

C. 3.

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**  
**KARYA ILMIAH : JURNAL ILMIAH**

Judul Karya Ilmiah (Artikel) : Occupational Exposure on Gasoline Station Workers Not Affect the Nasal Mucociliary Clearance Time and Pulmonary Function Test

Jumlah Penulis : 5 Orang

Status Pengusul : **Awal Prasetyo**, Salim Darry, Drestanta Redyaksa, Udadi Sadhana, Armunanto Sigit

Identitas Jurnal Ilmiah :

- a. Nama Jurnal : Advanced Science Letters
- b. Nomor ISSN : 2046-1402
- c. Vol, Nomor, halaman : Vol. 23 issue 4,p:3406-3408
- d. Edisi : April 2017
- e. Penerbit : American Scientific Publishers
- f. Jumlah halaman : 3
- g. DOI artikel (jika ada) : <https://doi.org/10.1166/asl.2017.9109>
- h. Alamat web jurnal : <https://www.ingentaconnect.com/contentone/asp/asl/2017/00000023/00000004/art00189>
- i. Terindeks di : Q3, SJR = 0,13
- j. On line turnitin : <https://doc-pak.undip.ac.id/2565/1/Turnitin-Occupational-Exposure.pdf>

Kategori Publikasi Jurnal Ilmiah :  **Jurnal Ilmiah Internasional Bereputasi/ Internasional \*\***  
 (beri ✓ pada kategori yang tepat)  Jurnal Ilmiah Nasional Terakreditasi  
 Jurnal Ilmiah Nasional/Nasional

Hasil Penilaian Peer Review :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
	Internasional / Internasional Bereputasi ** 40	Nasional Terakreditasi □	Nasional *** □	
a. Kelengkapan unsur isi artikel (10%)	4			4
b. Ruang lingkup dan kedalaman pembahasan (30%)	12			11
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	12			11
d. Kelengkapan unsur dan kualitas terbitan/ jurnal (30%)	12			12
<b>Total = (100%)</b>	<b>40</b>			<b>38</b>
<b>Nilai Pengusul =</b>			<b>60% x 38 = 22.8</b>	

**Catatan penilaian Artikel oleh Reviewer**

a. Kelengkapan unsur isi artikel	Unsur artikel lengkap: abstrak-pendahuluan-Metode-Hasil dan Pembahasan ditulis lengkap dan jelas
b. Ruang lingkup dan kedalaman pembahasan	Ruang lingkup sesuai bidang ilmu pengusul (Kedokteran-Kesehatan), Hasil dibahas dan dijelaskan cukup dalam dan membandingkan dg penelitian2 lain sebelumnya
c. Kecukupan dan kemutakhiran data/informasi dan metodologi:	Penelitian observasional dengan desain belah lintang membandingkan Mucociliary Clearance Time and Pulmonary Function Test pada Pekerja pompa bensin dan bukan. Data dikumpulkan dan diukur dengan kaidah ilmiah yg baik
d. Kelengkapan unsur dan kualitas terbitan/ jurnal	Jurnal internasional bereputasi Q3, SJR = 0,13

Semarang,  
 Reviewer 1



Prof. Dr. dr. Tri Nur Kristina, DMM, M.Kes  
 NIP. 19590527 198603 2 001  
 Bidang kerja : Fakultas Kedokteran Undip  
 Unit ilmu : Ilmu Kedokteran  
 Jabatan pangkat : Guru Besar

**LEMBAR  
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW  
KARYA ILMIAH : JURNAL ILMIAH**

Judul Karya Ilmiah (Artikel) : Occupational Exposure on Gasoline Station Workers Not Affect the Nasal Mucociliary Clearance Time and Pulmonary Function Test

Jumlah Penulis : 5 Orang

Status Pengusul : **Awal Prasetyo**, Salim Darry, Drestanta Redyaksa, Udadi Sadhana, Armunanto Sigit

Identitas Jurnal Ilmiah :

- a. Nama Jurnal : Advanced Science Letters
- b. Nomor ISSN : 2046-1402
- c. Vol, Nomor, halaman : Vol. 23 issue 4.p:3406-3408
- d. Edisi : April 2017
- e. Penerbit : American Scientific Publishers
- f. Jumlah halaman : 3
- g. DOI artikel (jika ada) : <https://doi.org/10.1166/asl.2017.9109>
- h. Alamat web jurnal : <https://www.ingentaconnect.com/contentone/asp/asl/2017/00000023/00000004/art00189>
- i. Terindeks di : Q3, SJR = 0,13
- j. On line turnitin : <https://doc-pak.undip.ac.id/2565/1/Turnitin-Occupational-Exposure.pdf>

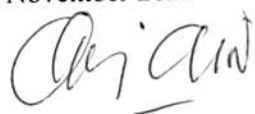
Kategori Publikasi Jurnal Ilmiah :  **Jurnal Ilmiah Internasional** / Internasional Bereputasi \*\*  
 (beri ✓ pada kategori yang tepat)  Jurnal Ilmiah Nasional Terakreditasi  
 Jurnal Ilmiah Nasional/Nasional

Hasil Penilaian Peer Review :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
	Internasional / Internasional Bereputasi ** 40	Nasional Terakreditasi <input type="checkbox"/>	Nasional *** <input type="checkbox"/>	
a. Kelengkapan unsur isi artikel (10%)	4			3,2
b. Ruang lingkup dan kedalaman pembahasan (30%)	12			11,5
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12			11,8
d. Kelengkapan unsur dan kualitas terbitan/ jurnal (30%)	12			11,8
<b>Total = (100%)</b>	40			38,3
<b>Nilai Pengusul =</b>			60% x 38,3 =	22,98

Catatan penilaian Artikel oleh Reviewer :

- a. Kelengkapan unsur isi artikel : abstrak lengkap dan informatif. Sistematika penulisan sesuai kaidah penulisan ilmiah. Pada metode tidak tercantum kriteria inklusi dan eksklusi. Rekomendasi penelitian dari KEPK FK Undip /RSDK. Pustaka pendukung relevan namun 84% > 10 tahun
- b. Ruang lingkup dan kedalaman pembahasan : ruang lingkup sesuai dengan bidang ilmu THT pengusul, mengetahui NMCC dan fungsi paru pekerja SPBU, hasil penelitian ini penting untuk keselamatan kerja bagi pegawai SPBU. Pembahasan luas dan dalam dengan mensitasi penelitian terdahulu
- c. Kecukupan dan kemutahiran data/informasi dan metodologi: studi kasus kontrol, sampel diambil dari subjek pekerja SPBU dan non SPBU. Cara pengambilan dan pengukuran sampel terstandar, analisis statistic menggunakan Pearson chi-square
- d. Kelengkapan unsur dan kualitas terbitan/ jurnal: Advanced Science Letters, merupakan jurnal Internasional terindeks Scopus (Q3), SJR 0,13; Penerbit : American Scientific Publishers

Semarang, 14 November 2022  
 Reviewer 2  


Prof. Dr. drg. Oedijani, MS  
 Bidang kerja : Fakultas Kedokteran Undip  
 Unit ilmu : Ilmu Kedokteran  
 Jabatan pangkat : Guru Besar

VOLUME 23 • NUMBER 4

APRIL 2017

[www.aspbs.com/science](http://www.aspbs.com/science)

*Advanced*

# SCIENCE

A Journal Dedicated to All Aspects  
of Scientific Research

# LETTERS

*Editor-in-Chief: Dr. Hari Singh Nalwa, USA*

*Special Sections on*

**2016 International Conference on Social Sciences and Humanities (SOSHUM 2016)**

**Kota Kinabalu, Sabah, Malaysia, 19–21 April 2016**

GUEST EDITORS: Mohd Shakir Bin Md. Saat, Hamzah Asyrani Bin Sulaiman,  
Mohd Azlishah Bin Othman, and Nurul' Atiqah Binti Hamid

**International Conference on Public Health for Tropical and Coastal Development**

**Semarang, Indonesia, 15–17 October 2016**

GUEST EDITOR: Hanifa M. Denny

**The Internet Data Telecommunication and Satellite 2016**

**Bali, Indonesia, 17–18 December, 2016**

GUEST EDITOR: Ford Lumban Gaol



AMERICAN  
SCIENTIFIC  
PUBLISHERS

Aims and Scope
Editorial Board
Instructions for Authors
Contact Information
Subscription Information
Copyright Transfer Agreement
Indexed/Abstracted
Cover Library
Contents

## Advanced Science Letters

ISSN: 1936-6612 (Print); EISSN: 1936-7317 (Online)  
Copyright © 2000-2020 American Scientific Publishers. All Rights Reserved.

### EDITORIAL BOARD

#### EDITOR-IN-CHIEF

**Professor Ahmad Umar**

Department of Chemistry, College of Science and Arts  
Promising Centre for Sensors and Electronic Devices (PCSED)  
Najran University, P.O. Box: 1988, Najran 11001, Kingdom of Saudi Arabia  
Phone: +966-534-574-597  
Fax: +966-7-5442-135  
Email: [advsci.asp@gmail.com](mailto:advsci.asp@gmail.com)

#### ASIAN EDITOR

**Dr. Katsuhiko Ariga, PhD**

Advanced Materials Laboratory  
National Institute for Materials Science  
1-1 Namiki, Tsukuba, Ibaraki 305-0044, JAPAN

#### ASSOCIATE EDITORS

**Diederik Aerts** (Quantum theory, Cognition, Evolution theory)  
Brussels Free University, Belgium.

**Yakir Aharonov** (Physics, Quantum Physics)  
School of Physics and Astronomy, Israel.

**Peter C. Aichelburg** (Gravitation)  
University of Vienna, Austria.

**Jim Al-Khalili** (Foundations of Physics, Nuclear Reaction Theory)  
University of Surrey, UK.

**Jake Blanchard** (Engineering Physics, Nuclear Engineering)  
University of Wisconsin–Madison, USA.

**Simon Baron-Cohen** (Cognitive Neuroscience)  
University of Cambridge, UK.

**Franz X. Bogner** (Cognitive Achievement)  
University of Bayreuth, Germany.

**John Borneman** (Anthropology)  
Princeton University, USA.

**John Casti** (Complexity Science)  
Internationales Institut für Angewandte Systemanalyse, Austria.

**Masud Chaichian** (High Energy Physics, String Theory)  
University of Helsinki, Finland.

**Sergey V. Chervon** (Gravitation, Cosmology, Astrophysics)  
Ulyanovsk State Pedagogical University, Russia

**Kevin Davey** (Philosophy of Science)  
University of Chicago, Chicago, USA.

**Tania Dey** (Colloids/Polymers/Nanohybrids)  
Canada.

**Roland Eils** (Bioinformatics)  
Deutsches Krebsforschungszentrum Heidelberg, Germany.

**Thomas Görnitz** (Quantum theory, Cosmology)  
University of Frankfurt, Germany.

**Bert Gordijn** (Nanoethics, Neuroethics, Bioethics)  
Radboud University Nijmegen, The Netherlands.

**Ji-Huan He** (Textile Engineering, Functional Materials)  
Soochow University, Suzhou, China.

**Nongyue He** (Biosensors/Biomaterials)  
China.

**Irving P. Herman** (Materials and Solid State Physics)  
Columbia University, USA.

**Dipankar Home** (Foundations of Quantum Mechanics)  
Bose Institute, Kolkata, India.

**Jucundus Jacobeit** (Climate, Global Change Ecology)  
University of Augsburg, Germany.



- Yuriy A. Knirel** (Bioorganic Chemistry)  
N. D. Zelinsky Institute of Organic Chemistry, Russia.
- Arthur Konnerth** (Neurophysiology, Molecular Mechanisms)  
University of Munich, Germany.
- G. A. Kourouklis** (Physics Solid State Physics)  
Aristotle University Thessaloniki, Greece.
- Peter Krammer** (Genetics)  
Deutsches Krebsforschungszentrum Heidelberg, Germany.
- Andrew F. Laine** (Biomedical Engineering)  
Columbia University, USA.
- Minbo Lan** (Organic Functional Materials)  
China.
- Martha Lux-Steiner** (Physics, Materials Science)  
Hahn-Meitner-Institut Berlin, Germany.
- Klaus Mainzer** (Complex Systems, Computational Mind, Philosophy of Science)  
University of Augsburg, Germany.
- JoAnn E. Manson** (Medicine, Cardiovascular Disease)  
Harvard University, USA.
- Mark P. Mattson** (Neuroscience)  
National Institute on Aging, Baltimore, USA.
- Lucio Mayer** (Astrophysics, Cosmology)  
ETH Zürich, Switzerland.
- Karl Menten** (Radioastronomy)  
Max-Planck-Institut für Radioastronomie, Germany.
- Yoshiko Miura** (Biomaterials/Biosensors)  
Japan.
- Fred M. Mueller** (Solid State Physics)  
Los Alamos National Laboratory, USA.
- Garth Nicolson** (Illness Research, Cancer Cell Biology)  
The Institute for Molecular Medicine, Huntington Beach, USA.
- Nina Papavasiliou** (DNA Mutators, Microbial Virulence, Antiviral Defence, Adaptive Immunity, Surface Receptor Variation)  
The Rockefeller University, New York, USA.
- Panos Photinos** (Physics)  
Southern Oregon University, USA.
- Zhiyong Qian** (Biomedical Engineering, Biomaterials, Drug Delivery)  
Sichuan University, CHINA.
- Reinhard Schlickeiser** (Astrophysics, Plasma Theory and Space Science)  
Ruhr-Universität Bochum, Germany.
- Surinder Singh** (Sensors/Nanotechnology)  
USA.
- Suprakas Sinha Ray** (Composites/Polymer Science)  
South Africa.
- Koen Steemers** (Architecture, Environmental Building Performance)  
University of Cambridge, UK.
- Shinsuke Tanabe** (Environmental Chemistry and Ecotoxicology)  
Ehime University, Japan.
- James R. Thompson** (Solid State Physics)  
The University of Tennessee, USA.
- Uwe Ulbrich** (Climat, Meteorology)  
Freie Universität Berlin, Germany.
- Ahmad Umar** (Advanced Materials)  
Najran University, Saudi Arabia.
- Frans de Waal** (Animal Behavior and Cognition)  
Emory University, USA.

### EDITORIAL BOARD

- Filippo Aureli**, Liverpool John Moores University, UK  
**Marcel Ausloos**, Université de Liège, Belgium  
**Martin Bojowald**, Pennsylvania State University, USA  
**Sougato Bose**, University College, London, UK  
**Jacopo Buongiorno**, MIT, USA  
**Paul Cordopatis**, University of Patras, Greece

**Maria Luisa Dalla Chiara**, University of Firenze, Italy  
**Dionysios Demetriou Dionysiou**, University of Cincinnati, USA  
**Simon Eidelman**, Budker Institute of Nuclear Physics, Russia  
**Norbert Frischauf**, QASAR Technologies, Vienna, Austria  
**Toshi Futamase**, Tohoku University, Japan  
**Leonid Gavrilov**, University of Chicago, USA  
**Vincent G. Harris**, Northeastern University, USA  
**Mae-Wan Ho**, Open University, UK  
**Keith Hutchison**, University of Melbourne, Australia  
**David Jishiasvili**, Georgian Technical University, Georgia  
**George Khushf**, University of South Carolina, USA  
**Sergei Kulik**, M.V.Lomonosov Moscow State University, Russia  
**Herald Kunstmann**, Institute for Meteorology and Climate Research, Forschungszentrum Karlsruhe, Germany  
**Alexander Lebedev**, Laboratory of Semiconductor Devices Physics, Russia  
**James Lindesay**, Howard University, USA  
**Michael Lipkind**, Kimron Veterinary Institute, Israel  
**Nigel Mason**, Open University, UK  
**Johnjoe McFadden**, University of Surrey, UK  
**B. S. Murty**, Indian Institute of Technology Madras, Chennai, India  
**Shahab A. A. Nami**, Aligarh Muslim University, India  
**Heiko Paeth**, Geographisches Institut der Universität Würzburg, Germany  
**Matteo Paris**, Università di Milano, Italia  
**David Posoda**, University of Vigo, Spain  
**Paddy H. Regan**, University of Surrey, UK  
**Leonidas Resvanis**, University of Athens, Greece  
**Wolfgang Rhode**, University of Dortmund, Germany  
**Derek C. Richardson**, University of Maryland, USA  
**Carlos Romero**, Universidade Federal da Paraíba, Brazil  
**Andrea Sella**, University College London, London, UK  
**P. Shankar**, Indira Gandhi Centre for Atomic Research, Kalpakkam, India  
**Surya Singh**, Imperial College London, UK  
**Leonidas Sotiropoulos**, University of Patras, Greece  
**Roger Strand**, University of Bergen, Norway  
**Karl Svozil**, Technische Universität Wien, Austria  
**Kit Tan**, University of Copenhagen, Denmark  
**Roland Triay**, Centre de Physique Théorique, CNRS, Marseille, France  
**Rami Vainio**, University of Helsinki, Finland  
**Victor Voronov**, Bogoliubov Laboratory of Theoretical Physics, Dubna, Russia  
**Andrew Whitaker**, Queen's University Belfast, Northern Ireland  
**Lijian Xu**, Hunan University of Technology, China  
**Alexander Yefremov**, Peoples Friendship University of Russia, Russia  
**Avraam Zeligidis**, University of Patras, Greece  
**Alexander V. Zolotaryuk**, Ukrainian Academy of Sciences, Ukraine

---

[Terms and Conditions](#) [Privacy Policy](#) Copyright © 2000-2020 American Scientific Publishers. All Rights Reserved.

Safety Climate and Construction Workers' Compliance on the Use of Personal Protective Equipment in Construction Project Jakarta

pp. 3399-3401(3)

**Authors:** *Alfanti, Galuh; Sawitri, Dian Ratna*

---

How Traditional Fishermen Prevent Accidents in Semarang Residential

pp. 3402-3405(4)

**Author:** *Widjasena, Baju*

---

Occupational Exposure on Gasoline Station Workers Not Affect the Nasal Mucociliary Clearance Time and Pulmonary Function Test

pp. 3406-3408(3)

**Authors:** *Prasetyo, Awal; Darry, Salim; Samuel, .; Redyaksa, Drestanta; Sadhana, Udadi; Sigit, Armunanto*

---

Cultivating the Research Environment to Enhance Quality of Life of Academics in an University Setting

pp. 3409-3410(2)

**Authors:** *Sawitri, Dian Ratna; Nurtjahjanti, Harlina; Prasetyo, Anggun Resdasari*

---

Correlation Between Tenure, BMI and Musculoskeletal Disorders Complaints Among Gemstone Craftsman in Keramat Village East Martapura District

pp. 3411-3413(3)

**Authors:** *Setyaningrum, Ratna; Hikmah, Noor; Pujianti, Nita*

---

Promotion of Safety and Health in Informal Sector by Primary Health Center in Semarang

pp. 3414-3416(3)

**Authors:** *Wahyuni, Ida; Ekawati, .*

---

The Effect of Exclusive Breastfeeding Practice on Maternal Anthropometry and Body Fat Changes

pp. 3417-3420(4)

**Author:** *Pangestuti, Dina Rahayuning*

---

The Difference of BMI and Micronutrient Intake Between Multibacillary Leprosy and Non Leprosy (A Study in District Brondong, Lamongan 2013)

pp. 3421-3423(3)

**Authors:** *Fatimah, Siti; Rahfiludin, M. Zen*

---

Promoting Healthy Diet Through Peer Nutrition Counseling *Posyandu Remaja* in Semarang City, Central Java, Indonesia

pp. 3424-3426(3)

**Authors:** Noer, Etika Ratna; Dieny, Fillah Fithra; Panunggal, Binar

---

Nutritional and Antinutritional Properties of *lindur* (*Bruguiera gymnorrhiza*) Fruits Flour from Different Pre-Treatments

pp. 3427-3430(4)

**Authors:** Dewi, Eko Nurcahya; Kurniasih, Retno Ayu; Purnamayati, Lukita

---

The Risk Factors of Underweight Among Under-Five Children in Rural Area of Central Java, Indonesia

pp. 3431-3434(4)

**Author:** Suyatno, .

---

Positive Correlation Between Kidney Injury Molecule-1 and Gentamicin Trough Level in Neonates with Infection

pp. 3435-3438(4)

**Authors:** Dwijayanti, Adisti; Louisa, Melva; Rundjan, Lily; Simanjuntak, Ernawati; Setiabudy, Rianto

---

Antenatal Depression and Its Determinant Factors in Urban Community Setting

pp. 3439-3441(3)

**Authors:** Anindyajati, Gina; Ismail, R. Irawati; Diatri, Hervita; Elvira, Sylvia D

---

The Prediction Model for Low Birth Weight in Batang District, Central Java, Indonesia

pp. 3442-3444(3)

**Authors:** Kartasurya, Martha Irene; Dharmawan, Yudhy; Widjanarko, Bagoes; Handayani, Novia

---

Reliability Testing of Screening Instruments for Antenatal Depression and Associated Risk Factors in Urban Primary Care

pp. 3445-3447(3)

**Authors:** Ismail, R. Irawati; Anindyajati, Gina; Diatri, Hervita; Elvira, Sylvia D

---

Factors Related to Self-Efficacy for Early Marriage in Bangka Belitung Island Province, Indonesia

pp. 3448-3450(3)

**Author:** Antarini, .

---





# Training and Education in Occupational Health—A Global Challenge

Norbert L. Wagner

*Saw Swee Hock School of Public Health, National University of Singapore, Singapore*

*Background:* “Occupational risks” rank only #14 globally and in low-income countries as causes of death. For working age adults (15–49 yrs) occupational risks are worldwide the #1 cause of disability with around 25 mill YLD ahead of malnutrition with 18.5 mill YLD and constitute the MAJOR contributor to early disability and loss of income for families. *Method:* We look at the Global Burden of Disease Study 2015 and its recent publications to see where “occupational risks” rank in their impact on the health of populations. *Results:* The impact of poor workplace health and safety on disability in Indonesia is dramatic. We see then that Occupational Risks are the #2 reason for disability during the adult working age, being the #1 reason for men and #3 reason for women behind high plasma glucose and malnutrition. *Conclusion:* Occupational risks have a major impact on the health of populations and the economy of a country as well as the income of families. We need to focus on teaching the important risks that have been identified: chemicals, particulates, ergonomic risks. To prevent the exposure from these risks should become a standard competency for all health professionals.

**Keywords:** Occupational Health, Global Burden of Disease, Teaching, Chemicals, Particulates, Ergonomics.

Copyright: American Scientific Publishers  
Delivered by Ingenta

## 1. INTRODUCTION

Risks to health arising from workplace exposures usually do not figure prominently on the big agendas of governments or development agencies. However, when we look at the Global Burden of Disease Study 2015 and its recent publications<sup>1</sup> we see that “occupational risks” rank only #14 globally and in low-income countries as causes of death.

So, why should we look at occupational risks when malnutrition, alcohol and drug abuse, high BMI or dietary risks are so much more important? We will take a closer look at the importance of “occupational risks” for a nation in terms of health and economy and highlight the topics that should be central for teaching Occupational Health.

## 2. METHOD

Taking a closer look at the Global Burden of Disease Study 2015 (GBD) we see the pictures change when we focus on causes for disability (measured in Years Lived with Disability, YLD) and on the causes of deaths and disability arising from workplace exposures. Doing so we need to keep two things in mind

(1) The GBD only accounts for roughly 65% of all health events, deaths or disability. The other third of all health events is not included as there are no reliable data available to make better estimates.

(2) Around 70% of the workforce globally works in the informal sector. A sector that is hard to reach with any intervention, technical or educational.

## 3. RESULTS

Regarding the Years Lived with Disability, only malnutrition (around 54 mill YLD) and high plasma glucose (around 41 mill YLD), a proxy for Diabetes, seem globally more important than occupational risks (around 36 mill YLD).<sup>2</sup> Workplace risks rise to the #2 most important cause of disability for low-income countries (World Bank classification) even though our analysis at that point includes all human beings from 1 day of age until over 80 years of age.

Zooming in on the economically so important group of working age adults we see that Occupational risks are worldwide the #1 cause of disability with around 25 mill YLD ahead of malnutrition with 18.5 mill YLD. In other words, Occupational risks are the MAJOR contributor to early disability and loss of income for families.

When we focus on one country, Indonesia, we see how this analysis can help us focus our efforts in education and training in workplace safety and health.

In Indonesia, occupational health risks account for approximately 5 out of 100,000 deaths per year for 15–49 year old adults (see Table I), a comparatively low rate compared to the rate for high blood pressure with around 35 per 100,000.

The impact of poor workplace health and safety on disability and years of healthy life lost in Indonesia is however dramatic. We see then that Occupational Risks are the #2 reason for disability during the adult working age, being the #1 reason for men and #3 reason for women behind high plasma glucose and malnutrition.



# Small Island Developing States, Climate Change, and Food and Nutrition Security

Lisa Schubert<sup>1,\*</sup>, Wendy Foley<sup>1,2</sup>, Amy Savage<sup>1</sup>, and Grace Muriuki<sup>3</sup>

<sup>1</sup>The University of Queensland, School of Public Health, Herston Road, Herston, Queensland 4006, Australia

<sup>2</sup>Southern Queensland Centre of Excellence in Aboriginal and Torres Strait Islander Primary Health Care, 37 Wirraway Parade, Inala QLD 4077, Australia

<sup>3</sup>The University of Queensland, Global Change Institute, St Lucia Queensland 4067, Australia

*Background:* Climate change is a critical concern globally and small island developing states in the Pacific region are especially vulnerable to climate change-related phenomena. Pacific Islands have been identified as being amongst the countries most vulnerable to the health impacts of climate change. The purpose of this paper is to describe impacts of climate change on food and nutrition security in Pacific Island countries, the mechanisms linking climate change and nutrition, and strategies and policies to address them. *Method:* A literature review and documentary analysis was undertaken. Case materials from Pacific Island countries are used to illustrate both climate change impacts and promising strategies. *Results:* Climate change exacerbates the existing burden of malnutrition. Food and nutrition security are affected through changes in local food production and transition from traditional nutritious diets to dependence on less nutritious imported foods, undermining efforts to reduce hunger and promote nutrition. Undernutrition, in turn, weakens climate resilience and the coping strategies of vulnerable populations. Nutrition-sensitive adaptation and mitigation measures, climate-resilient and nutrition-sensitive agriculture development, improved maternal and child care and health, and both community development and food system resilience measures are proposed as means to address the impacts of climate change on food and nutrition security. *Conclusion:* Pacific Island countries should not face these challenges alone. Strengthened global, regional and community responses to organize better preparedness, adaptation and mitigation against climate change and its impact on nutrition in Pacific island countries is needed. Specific opportunities to address these issues in the Pacific will be presented.

**Keywords:** Climate Change, Food and Nutrition Security, Small Island Developing States, Pacific Island Countries.

## 1. INTRODUCTION

Climate change is a critical concern globally and small island developing states (SIDS) in the Pacific region are especially vulnerable to climate change-related phenomena.<sup>1,2</sup> Increasing policy, development, scientific and public health attention is being paid to climate change risks and vulnerabilities, and to climate change-related preparedness, adaptation, and mitigation. While those most responsible for anthropogenic climate change reside in industrialized countries, Pacific Island peoples are among those most impacted from its health consequences,<sup>3</sup> including from malnutrition and food insecurity.

The Pacific Ocean is home to 20 SIDS with diverse geography, populations, cultures and economies. Populations inhabit 2 distinct Island types: High islands (volcanic) and low islands (coral atolls) spread over three subregions of Melanesia, Micronesia and Polynesia. Land area comprises only 2% of the combined

jurisdictions of all Pacific SIDS, being dwarfed by their Exclusive Economic Zones. The total population is less than 11 million.

Traditional lifestyles in Pacific SIDS depend on subsistence livelihoods including agriculture, fishing, hunting and wild foraging, with Pacific Islander peoples having developed sophisticated management of both terrestrial and marine food production systems. Today, while subsistence activities still persist, income generation activities and trade policies have resulted in imported foods becoming readily available for many. Simultaneously, inadequate food security in Pacific Islands is worsening as a consequence of multiple factors: a decline in local availability and production of subsistence foods; a lack of income to purchase adequate alternative foods; falling food production per capita, low or absent growth in agricultural production, and inadequate support for subsistence agriculture, and increased and costly dependence on food imports.<sup>4,5</sup>

Dietary patterns have shifted over the past 50 years from reliance on traditional low-fat diets, rich in root vegetables

\* Author to whom correspondence should be addressed.