die vom Gesundheitspersonal gemeldeten Praktiken, Darstellungen und Hindernisse für die Alkohol basierte Händedesinfektion zu bewerten. Das Audit beinhaltete eine positive Diskussion zwischen dem Auditor, dem Gesundheitspersonal und Patienten, die dazu führte, dass die Gesundheitspersonal dazu veranlasste, die tatsächlichen Praktiken und Hindernisse, mit denen es vor Ort konfrontiert war, darzulegen, und das die Patienten dazu veranlasste, über die Praktiken der Händedesinfektion des Gesundheitspersonals und die Informationen, die sie über ihre eigene Handhygiene erhielten, zu berichten.

Zielsetzung: Es sollte beurteilt werden, ob ein Zusammenhang zwischen der vom Gesundheitspersonal berichteten Compliance der Händedesinfektion und der von Patienten berichteten Compliance des Gesundheitspersonals der Händedesinfektion in den Pulpe'friction-Auditdaten besteht.

Methoden: Die Daten von Pulpe'friction wurden vom 1. Januar bis 31. Dezember 2019, also vor der COVID-19-Pandemie, erhoben. Mit Hilfe gemischter linearer Modelle wurde der Zusammenhang zwischen der Selbstauskunft des Gesundheitspersonals zur Einhaltung der Compliance der Händedesinfektion und der Einschätzung der Patienten hinsichtlich Einhaltung der Compliance durch das Gesundheitspersonal vor der Behandlung analysiert.

Ergebnisse: Es bestand ein positiver Zusammenhang zwischen der von Patienten und der vom Gesundheitspersonal eingeschätzten Praxis hinsichtlich der Häufigkeit der Durchführung der Händedesinfektion vor der Behandlung, was bedeutet, dass die Aussagen der Fachkräfte und der Patienten in die gleiche Richtung gehen. Dieser Zusammenhang wurde in Krankenhäusern bei Patienten unter 45 Jahren und über 64 Jahren und bei nichtärztlichen Berufsgruppen im Bereich des Rettungsdienstes, nicht aber bei Ärzten und nicht in Pflegeeinrichtungen festgestellt. Die Patienten fühlten sich stärker an der Beobachtung und Bewertung der Praktiken der Gesundheitsdienstleister einbezogen, wenn sie Informationen darüber erhalten hatten, wann und wie die Hände zu desinfizieren sind.

Fazit: Die Einschätzung der Patienten stand in Übereinstimmung mit den Erklärungen des Gesundheitspersonals zur Compliance der Händedesinfektion. Neue Indikatoren, die die Erfahrungen der Patienten einbeziehen, könnten interessant sein, und die Patienten erklärten sich bereit, in die Bewertung der beruflichen Praxis einbezogen zu werden.

Schlüsselwörter: Evaluierung, Händedesinfektion, Patienteneinschätzung, Alkohol basierte Einreibemittel, Infektionsprävention

Introduction

Hand hygiene plays an important role in interrupting the transmission of nosocomial infections from healthcare workers (HCW) to patients [1], [2], [3], [4], [5], [6], [7]. There are two ways of performing hand hygiene: rubbing hands with an alcohol-based hand rub (ABHR) or washing them with soap and water. When hands are visually clean and dry, ABHR is preferable, as it is microbiologically more effective [2], [4], [5], [7], better tolerated by the skin [2],

[8], [9], more user-friendly, does not need towels for drying because it is not dependent on water outlets, has a shorter exposure time (15 sec) [10], [11], [12], [13], is more ecological [14] and is associated with higher compliance of implementation [7].

Patients can play an important role in hand hygiene improvement: first by correctly disinfecting their hands and second by sharing their observations of what they see in a healthcare setting. The idea of involving healthcare recipients in the design and implementation of health policies was born in the mid-1990s in Canada and be-

came increasingly important all over the world. Patients' feedback provides a unique point of view to improve health care pathways and guide HCW and decision-makers. French healthcare recipients are nowadays involved in all decision-making authorities, from individual care to boards of directors, with a power of decision. Patients' observations remain a largely neglected method in evaluating HCWs' ABHR practices. There is still no information about the accuracy of patients' observations, and thus whether or not interest even exists in involving them in the evaluation of HCWs' hand hygiene practices. In 2018, the Ministry of Health and the French National Public Health Agency Santé Publique France created the French national mission of transversal support for actions to prevent healthcare-associated infections (called "MATIS") to facilitate the prevention of HAIs.

In 2019, MATIS proposed the national "Pulpe'friction" audit to assess HCWs' reported hand-rub practices and barriers to using ABHRs (method in [15]). This audit was developed in line with WHO guidelines to monitor the use of hand disinfectants by medical staff and to promote improvement measures consists in a positive discussion between an auditor and each HCW and patient, inducing the HCW to report their real practices as well as the barriers they faced in the field, in addition to encouraging the patients to share the HCW practices they saw and whether they received information about the moments at which they could, as a patient, perform a hand disinfection. This audit can be performed each year, providing the infection control team with useful data for adapting/modifying their actions accordingly.

This study determined whether there was an association between the HCWs' reported practices and the patients' observations of HCWs' practices.

Materials and methods

Pulpe'friction audit began in 2019 and is still ongoing. It is one of the official tools of the French National Hand Hygiene Day. Its methodology follows WHO guidelines and the French Hygiene Society (SF2H). Its name is inspired by the fingertips ("pulpe des doigts" in French), an important part during hand rubbing, and by ABHR, called "friction" in French. The Pulpe'friction quick audit is based on a partnership between the person interviewed and the interviewer, who collects reported practices through a short individual questionnaire of less than 10 questions, lasting 5 to 10 minutes. The methodology provides language elements to lead the HCW report practices that correspond as exactly as possible to HCW's real practices. HCWs were asked how frequently they performed ABHR in four situations: "before patient contact", "before an invasive technique", "after patient contact", "after contact with patient surroundings", using a scale from 0 (=never) to 10 (=always).

Patients were asked about their age, how often they saw HCWs performing hand rubs before touching them in the past few days (0=never to 10=always), the importance

they gave to this action of hand disinfection (0=not important at all to 10=absolutely necessary), if they think that patients should help evaluating professionals' hand rubbing (yes or no), if they received any information during their stay about when they should perform hand hygiene (yes or no), and how important is it for them to receive that kind of information (0=not important at all to 10=absolutely necessary). To be interviewed, patients had to be conscious and able to understand questions. The data were entered online on the Pulpe'friction web app on the Healthcare Associated Infection Prevention Network (RéPias) website (www.preventioninfection.fr). Infection control teams obtain automated results with personalized advice for each session in order to help to choose adapted actions.

Ethics approval and consent to participate

Data were anonymized, and participants consented to their use. The database management was approved by the ethics committee of the Guadeloupe University Hospital (reference number A11-20-02-21-BOX-IMPACT1), in accordance with the General Data Protection Regulation of the EU, the French National Commission for Data Protection (CNIL) and French regulations.

Study population

The study included the data of the hospitals (public hospitals and clinics), nursing homes and establishments for disabled adults which participated in the audit from the 1st January 2019 to the 31st December 2019. HCWs were grouped into two categories: physicians and paramedics (such as nurses, auxiliary nurses, physiotherapists).

Statistical analysis

It could be considered that the data reported by the patients in a same ward were not independent (cluster effect, which could also be considered for the HCWs in the same ward). So, data were pooled to obtain average scores per ward. Mixed generalized linear models were performed to assess if there was an association between the average patients' declaration and the average HCWs' declaration regarding hand rubbing before patient contact. Therefore, at least two patients and two HCWs per ward were needed to calculate means and perform regression models. A subset of 148 facilities met the criteria, and the analysis of the non-selected facilities showed that they were not different from the selected ones in terms of specialty, profession distribution and patient characteristics. Generalized linear models included a random effect of the facility to consider the correlation of practices within a facility. Multivariate models were performed using significant variables and relevant parameters according to the literature (age of patients, professional occupation, ward specialty). A weighting was implemented for the number of people audited within wards.

R studio® version 1.2.5033 [16] was used to perform the statistical analysis. A p -value <0.05 was considered significant.

Results

Overall, 16,285 HCW and 5,299 patients answered from January 1st to December 31st, 2019. Respondents came from 307 healthcare facilities, including 274 hospitals and 33 nursing homes from 16 of the 17 French regions. There were 5,247 patients and 15,761 HCWs in hospitals, and 52 patients and 524 HCWs in nursing homes (Table 1).

HCWs declared an average compliance of 94% (9.4/10) for the situation “before the insertion of an invasive device” and assigned an importance of 97% to this situation. They reported an average compliance of 84% for the situation “after touching the patient” and attached an importance of 92% to this situation. Two situations were below 80%: “before touching the patient” (compliance 71%, importance given 87%) and “after touching the patient's immediate environment” (compliance 76%, importance given 85%). Around 72% of patients agreed to participate in the evaluation of professional practices, including 72.6% in hospitals and 51.9% in nursing homes. The desire to become involved varied across wards, with 54.2% in emergency wards compared to 75% in surgical wards. Around 36% of patients reported that they received information about when to perform hand hygiene and attached an importance of 80% to receiving this knowledge. Patients hospitalized for hemodialysis were the most informed (74%), while patients in laboratories and medical imaging were the least informed (10%). Patients observed that professionals had a compliance rate of 76% for the situation “before a contact for a care” (and attached an importance of 90% to this situation. Patients were 6.7 times more likely to be informed if they were hospitalized in a hemodialysis sector, 38% more likely in psychiatry, follow-up and rehabilitation care, or in long-term care, but 73% less likely to be informed if they were in technical sectors than in infectious diseases wards. They were 11.5% less likely to be informed if aged ≥ 65 years (Table 2).

A subset of 148 facilities was used to perform regression models between patients' and professionals' answers (140 hospitals and 8 nursing homes) for a total of 10,715 respondents (4,751 patients and 5,964 HCWs). These results were expressed as percentages, which implies multiplying the coefficients and confidence intervals displayed in Table 3 by 10, to facilitate understanding and interpretation. There was a positive association between the observations by patients and professionals' report regarding the frequency of professional hand rubbing: here, a β of 0.13 means that the patient frequency of observation increased by 1.3% when the professional report increased by 10% (CI95%=[0.01–0.02], $p=0.001$). The association was found in hospitals (CI95%=[0.01–0.02], $p=0.001$) but not in nursing homes

(CI95%=[–0.36–0.31], $p=0.85$), for ≤ 44 years old (CI95%=[0.02–0.06], $p<0.001$) and ≥ 64 years old (CI95%=[–0.01–0.02], $p=0.84$) but not 45–64 years old (CI95%=[–0.01–0.02], $p=0.84$) (Table 3). In parallel, the association was found for paramedics (CI95%=[0.01–0.02], $p=0.03$) but not for physicians (CI95%=[–0.01–0.01], $p=0.36$).

The average frequency of patient's observation of professional hand rubbing increased by 4% when the importance attributed to this practice increased by 10% (CI95%=[0.36; 0.44], $p<0.001$). The average frequency of patient's observation of professional hand rubbing increased by 8.5% when patients had received prior information about hand hygiene CI95%=[0.7; 1], $p<0.001$. It decreased by 5.1% when they were ≥ 65 years old (CI95%=[–0.68; –0.36], $p<0.001$) (Table 4).

Also, the importance attached to professional hand rubbing increased by 1.7% (95% CI=[0.04; 0.27], $p=0.001$) and the desire to become involved in the evaluation of professional practices by 37% (odds ratio=1.37, CI95%=[1.20; 1.55], $p<10^{-3}$) when patients had received prior information about when they should perform hand hygiene.

Discussion

These results suggested a clear association between HCWs' declared practices and patients' observations. These results seem important since patient perception of hand rubbing remains mostly unknown. These results suggested that patients' observations could be integrated into a new quality- and safety-of-care indicator, a suggestion which has already been put forth in the literature [17].

This study has some limitations. The sample was large enough to be considered representative of French hospitals, but not for nursing homes. The questions were designed to limit interpretation bias and facilitate understanding and honesty of the responses. The Hawthorne effect was also avoided, but the bias of social desirability cannot be excluded with this method.

There was a strong association between the perceptions of the patients under 45 or over 64 and professional's declarations. In contrast, this association was not significant for 45–64 year-old patients. This curvilinear relationship is known in psychology as the Erikson's psychosocial theory, saying that “The individual progresses through a number of stages or crises”. Anxiety about death varies with age, with a peak of anxiety when people are between 45–64 years old [18]. Adults aged 45–64 could potentially be more anxious about their death, and less likely to check on HCWs' practices, possibly as a result of being more prone to shock and denial. No association was found between nursing home residents' observations and professionals' self-reports. The literature has shown that nursing home residents value the human relationships over other needs [19]. The importance of follow-up is centered on medical and social

Table 1: Characteristics of the study population

| Characteristics | Hospitals | | Nursing homes | |
|---------------------------------------|-----------|------|---------------|------|
| | n | %* | n | %* |
| Facilities | 274 | 89.3 | 33 | 10.7 |
| HCW | 15,761 | 96.8 | 524 | 3.2 |
| Physicians | 14,113 | 86.7 | 515 | 3.3 |
| Facilities which interviewed patients | 154 | 50.2 | 9 | 2.8 |
| Patients | 5,247 | 99.0 | 52 | 1.0 |
| <25 years | 199 | 3.8 | 0 | 0.0 |
| 25–44 years | 555 | 10.4 | 1 | 0.1 |
| 45–64 years | 1,352 | 25.5 | 3 | 0.1 |
| 65–84 years | 2,243 | 42.3 | 20 | 3.7 |
| ≥85 years | 898 | 17.0 | 28 | 0.5 |

*100%=sum of hospitals and nursing homes

n: sample size

Table 2: Mixed generalized models regarding patient's information level about hand hygiene

| | OR | 95%CI[OR] | p-value |
|-----------------------------------------------|------|--------------|------------------|
| Facility type | | | |
| Hospital (Ref. *) | 1 | | |
| Nursing home | 1.09 | [0.61; 1.9] | 0.76 |
| Specialty | | | |
| Infectious Diseases (Ref.) | 1 | | <0.001 |
| Surgery | 1.02 | [0.77; 1.37] | |
| Gynaecology-obstetrics | 1.18 | [0.78; 1.8] | |
| Hemodialysis | 6.72 | [4.81; 9.46] | |
| Conventional medicine | 0.93 | [0.7; 1.25] | |
| Psychiatry/FRC ¹ /LTC ² | 1.38 | [1.04; 1.83] | |
| ICU ³ | 1.25 | [0.81; 1.92] | |
| Technical sectors ⁴ | 0.27 | [0.04; 0.97] | |
| Health and social wards | 1.16 | [0.82; 1.63] | |
| Emergencies | 0.77 | [0.27; 1.9] | |
| Age | | | |
| <65 years (Ref.) | 1 | [0.79; 0.99] | 0.04 |
| ≥65 years | 0.89 | | |

¹Follow-up and rehabilitation care; ²Long term care; ³Intensive care unit; ⁴Medical imaging and laboratories

*Ref: the group serving as the reference for the calculation of all the other odds ratio

support, and technical care is less frequent than in the other wards. However, further investigations should be made in the future with a larger sample and variety of health and social welfare institutions.

In France, medical school deans expressed the will to engage patients as teachers in university programs [20]. Patients could become mentors by creating a space for reflexion and express what they experience as recipients in the healthcare system [12]. The French hospital certification now requires audits that include patient feedback through satisfaction scores via different indicators.

Patients' observations are collected in Pulpe'friction to make HCWs aware of the experiences and opinions of

the people to whom they provide care. It helps some practices make more sense to HCWs. This study confirmed the willingness of the patients to be involved, as two-thirds of them agreed to evaluate professional ABHR. As shown by the results of the Patient Reported Outcomes (PROMs) and Patient Reported Experience (PREMs) collection methods, collecting patients' experiences/observations is informative and provides feedback to healthcare teams, particularly in surgery [21], [22], [23] and neurology [24]. PREMs collect information on how patients experience their care, through satisfaction measurements and subjective-experience questionnaires. The

Table 3: Mixed generalized linear models of average patients' observation of professional hand rubbing before care according to average healthcare professionals' self-declared practices

| | Average patients' visibility per ward | | | | | | | | |
|-------------------------------------------------------------|---------------------------------------|------------------|----------------|---------------------------------------|------------------|----------------|-------------------------------------|------------------|----------------|
| | Overall (N ¹ =389) | | | Hospitals (n ¹ =381) | | | Nursing homes (n ¹ =8) | | |
| | β | 95%CI[β] | <i>p.value</i> | β | 95%CI[β] | <i>p.value</i> | β | 95%CI[β] | <i>p.value</i> |
| Average HCWs' self-declared hand rubbing frequency per ward | 0.13 | 0.02–0.23 | 0.02 | 0.14 | 0.03–0.24 | 0.01 | 0.28 | 3.61–3.06 | 0.85 |
| | ≤44 years old (N ¹ = 201) | | | 45-64 years old (N ¹ =290) | | | ≥65 years old (N ¹ =389) | | |
| | β | 95%CI[β] | <i>p.value</i> | β | 95%CI[β] | <i>p.value</i> | β | 95%CI[β] | <i>p.value</i> |
| | 0.42 | 0.21–0.63 | <0.001 | 0.02 | –0.17–0.20 | 0.84 | 0.13 | 0.02–0.23 | 0.02 |

¹number of wards

Table 4: Mixed generalized models of average patients' observations of professional hand rubbing before care

| Variables | Average of patients' observation per ward | | |
|---------------------------------------------------------------------------------|-------------------------------------------|------------------|----------------|
| | β | 95%CI[β] | <i>p-value</i> |
| Importance attributed to professional hand rubbing before care | 0.4 | [0.36; 0.44] | <0.001 |
| Desire to participate in the evaluation of professional practices | | | |
| No (Ref.) | | | |
| Yes | 0.111 | [–0.06; 0.29] | 0.21 |
| Received information about when to perform hand hygiene | | | |
| No (Ref.) | | | |
| Yes | 0.857 | [0.7; 1.02] | <0.001 |
| Importance attached to receiving information about when to perform hand hygiene | 0.169 | [0.14; 0.2] | <0.001 |
| Age | | | |
| <65 years old (Ref.) | | | |
| ≥65 years old | –0.517 | [–0.68; –0.36] | <0.001 |

feedback from patients using PREMs methods can enable HCWs to modify their practices.

To collect patient's experiences/observations also allows the patients to become actors in the healthcare organization. It is now clear that representation of hand hygiene should be improved, whether inside or outside the hospital, as patient awareness regarding hygiene practices can help to reduce the prevalence of HAI [25], [26]. Participation in the evaluation of professional practices could also include the patient's family, as it seems to improve the quality and safety of care [27].

Conclusions

This study showed that patients' reports are correlated with healthcare professionals' declared practices. Further tools could be developed based on Pulpe'friction audits to assess other practices in a social and human approach, including patients and their family.

Notes

Competing interests

The authors declare that they have no competing interests.

All authors are active at the French national mission of transversal support for actions to prevent healthcare-associated infections (Mission d'Appui Transversal de prévention des Infections associées aux Soins – MATIS)

Funding source

None

Consent for publication

All authors reviewed and approved the publication of this manuscript

Acknowledgments

Authors thanks the infection control teams, HCWs and patients who participated to the Pulpe'friction quick audits in 2019.

Author's ORCID

The ORCID ID of Venier AG is: 0000-0002-5077-9820

References

- Larson EL, Early E, Cloonan P, Sugrue S, Parides M. An organizational climate intervention associated with increased handwashing and decreased nosocomial infections. *Behav Med*. 2000;26(1):14-22. DOI: 10.1080/08964280009595749
- Kampf G, Kramer A. Epidemiologic background of hand hygiene and evaluation of the most important agents for scrubs and rubs. *Clin Microbiol Rev*. 2004 Oct;17(4):863-93. DOI: 10.1128/CMR.17.4.863-893.2004
- Pittet D, Allegranzi B, Sax H, Dharan S, Pessoa-Silva CL, Donaldson L, Boyce JM; WHO Global Patient Safety Challenge, World Alliance for Patient Safety. Evidence-based model for hand transmission during patient care and the role of improved practices. *Lancet Infect Dis*. 2006 Oct;6(10):641-52. DOI: 10.1016/S1473-3099(06)70600-4
- Pittet D, Allegranzi B, Boyce J; World Health Organization World Alliance for Patient Safety First Global Patient Safety Challenge Core Group of Experts. The World Health Organization Guidelines on Hand Hygiene in Health Care and their consensus recommendations. *Infect Control Hosp Epidemiol*. 2009 Jul;30(7):611-22. DOI: 10.1086/600379
- Händehygiene in Einrichtungen des Gesundheitswesens: Empfehlung der Kommission für Krankenhaushygiene und Infektionsprävention (KRINKO) beim Robert Koch-Institut (RKI). *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz*. 2016 Sep;59(9):1189-220. DOI: 10.1007/s00103-016-2416-6
- Haverstick S, Goodrich C, Freeman R, James S, Kullar R, Ahrens M. Patients' Hand Washing and Reducing Hospital-Acquired Infection. *Crit Care Nurse*. 2017 Jun;37(3):e1-e8. DOI: 10.4037/ccn2017694
- Widmer AF. Replac hand washing with use of a waterless alcohol hand rub? *Clin Infect Dis*. 2000 Jul;31(1):136-43. DOI: 10.1086/313888
- Kramer A, Mersch-Sundermann V, Gerdes H, Pitten FA, Tronnier H. Toxikologische Bewertung für die Händedesinfektion relevanter antimikrobieller Wirkstoffe. In: Kampf G, editor. *Hände-Hygiene im Gesundheitswesen*. Berlin: Springer; 2003. p. 105-74. DOI: 10.1007/978-3-642-55718-7_5
- Löffler H, Kampf G, Schmermund D, Maibach HI. How irritant is alcohol? *Br J Dermatol*. 2007 Jul;157(1):74-81. DOI: 10.1111/j.1365-2133.2007.07944.x
- Pires D, Soule H, Bellissimo-Rodrigues F, Gayet-Ageron A, Pittet D. Hand Hygiene With Alcohol-Based Hand Rub: How Long Is Long Enough? *Infect Control Hosp Epidemiol*. 2017 May;38(5):547-52. DOI: 10.1017/ice.2017.25
- Kramer A, Pittet D, Klasinc R, Krebs S, Koburger T, Fusch C, Assadian O. Shortening the Application Time of Alcohol-Based Hand Rubs to 15 Seconds May Improve the Frequency of Hand Antisepsis Actions in a Neonatal Intensive Care Unit. *Infect Control Hosp Epidemiol*. 2017 Dec;38(12):1430-4. DOI: 10.1017/ice.2017.217
- Paula H, Becker R, Assadian O, Heidecke CD, Kramer A. Wettability of hands during 15-second and 30-second handrub time intervals: A prospective, randomized crossover study. *Am J Infect Control*. 2018 Sep;46(9):1032-5. DOI: 10.1016/j.ajic.2018.02.015
- Harnoss JC, Dancer SJ, Kaden CF, Baguhl R, Kohlmann T, Papke R, Zygmunt M, Assadian O, Suchomel M, Pittet D, Kramer A. Hand antisepsis without decreasing efficacy by shortening the rub-in time of alcohol-based handrubs to 15 seconds. *J Hosp Infect*. 2020 Apr;104(4):419-24. DOI: 10.1016/j.jhin.2019.09.004
- Duane B, Pilling J, Saget S, Ashley P, Pinhas AR, Lyne A. Hand hygiene with hand sanitizer versus handwashing: what are the planetary health consequences? *Environ Sci Pollut Res Int*. 2022 Jul;29(32):48736-47. DOI: 10.1007/s11356-022-18918-4
- RéPias. Quick audit Hygiène des mains national «Pulpe' friction». Saint-Maurice cedex: Santé publique France; 2019. Available from: <https://www.preventioninfection.fr/wp-content/uploads/2019/07/M%C3%A9thodo-compl%C3%A8te-Pulpe-Friction-1.pdf>
- RStudio – Open source & professional software for data science teams. [cited 2021 Jun 21]. Available from: <https://rstudio.com/5>
- Haute Autorité de Santé. Indicateurs de qualité et de sécurité des soins (IQSS). [cited 2021 Jun 21]. Available from: https://www.has-sante.fr/jcms/r_1500957/fr/indicateurs-de-qualite-et-de-securite-des-soins-iqss
- Guiot D, Urien B. Comprendre le consommateur âgé – Nouveaux enjeux et perspectives. Louvain-la-Neuve: De Boeck Supérieur; 2012. DOI: 10.3917/dbu.guiot.2012.01
- Paque K, Bastiaens H, Van Bogaert P, Dilles T. Living in a nursing home: a phenomenological study exploring residents' loneliness and other feelings. *Scand J Caring Sci*. 2018 Dec;32(4):1477-84. DOI: 10.1111/scs.12599
- Ministère des Solidarités et de la Santé. Des patients enseignants au sein de l'Université Paris 13 – PEP13. 2019 Apr 18 [cited 2021 Jun 21]. Available from: <https://solidarites-sante.gouv.fr/systeme-de-sante-et-medico-social/parcours-de-sante-vos-droits/bonnes-pratiques-en-region/ile-de-france/article/des-patients-enseignants-au-sein-de-l-universite-paris-13-pep13>
- Bansback N, Trenaman L, MacDonald KV, Hawker G, Johnson JA, Stacey D, Marshall DA. An individualized patient-reported outcome measure (PROM) based patient decision aid and surgeon report for patients considering total knee arthroplasty: protocol for a pragmatic randomized controlled trial. *BMC Musculoskelet Disord*. 2019 Feb;20(1):89. DOI: 10.1186/s12891-019-2434-2
- Rolfson O, Bohm E, Franklin P, Lyman S, Denissen G, Dawson J, Dunn J, Eresian Chenok K, Dunbar M, Overgaard S, Garellick G, Lübbecke A; Patient-Reported Outcome Measures Working Group of the International Society of Arthroplasty Registries. Patient-reported outcome measures in arthroplasty registries Report of the Patient-Reported Outcome Measures Working Group of the International Society of Arthroplasty Registries Part II. Recommendations for selection, administration, and analysis. *Acta Orthop*. 2016 Jul;87 Suppl 1(Suppl 1):9-23. DOI: 10.1080/17453674.2016.1181816
- Black N, Varaganum M, Hutchings A. Relationship between patient reported experience (PREMs) and patient reported outcomes (PROMs) in elective surgery. *BMJ Qual Saf*. 2014 Jul;23(7):534-42. DOI: 10.1136/bmjqs-2013-002707

24. Breckenridge K, Bekker HL, Gibbons E, van der Veer SN, Abbott D, Briançon S, Cullen R, Garneata L, Jager KJ, Lønning K, Metcalfe W, Morton RL, Murtagh FE, Prutz K, Robertson S, Rychlik I, Schon S, Sharp L, Speyer E, Tentori F, Caskey FJ. How to routinely collect data on patient-reported outcome and experience measures in renal registries in Europe: an expert consensus meeting. *Nephrol Dial Transplant*. 2015 Oct;30(10):1605-14. DOI: 10.1093/ndt/gfv209
25. Stewardson AJ, Sax H, Gayet-Ageron A, Touveneau S, Longtin Y, Zingg W, Pittet D. Enhanced performance feedback and patient participation to improve hand hygiene compliance of health-care workers in the setting of established multimodal promotion: a single-centre, cluster randomised controlled trial. *Lancet Infect Dis*. 2016 Dec;16(12):1345-55. DOI: 10.1016/S1473-3099(16)30256-0
26. Diefenbacher S, Pfattheicher S, Keller J. On the Role of Habit in Self-Reported and Observed Hand Hygiene Behavior. *Appl Psychol Health Well Being*. 2020 Mar;12(1):125-43. DOI: 10.1111/aphw.12176
27. Johnson KE, Mroz TM, Abraham M, Figueroa Gray M, Minniti M, Nickel W, Reid R, Sweeney J, Frosch DL, Ness DL, Hsu C. Promoting Patient and Family Partnerships in Ambulatory Care Improvement: A Narrative Review and Focus Group Findings. *Adv Ther*. 2016 Aug;33(8):1417-39. DOI: 10.1007/s12325-016-0364-z

Corresponding author:

Dr. Anne-Gaëlle Venier
CPIas Nouvelle-Aquitaine, CHU Pellegrin, bâtiment le
Tondu, place Amelie raba-leon, 330076 Bordeaux cedex,
France, Phone: + 33 5 56 79 60 58
anne-gaëlle.venier@chu-bordeaux.fr

Please cite as

Velardo F, Péfau P, Nasso R, Parneix P, Venier AG. Using patients' observations to evaluate healthcare workers' alcohol-based hand rub with Pulpe'friction audits: a promising approach? *GMS Hyg Infect Control*. 2023;18:Doc29.
DOI: 10.3205/dgkh000455, URN: urn:nbn:de:0183-dgkh0004554

This article is freely available from

<https://doi.org/10.3205/dgkh000455>

Published: 2023-11-29

Copyright

©2023 Velardo et al. This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 License. See license information at <http://creativecommons.org/licenses/by/4.0/>.