ABBREVIATIONS AND ACRONYMS

A

AA: arachidonic acid
AC: hydrogen cyanide
ACGIH: American Conference of Governmental Industrial Hygienists
Ach: acetylcholine
AChE: acetylcholinesterase
ADMS: assistant director of medical services
AEF: American Expeditionary Forces
AEGL: acute exposure guidance level
AML: area medical laboratory
AMN: atropine methylnitrate
AR: Army Regulation
ARC: American Red Cross
ARDS: acute respiratory distress syndrome
ATCA: 2-aminothiazoline-4-carboxylic acid
ATNAA: antidote treatment nerve agent autoinjector
ATP: adenosine triphosphate
aTSP: active topical skin protectant
A-V: atrial-ventricular

B

BA: bromoacetone
BAL: British anti-Lewisite (dimercaprol)
BALF: bronchoalveolar lavage fluid
BAS: battalion aid station
BBC: bromobenzyl cyanide
BChE: butyrylcholinesterase
BEF: British Expeditionary Forces
BMZ: basement membrane zone
BTX: batrachotoxin
BZ: 3-quinuclidinyl benzilate

C

CA: bromobenzyl cyanide
CaE: carboxylesterase
CAI: chemical accident or incident
CAIRA: chemical accident or incident response and assistance
cAMP: adenosine 3′,5′-cyclic monophosphate
CANA: convulsive antidote, nerve agent
CAS: Chemical Abstracts Service
CB: chemical-biological
CBIRF: Chemical/Biological Incident Response Force
CBR: chemical, biological, and radiological
CBRN: chemical, biological radiological, and nuclear
CBRNE: chemical, biological, radiological, nuclear, explosive
CBRRT: chemical biological rapid response team
CDC: Centers for Disease Control and Prevention
CEA: cultured epidermal autograft
cGMP: current Good Manufacturing Practice
CHASE (Operation): Cut Holes and Sink 'Em
ChE: cholinesterase
CK: cyanogen chloride
CN^-: cyanide anion
CN: chloroacetophenone
CNO^-: cyanate
CNS: central nervous system
COLPRO: collective protection
CP EMEDS: collectively protected expeditionary medical support
CPRP: chemical personnel reliability program
CR: dibenz(*b,f*)(1,4)oxazepine
CS: *o*-chlorobenzylidene malononitrile
CSA: The Covenant, the Sword, and the Arm of the Lord
CSEPP: Chemical Stockpile Emergency Preparedness Program
CSF: colony-stimulating factor
CSMSPD: chemical surety medical support program director
C*t*: concentration (C) of agent vapor or aerosol in air multiplied by time (*t*) of exposure
CWA: chemical warfare agent
CWC: Chemical Weapons Convention (1993)
CWS: US Army Chemical Warfare Service

D

DA PAM: Department of the Army pamphlet
DA: diphenylchloroarsine
DC: diphenylcyanoarsine
DCE: defense coordinating element
DEET: N,N-diethyl-meta-toluamide
DEPMEDS: deployable medical system
DFP: diisopropyl phosphorofluoridate
DHHS: Department of Health and Human Services
DHP: diisopropylfluorophosphate
DHS: Department of Homeland Security
DM: diphenylaminoarsine
4-DMAP: 4-dimethylaminophenol
DMS: director of medical services
DNA: deoxyribonucleic acid
DoD: Department of Defense
DOE: Department of Energy
DOJ: Department of Justice
DOT: Department of Transportation
DVA: Department of Veterans Affairs

E

ECG: electrocardiogram
EDTA: ethylenediaminetetraacetate
EEG: electroencephalogram
EKG: electrocardiogram
EMEDS: expeditionary medical support
EMS: emergency medical service
EMT: emergency medical technician
EOC: emergency operations center
EPA: Environmental Protection Agency
Eq: equine
ER: endoplasmic reticulum
Er: YAG: erbium: yttrium-aluminium-garnet
ESF: emergency support function

F

FBI: Federal Bureau of Investigation
FBS: fetal bovine serum
FCC: federal coordinating center
FDA: Food and Drug Administration
FEMA: Federal Emergency Management Agency
FHP: force health protection
FOC: full operational capability
FRC: forward resuscitation care

G

GA: tabun
GABA(A): gamma-aminobutyric A
GB: sarin
GD: soman
GF: cyclosarin
GK-11: gacyclidine
GM1: monosialotetrahexosylganglioside
GSA: General Services Administration
GSH: glutathione

H

H: mustard
H_2O_2: hydrogen peroxide
H_2S: hydrogen sulfide
HAZMAT: hazardous materials
HAZWOPER: hazardous waste operations and emergency response
HC: hexachloroethane
HCN: hydrogen cyanide
HD: mustard (distilled)
HE: high explosives
HHS: Department of Health and Human Services
HN2: nitrogen mustard
HSS: health service support
Hu PON1: human paraoxonase 1
HWA: Heereswaffenamt

I

ICAM: improved chemical agent monitor
ICG: indocyanine green
ICS: incident command system
IDLH: immediately dangerous to life or health
IgG: immunogammaglobulin
IL: interleukin
IM: intramuscular
IMA: installation medical authority
IND: investigational new drug
IOC: initial operational capability
IOT&E: initial operational test and evaluation
IP: intraperitoneal injection
IPE: individual protective ensemble/equipment
IV: intravenous

J

JFO: joint field office
JPEO: joint program executive office
JPEO-CBD: Joint Program Executive Office for Chemical Biological Defense
JPMO: joint product management office
JSGPM: joint service general purpose mask
JSLIST: joint service lightweight integrated suit technology
JSMLT: joint service mask leakage tester
JSPDS: joint service personnel skin decontamination system
JTF: joint task force

K

KCN: potassium cyanide
K_m: a measure of the strength of binding of a substrate to an enzyme

L

LCt_{50}: the vapor or aerosol exposure that is lethal to 50% of the exposed population
LD_{50}: median lethal dose
LDPI: laser Doppler perfusion imaging
LHON: Leber hereditary optic neuropathy
LPS: lipopolysaccharide
LSD: lysergic acid diethylamide

M

MAC: multiagency coordination
MANAA: medical aerosolized nerve agent antidote
MCE: maximum credible event
MDMA: 3, 4-methylene-dioxymethylamphetamine
MEDCOM: medical command
MEDEVAC: medical evacuation
MITS: medical identification and treatment systems
MO: medical officer
MOPP: mission-oriented protective posture
MPE: most probable event
MRI: magnetic resonance imaging
MRT: mean residence time
MRT: medical response team
MS C LRIP: milestone C low rate initial production
MT: metric ton
MTF: medical treatment facility
MULO: multipurpose overboot

N

N_2O: nitrogen oxide
N_2O_4: nitrogen tetroxide
NAAG: N-acetyl-aspartyl-glutamate
NaCN: sodium cyanide
NAD^+ : nicotinamide adenine dinucleotide
$NaNO_2$: sodium nitrite
NATO: North Atlantic Treaty Organization
NBC: nuclear, biological, chemical
NCO: noncommissioned officer
NCS: National Communications System
NDA: new drug application
NDMS: National Disaster Medical System
NF: number facility
NIMS: National Incident Management System
NIOSH: National Institute for Occupational Safety and Health
NMDA: *N*-methyl D-aspartate
NO: nitric oxide
NO_2: nitrogen dioxide
NORTHCOM: Northern Command
NRP: National Response Plan
NSAID: nonsteroidal antiinflammatory drug
NSP: neurotoxic shellfish poisoning

O

OC: oleoresin capsicum
OH: hydroxyl radical
OP: organophosphorus
OPCW: Organization for the Prohibition of Chemical Weapons
OPIDN: organophosphorus ester–induced delayed neurotoxicity
Ops: operations
OSHA: Occupational Safety and Health Administration

P

PADPRP: poly(adenosine diphosphate-ribose) polymerase
PAF: platelet-aggregating factor
2-PAM Cl: 2-pralidoxime chloride
2-PAM: 2-pralidoxime
PAPP: p-aminopropiophenone
PARP: poly(ADP-ribose) polymerase
PATS: protection assessment test system
PB: pyridostigmine bromide
PBN: alpha-phenyl-N-tert-butylnitrone
PBN: N-tert-butyl-alfa-phenylnitrone
PbTx: brevetoxin
PCP: phencyclidine
PFIB: perfluoroisobutylene
pHu: plasma-derived human
PKC: protein kinase C
PLA_2: phospholypase A2
pMo: plasma-derived mouse
2-PMPA: 2-pentanedioic acid
POM: program objective memorandum
PPE: personal protective equipment
PR: protective ratio
PS: chloropicrin
PTSD: posttraumatic stress disorder
PTX: palytoxin

R

RADS: reactive airways dysfunction syndrome
RBC-ChE: red blood cell cholinesterase
RCA: riot control agent
RD_{50}: dose required to cause a 50% decrease in respiration
REM: rapid eye movement
RH: relative humidity
rHu BChE: recombinant human butyrylcholinesterase
RNA: ribonucleic acid
RPM: respiratory rate, pulse, and motor function
RSDL: Reactive Skin Decontamination Lotion

S

SCN^-: thiocyanate
SE: status epilepticus
SERPACWA: skin exposure reduction paste against chemical warfare agents
SMART: special medical augmentation response team
SNS: strategic national stockpile
SRBD: seizure-related brain damage
SS: Schutzstaffel
START: simple triage and rapid treatment
STEL: short-term exposure limit
STM: Sacco triage method
STX: saxitoxin

T

TBSA: total body surface area
TEN: toxic epidermal necrosis
TIC: toxic industrial chemical
TIM: toxic industrial material
TNF: tumor necrosis factor
TRP: transient receptor potential
TTX: tetrodotoxin
TWA: time-weighted average

U

UN: United Nations
USACHPPM: US Army Center for Health Promotion and Preventive Medicine
USAMRICD: US Army Medical Research Institute of Chemical Defense
USAMRIID: US Army Medical Research Institute of Infectious Diseases
USDA: US Department of Agriculture
USJCOM: US Joint Forces Command
USMC: US Marine Corps

V

V/Q: ventilation profusion ratio
VAC: Vacuum-Assisted Closure Therapy
VR1: vallinoid receptor subtype 1

W

WBGT: wet-bulb globe temperature
WMD: weapons of mass destruction

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Dedicated to the Memory of

Brennie E. Hackley, Jr, and Frederick R. Sidell

DR BRENNIE E. HACKLEY, JR

Chemist, Teacher, Scientific Advisor

July 29, 1924 – November 5, 2006

Dr Hackley received a BS in chemistry from Wilberforce University in 1946. Following graduation, he enlisted in the US Army and was later commissioned as an officer. After more than 30 years' service, he retired from the US Army Reserve Corps in 1981 at the rank of colonel. Dr Hackley began his civilian career in 1952 as an organic research chemist in the Medicinal Chemistry Branch of the Army Chemical Center and went on to earn advanced degrees in chemistry from the University of Delaware, including a PhD in 1957. During his career, Dr Hackley studied the relationship between chemical structures and chemotherapeutic activity in reference to efficacy against toxic agents. He contributed to the elucidation of mechanisms of reactions of nucleophiles with organophosphorus compounds and synthesized a number of oximes, for which he held 18 patents. One oxime synthesized by Dr Hackley, toxogonin, was adopted as an antidote against chemical nerve agents by the US Air Force.

In 1984 Dr Hackley was designated Chief Scientist and Scientific Advisor to the Commander of the US Army Medical Research Institute of Chemical Defense (USAMRICD). During Operation Desert Storm, Dr Hackley responded to emergency calls by combat divisions for predeployment briefings on medical management of chemical casualties, initiating a traveling training program that prepared deploying medical personnel to treat soldiers on the battlefield if chemical weapons were employed. As an instructor and course director for USAMRICD's Medical Management of Chemical and Biological Casualties course, Dr Hackley delivered lectures in Saudi Arabia; Johnston Island, Hawaii; Okinawa, Japan; and Germany on pulmonary agents, cyanide, vesicants, and nerve agent threats.

While serving as chairman of the Scientific Steering Committee on Nerve Agent Antidotes, he advised the Command that one of the precursors for the then current synthesis of the oxime HI-6, under consideration as a replacement for the fielded 2-PAM chloride, was carcinogenic and would not pass scrutiny by the Food and Drug Administration. Additionally, Dr Hackley convinced the Command that HI-6 wasn't cost effective, and that its effectiveness compared to 2-PAM chloride was not great enough to justify its replacement.

Dr Hackley represented the US Army Medical research program competently and effectively for almost 6 decades. His efforts significantly improved communication and relationships between the Chemical and Medical Corps and strengthened USAMRICD's image as the lead laboratory for the development of medical countermeasures for chemical threat agents.

DR FREDERICK R. SIDELL

Physician, Teacher, Scientist

July 27, 1934 – February 14, 2006

No physician has contributed more to the US Army Medical Department's chemical defense training and education programs than Dr Frederick Sidell. Dr Sidell graduated from Marietta College in Marietta, Ohio, in 1956, and also later from the New York University School of Medicine. He completed his internship and residency in internal medicine at Cleveland Metropolitan General Hospital. Dr Sidell initially served 2 years on active duty with the Army Medical Corps in the rank of captain. He was stationed at Edgewood Arsenal in Maryland, an assignment that would determine his future in medicine and lead to his subsequent employment with the Department of Defense. While with the Department of Defense Dr Sidell became one of the world's leading experts and educators in the field of medical effects of chemical warfare agents. He retired in 1995 after 30 years in government service.

In the late 1960s, when training in medical chemical defense was very limited, Dr Sidell and some of his colleagues recognized the need for specialty training and developed a course for military medical personnel on the medical management of chemical agent casualties. Dr Sidell guided the development of this new training program and served as the course director for many years. Eventually, such training was expanded to additional courses for nonmedical personnel and military leaders. Dr Sidell also prepared and updated detailed educational materials addressing nerve agents, vesicants, cyanide, and pulmonary agents, and provided education and training for the Chemical Stockpile Emergency Preparedness Program and the Domestic Preparedness Program.

Dr Sidell's expertise was nationally and internationally recognized, and he was often called upon for highly sensitive assignments that required technical expertise. These included a trip to southeast Asia in 1979 to investigate the alleged use of "yellow rain" against the Hmong in Laos. In 1988, he examined Kurdish civilian casualties who were victims of chemical warfare in their homeland. He traveled to Japan in 1995 to assist and advise Japanese physicians on the care of causalities from a terrorist-led sarin nerve agent incident in the Tokyo subway system.

Dr Sidell was the lead editor of the first edition of *Medical Aspects of Chemical and Biological Warfare,* published in 1997, contributing to many of the chapters on chemical warfare agents. His research and studies have been published in over 100 reports and articles, and he also wrote several handbooks on the treatment of chemical casualties. Following his official retirement, Dr Sidell continued providing education and training in the management of chemical agents and casualty treatment to civilian first responders, including many emergency medical treatment units throughout the United States.

In addition to the many achievement awards and commander's medals received by Dr Sidell, a new building at the Edgewood area of the Aberdeen Proving Ground was named the Sidell Learning Center in 2002 in recognition of his great contribution to medical education and training. In 2003 Dr Sidell was inducted into the Marietta College Hall of Honor, becoming one of only 24 people to be so recognized at that time. Dr Sidell's knowledge, experience, and dedication contributed greatly to the development of the outstanding medical training programs throughout the Department of Defense today. His insight and pragmatic views have guided the development of medical policy against weapons of mass destruction and medical research on safe and effective medical countermeasures against current and future chemical threats facing the military.