

HOW WELL BUILDING STANDARD CAN IMPROVE THE EFFICIENCY OF LABOUR AND WELLBEING OF HEALTHCARE WORKERS

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continents

87,000

150+

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О компании АЕСОМ

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В сферу наших услуг входит проектирование, строительство, финансовое управление и управление инфраструктурными активами для заказчиков из государственного и частного секторов в более чем 150 странах.

Будучи полностью интегрированной компанией, мы объединяем знания и опыт наших экспертов из разных уголков мира для того, чтобы помочь нашим клиентам реализовать самые трудновыполнимые проекты.

Наша деятельность во всем ее разнообразии направлена на самые важные аспекты жизни и носит преобразовательный характер, будь то создание высококачественных зданий, объектов инфраструктуры,

МИКРОРАЙОНОВ И ОКРУЖАЮЩИХ СРЕД ИЛИ СТАБИЛЬНАЯ И НАДЕЖНАЯ РЕАЛИЗАЦИЯ ГОСУДАРСТВЕННЫХ ПРОЕКТОВ.

01 AECOM



CLIENTS RELY ON AECOM TO SOLVE CHALLENGES THAT HEALTHCARE SYSTEMS FACE WHEN PLANNING NEW AND RENOVATED FACILITIES — AND THE IMPORTANCE OF GETTING IT RIGHT IS CRITICAL.



SERVICES INCLUDE:

- Concept design
- Design development
- Interior design
- Design and technical documentation for approvals
- Initial client project briefs

- Design and technical documentation for tender
- Strategic planning
- Master planning
- Landscape architecture and urban design
- Environmental and ecological planning

01 AECOM Healthcare



CLIENTS RELY ON AECOM TO SOLVE CHALLENGES THAT HEALTHCARE SYSTEMS FACE WHEN PLANNING NEW AND RENOVATED FACILITIES — AND THE IMPORTANCE OF GETTING IT RIGHT IS CRITICAL.

We are a leader in delivering acute care, ambulatory and critical care centers. specialized laboratory spaces, biomedical research facilities, life sciences centers, senior living housing and medical administrative buildings. constant advancement The technology, ever-changing patient demographics, and more stringent regulations is critical in the healthcare market, and our technical professionals are acutely aware of the complexities and requirements.

Around the world, we create healing environments that offer quiet overnight sterile operating stavs, rooms. cleanroom research laboratories, visitorfriendly accommodations, and places of rest and recuperation. Our project experience has earned special recognition within the healthcare industry, because we listen and respond with solutions that support and articulate each client's vision through the eyes of patients, families, medical staff and the surrounding community.



66

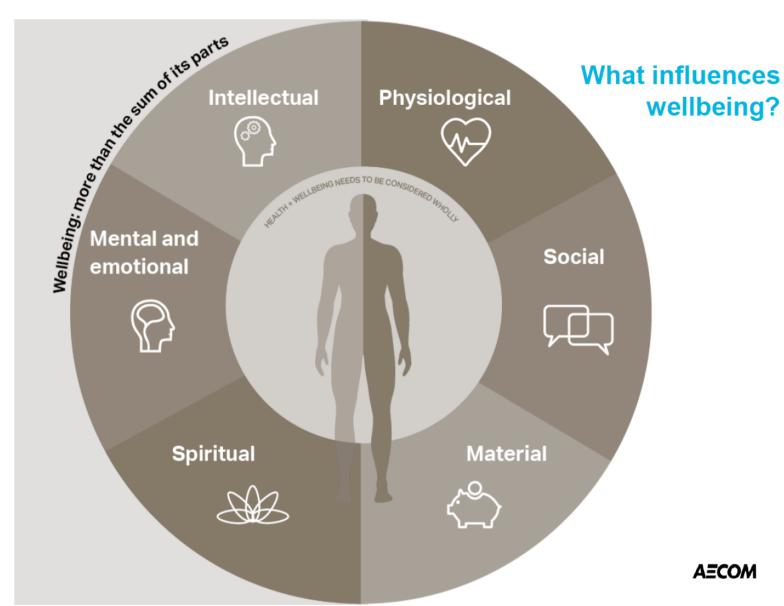
HEALTH IS A STATE OF COMPLETE PHYSICAL,
MENTAL, AND SOCIAL WELL-BEING, AND NOT
MERELY THE ABSENCE OF DISEASE OR INFIRMITY.

THE WORLD HEALTH ORGANIZATION

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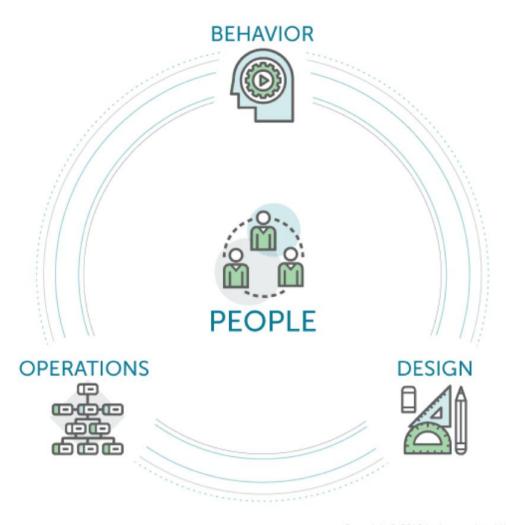








WELL IS HOLISTIC



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DEVELOPMENT OF WELL









2014

IWBI launches the **WELL Building StandardTM** after a six-year, expert peer review process that spanned three phases: scientist, practitioner and medical



With the debut of the WELL Community StandardTM pilot, IWBI expanded its scope to set a new global benchmark for healthy communities at the district-scale

2018

Condensing learnings from WELL users, project outcomes and the latest research, IWBI rolls out the WELL v2TM pilot. The next version of WELL represents a new paradigm for supporting human health through better buildings.

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A COMPREHENSIVE APPROACH TO WELL-BEING

The WELL Building Standard is made up of features that address ten concepts:







WATER



NOURISHMENT



LIGHT



MOVEMENT









MIND



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SILVER, GOLD OR PLATINUM







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Levels of certification

STANDARD VERSION	LEVEL OF ACHIEVEMENT	PRECONDITIONS THAT MUST BE ACHIEVED	OPTIMIZATIONS THAT MUST BE ACHIEVED
WELL Building Standard®	Silver Certification	All applicable	None
	Gold Certification	All applicable	40% of applicable
	Platinum Certification	All applicable	80% of applicable

Certification process



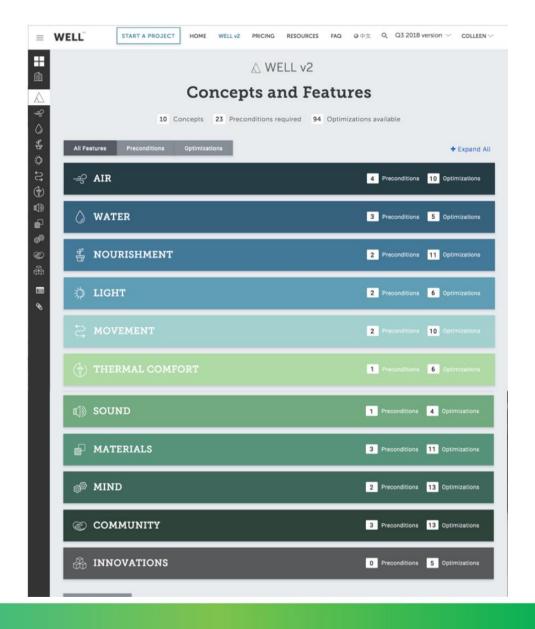


Scorecard

DYNAMIC SCORECARD

- Leverage the WELL v2 digital platform to create a custom scorecard
- Enter your project details and browse a selection of suggested features tailored to help you achieve your project's unique goals.











Concentrations of some pollution indicators can be 2-5 times higher indoors compared to outdoors.¹

Polluted air is the number one environmental cause of premature mortality, contributing to 200,000 premature deaths annually in the United States alone and approximately seven million, or one in eight, premature deaths globally.²

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^{1.} Calazzo F, Ashok A, Waitz IA, Yim SHL, Barrett SRH. Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005. Atmospheric Environment. 2013;79:198-208

^{2.} World Health Organization. 7 million premature deaths annually linked to air pollution. 2014; http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/. Accessed May 20, 2016.

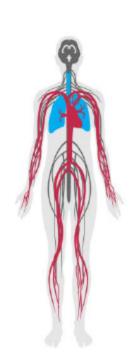
Air

The WELL Building
Standard for Air promotes
clean air through reducing
or minimizing the sources
of indoor air
pollution, requiring optimal
indoor air quality to
support the health wellbeing of building
occupants.



Key initiatives implemented for this category include:

- ✓ Cleaning Protocol
 - Certified green and healthy cleaning products
 - WELL approved cleaning schedule
- ✓ Increased Ventilation
 - Supply of outdoor air exceeds recommended standard
- ✓ Air Quality Standards
 - Air quality tests for VOCs, Particulates, Inorganic gases & Radon
 - Real-time Air Quality monitoring
- ✓ Pest Control
 - Low or zero toxicity Pesticides
- √ Cleaning Equipment
 - HEPA filters on Vacuum cleaners
 - Microfiber dusters & cloths
- ✓ Low VOC building materials and furniture.
- ✓ Healthy entrance



02 WELL Building Standard Water





WATER: THE ISSUE

Being dehydrated by just 2% has been shown to impair cognitive performance.¹

The Institute of Medicine recommends that women consume at least 2.7 L [11 cups] and men consume at least 3.7 L [16 cups] of water from foods and beverages each day.²



^{1.} Cognitive performance and dehydration. J Am Coll Nutr. 2012;31(2):71-78

^{1.} Grandjean AC, Grandjean NR. Dehydration and cognitive performance. J Am Coll Nutr. 2007;26(5 Suppl):549s-554s

^{2.} Institute of Medicine of the National Academies. Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate. Washington, DC: The National Academies Press; 2005.

Water







WATER: THE IMPACT

Research indicates that thirsty individuals who drink water prior to performing a mental task have faster reaction times than those who do not drink water.¹

1. Edmonds C, Crombie R, Gardner M. Subjective thirst moderates changes in speed of responding associated with water consumption. Frontiers in Human Neuroscience. 2013;7(363).

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Water



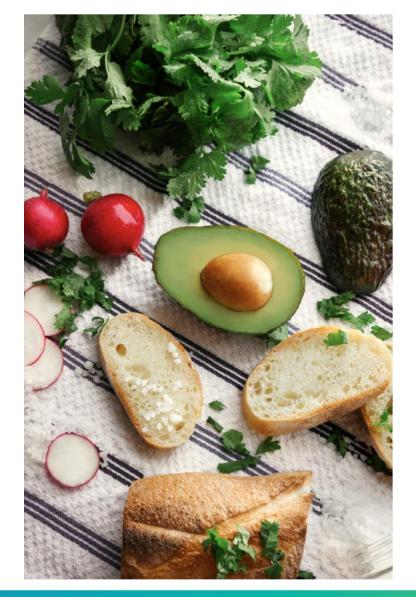
The WELL Building
Standard for Water
promotes safe and clean
water through the
implementation of proper
filtration techniques and
regular testing in order for
building occupants to
receive optimal quality of
water for
various uses.

Key initiatives implemented for this category include:

- √ Periodic Water Quality Testing
 - Testing for; dissolved metals, disinfectants, fluoride, Agricultural contaminants, organic contaminants & Inorganic contaminants
- ✓ Drinking Water Promotion
 - Provide all occupants with water jugs and a water bottle
 - Filtered chilled water supplied to teapoints



Nourishment







Fruit and vegetable intake is associated with increased productivity and job performance.¹

Increased nutritional knowledge has been shown to promote healthy eating and especially fruit and vegetable intake.²

1.Merrill RM, Aldana SG, Pope JE, et al. Self-rated job performance and absenteeism according to employee engagement, health behaviors, and physical health. JOEM 2013;55(1):10-18.

2. Wardle J, Parmenter K, Waller J. Nutrition knowledge and food intake. Appetite. 2000. 34(3):269-75.

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Nourishment



The WELL Building
Standard for Nourishment
requires the availability of
fresh, wholesome foods,
limits unhealthy
ingredients and
encourages better eating
habits and food culture.

Key initiatives implemented for this category include:

- √ Fruits and Vegetables
 - Daily supply of fruit and vegetables
- √ Processed Foods
 - Refined sugar restriction for all food offerings
 - Trans fat ban in all food offerings
- ✓ Artificial Ingredients
 - All food offerings labelled to indicate artificial ingredients
- ✓ Nutritional Information
 - Total calories, macronutrient content, micronutrient content and total sugar content information available for all food offerings



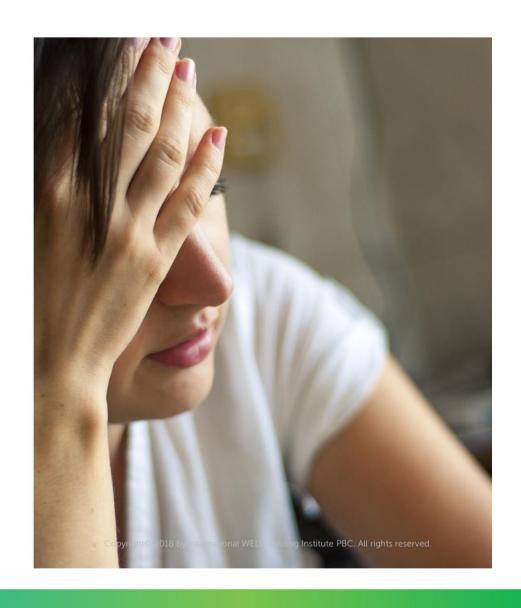
02 WELL Building Standard Light





Disruption to the body's circadian rhythm are associated with chronic diseases including obesity, diabetes, and depression.¹

1. National Institute of General Medical Sciences, Circadian Rhythms Fact Sheet, 2012; https://www.nigms.nih.gov/Education/Pages/Factsheet, CircadianRhythms.aspx, Accessed December 1, 2016.



02 WELL Building Standard Light

The WELL Building
Standard® for Light
provides illumination
guidelines that are aimed
to minimize disruption to
the body's circadian
system, enhance
productivity, support good
sleep quality and provide
appropriate visual
acuity where needed.



Key initiatives implemented for this category include:

- √ Electric Light Glare Control
 - Lighting and surfaces designed to reduce eyesight fatigue
- ✓ Solar Glare Control
 - Reduced glare through intelligent façade design
 - Automated Internal Blinds
- ✓ Circadian Lighting Design
 - Early stage design intervention
 - Daylight modelling in combination with melanopic lux levels from the electric luminaires.



Modern Engineering Systems

Movement



Physical inactivity is highly prevalent worldwide, with 23% of adults failing to meet international exercise and physical activity guidelines established by the WHO.¹

Additionally, the WHO notes that individuals who are insufficiently active have a 20-30% higher risk of mortality compared to those who meet international recommendations.²

^{2.} World Health Organization, Physical Activity. 2015; https://www.who.int/mediacentre/factsheets/fs385/en/. Accessed June 10, 2016.
2. Ding D, Lawson KD, Kolbe-Alexander TL, et al. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. Lancet (London, England). 2016;388(10051):1311-1324.

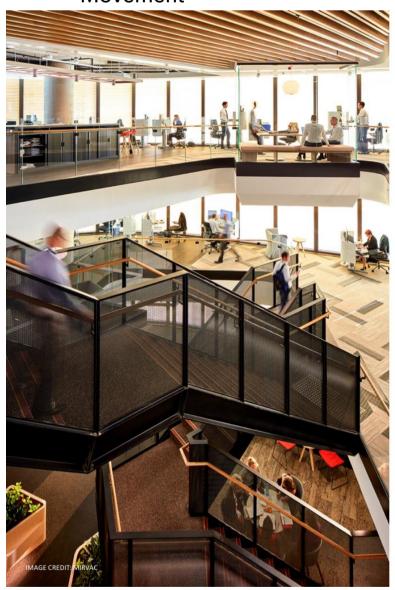




^{1.} Edmonds C, Crombie R, Gardner M. Subjective thirst moderates changes in speed of responding associated with water consumption. Frontiers in Human Neuroscience. 2013;7(363).

MES Modern Engineering Systems

Movement





Worldwide, if physical inactivity was reduced by 10% or 25%, over 533,000 and 1.3 million deaths, respectively, could be avoided every year.¹

1. Lee IM, Shiroma EJ, Lobelo F, et al. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. Lancet (London, England). 2012;380(9838):219-229

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Movement



The WELL Building
Standard for Fitness
promotes the integration of
physical activity into
everyday life by
providing the opportunities
and support for an active
lifestyle and discouraging
sedentary behaviours

Key initiatives implemented for this category include:

- ✓ Interior Fitness Circulation
 - Intertenancy stairs connecting multiple levels
- ✓ Activity Incentive Programs
 - Fitbit subsidy
 - Company funded weekly exercise classes
 - Subsidy of costs for employee participation in races, fitness activities and sports teams



Thermal Comfort







THERMAL COMFORT: THE ISSUE

An office that is too hot or too cold can cause a drop in productivity of up to 9%.4

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Bhattacharya A. Costs of occupational musculoskeletal disorders (MSDs) in the United States. International Journal of Industrial Ergonomics. 2014;44(3):448-454.

Banbury S, Berry DC. Disruption of office-related tasks by speech and office noise. British Journal of Psychology. 1998;89(3):499-517.

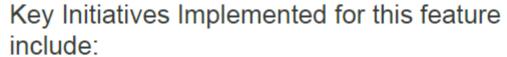
Perham N, Banbury S, Jones DM. Do realistic reverberation levels reduce auditory distraction? Applied Cognitive Psychology. 2007;21(7):839-847.

^{4.} Olli S, William JF, Quanhong L-G. Effect of temperature on task performance in office environment. 5th International Conference on Cold Climate Heating, Ventilating and Air Conditioning. Moscow, Russia:2006.

Thermal Comfort



The WELL Building
Standard for Comfort
establishes requirements
designed to create
distraction-free,
productive and
comfortable indoor
environments.



- ✓ ADA Accessible Design Standards
 - Used local UK design standards
- √ Ergonomics: Visual and Physical
 - Ergonomically assessed and approved workstations, chairs and monitor displays
 - Desk height flexibility
 - Seat flexibility
- √Thermal Comfort
 - Compliance against ASHRAE 55 simulated.







Mind

Various environmental characteristics can have direct impacts on mental health and well-being, such as housing, crowding, noise, indoor air quality, and light.¹

Mental, neurological, and substance use disorders account for 14% of the global burden of disease and depression alone is the leading cause of disability worldwide.²

Poor mental health is linked to poor health outcomes such as cardiovascular disease, obesity, and diabetes and to poor health behaviors such as smoking, disordered sleep patterns, and physical inactivity.³

^{1.} Evans GW. The built environment and mental health. J Urban Health. 2003;80(4):536-555.

^{2.} World Health Organization, Depression, http://www.who.int/mediacentre/factsheets/fs369/en/, Accessed May 25, 2016.

^{2.} World Health Organization. Mental health action plan 2013-2020. Geneva: World Health Organization; 2013...

^{3.} Centers for Disease Control and Prevention. Mental Health Basics. 2013; http://www.cdc.gov/mentalhealth/basics.htm. Accessed May 20, 2016.

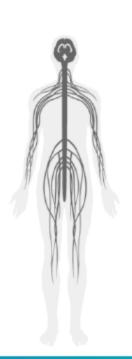
Mind

The WELL Building
Standard for Mind requires
design, technology and
treatment strategies
designed to provide
a physical environment
that optimizes cognitive
and emotional health.



Key initiatives implemented for this category include:

- ✓ Health and Wellness Awareness
 - Digital Health and Wellness resource library
 - WELL Building Standard Guide for the Tenancy
- ✓ Post-Occupancy Surveys
 - Pre and Post Occupancy survey covering workspace satisfaction, Environment Design, Facilities and Services, IEQ, Furniture & Layout & Technology
 - Leesman Survey UK equivalent
- √ Self-Monitoring
 - Fit Bit subsidy for employees
- ✓ Beauty and Design
- √ Spaces for display of art.
- ✓ Biophilic design focus to introduce nature's patterns and designs in addition to live planting.





Sound



SOUND: THE ISSUE

Exposure to noise has been shown to hinder the health and well-being of people in a number of different ways.¹

In addition to airborne noise sources, impact noise from adjacent activity such as footfall, exercise or mechanical vibration can create uncomfortable environments for those in receiving locations.^{2,3}

People are generally dissatisfied when conversations can readily transmit between rooms or across an open office, thus hindering confidentiality or creating distraction from tasks.⁸

^{1.} Hänninen O, Knol AB, Jantunen M, et al. Environmental Burden of Disease in Europe: Assessing Nine Risk Factors in Six Countries. Environ Health Perspect. 2014;122(5):439-446. doi:10.1289/ehp.1206154

^{2.} The American Society of Heating Refrigerating and Air-Conditioning Engineers. Chapter 48. Noise and Vibration Control, ASHRAE Handb HVAC Appl, 2009;(1):1-28.

^{3.} Dudarewicz A. the Impact of Low Frequency Noise on Human Mental Performance. 2005;18(2):185-199.

^{4.} Cavanaugh WJ, Farrell WR, Hirtle PW, Watters BG. Speech Privacy in Buildings. 2011.



Sound



SOUND: THE IMPACT

When exposure to noise is reduced, people are less susceptible to distraction, overall stress and potential health risk.¹

The fortification of façade elements can ensure that exterior noise intrusion is subdued much to the benefit of personal comfort during work, study or sleep. ²⁻⁸

- 1. Evans GW, Johnson D. Stress and open-office noise. J Appl Psychol. 2000;85(5):779-783. doi:10.1037/0021-9010.85.5.779
- 2. Fyhri A, Aasvang GM. Noise, sleep and poor health: Modeling the relationship between road traffic noise and cardiovascular problems. Sci Total Environ. 2010;408(21):4935-4942. doi:10.1016/j.scitotenv.2010.06.057
- 3. Jarup L, Babisch W, Houthuijs D, et al. Hypertension and exposure to noise near airports: The HYENA study. Environ Health Perspect. 2008;116(3):329-333. doi:10.1289/ehp.10775
- 4. Anna L, Blangiardo M, Fortunato L, et al. Aircraft noise and cardiovascular disease near Heathrow airport in London: Small area study. BMJ. 2013;347(7928):9-12. doi:10.1136/bmj.f5432
- 5. Klatte M, Bergström K, Lachmann T. Does noise affect learning? A short review on noise effects on cognitive performance in children. Front Psychol. 2013;4(August):1-6. doi:10.3389/fpsyg.2013.00578
- 6. Trimmel K, Sch??tzer J, Trimmel M. Acoustic noise alters selective attention processes as indicated by direct current (DC) brain potential changes. Int J Environ Res Public Health. 2014;11(10):9938-9953. doi:10.3390/ijerph111009938
- 7. Kaltenbach M, Maschke C, Klinke R. Health consequences of aircraft noise. Dtsch Arztebl Int. 2008;105(31-32):548-556. doi:10.3238/arztebl.2008.0548
- 8. Solet J, Buxton O, Ellenbogen J, Wang W, Carballiera a. Validating Acoustic Guidelines for Healthcare Facilities: Evidence-based design meets Evidence-based medicine: The Sound Sleep Study. 2010:1-56. papers2://publication/uuid/C795CF4F-BD80-4B4F-B5B0-C3FAADD03030.
- 9. Goines L, Hagler L. Noise Pollution: A Modern Plague: Adverse Health Effects of Noise. South Med J. 2007;100(3):287-294.

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MES Modern Engineering Systems

Materials



MATERIALS: THE ISSUE

An estimated 95% of chemicals largely used in construction lack sufficient data on health impacts.¹

The global chemicals output grew by 84% between 2000 and 2010, with emerging economies accounting for 65% of the increase.²

Chemical production is estimated to increase at a rate three times greater than global population growth and is expected to double every 25 years.



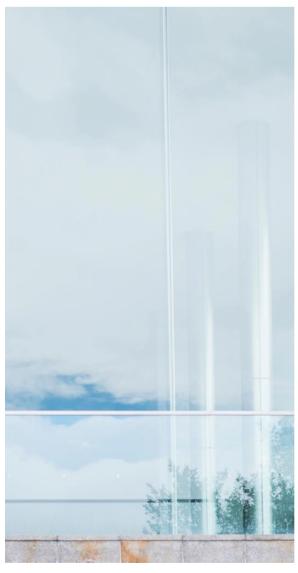
¹ Pacheco-Torgal F, Jalali S, Fucic A. Toxicity of Building Materials. Sawston, Cambridge: Woodhead Publishing Limited; 2012.

^{2.} United Nations Environment Programme. Global Chemicals Outlook. United Nations Press; 2013.

^{3.} Wilson MP, Schwarzman MR. Toward a new U.S. chemicals policy: rebuilding the foundation to advance new science, green chemistry, and environmental health. Env Heal Perspect. 2009;117(8):1202-1209. doi:10.1289/ehp.0800404

MES Modern Engineering Systems

Materials





MATERIALS: THE IMPACT

Low-hazard cleaning products, the use of effective cleaning equipment, and design guidelines that promote efficient cleaning practices also ensure good indoor air quality.¹

The application of Integrated Pest Management (IPM) and use of low-hazard pesticides, along with signage and notice of application, further works to protect health.²

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¹ Pacheco-Torgal F, Jalali S, Fucic A. Toxicity of Building Materials. Sawston, Cambridge: Woodhead Publishing Limited; 2012.

^{2.} United Nations Environment Programme. Global Chemicals Outlook. United Nations Press; 2013.



Community



The global, national and local conditions that surround an individual are known as the social determinants of health, which include physical determinants, or the physical and built conditions that impact the health of an individual.^{1,2}

Many people around the world still struggle with access to basic health services, and access varies based on race, ethnicity, socioeconomic status, age, sex, disability status, sexual orientation, gender identity and residential location.³

^{1.} World Health Organization. About social determinants of health. WHO. http://www.who.int/social_determinants/sdh_definition/en/. Published 2017.

^{2.} U.S. Department of Health and Human Services. Social Determinants of Health. https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health. Accessed January 16, 2018.

1. U.S. Department of Health and Human Services. Access to Health Services. Healthy People 2020. https://www.healthypeople.gov/2020/topics-objectives/topic/Access-to-Health-Services. Accessed February 4, 2018.



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^{1.} World Health Organization. About social determinants of health. WHO. http://www.who.int/social_determinants/sdh_definition/en/. Published 2017.

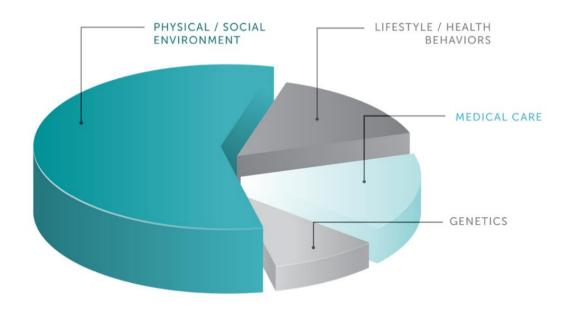
^{2.} U.S. Department of Health and Human Services. Social Determinants of Health. https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health. Accessed January 16, 2018.

1. U.S. Department of Health and Human Services. Access to Health Services. Healthy People 2020. https://www.healthypeople.gov/2020/topics-objectives/topic/Access-to-Health-Services. Accessed February 4, 2018.

03 What determines the state of health



WHAT DETERMINES THE STATE OF HEALTH?



Source: Centers for Disease Control and Protection. Frequently Asked Questions. 2014. Available online at: http://www.cdc.gov/nchhstp/socialdeterminants/faq.html

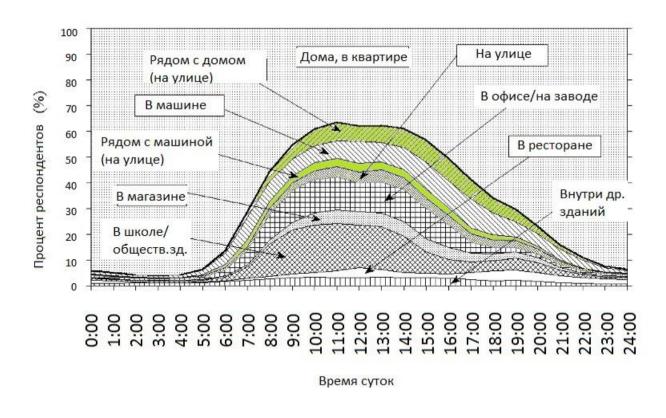
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03 Importance of physical environment



"We shape our buildings; thereafter they shape us."



^{1.} The National Human Activity Pattern Survey (NHAPS): a resource for assessing exposure to environmental pollutants



1 Importance of physical environment in Healthcare





Emotional breakdown of a physician after losing a 19-year old patient

1 Importance of physical environment in Healthcare





Reduced Stress and Anxiety:

- Improved wayfinding
- Improved lighting
- Thermal comfort
- Acoustic comfort

Faster Recovery Times:

- Biophilia and access to outdoors
- Social interaction

Staff Comfort and Wellbeing

- Circadian lighting design
- Task based working
- Healthy canteen offering
- Ongoing maitenence



Building future of healthcare

Thank you!

