

# ROOT CAUSE INVESTIGATIONS FOR CAPA

## CLEAR AND SIMPLE



James L. Vesper

[www.pda.org/bookstore](http://www.pda.org/bookstore)

# **Root Cause Investigations for CAPA: Clear and Simple**

**To order the book, please visit: [go.pda.org/CAPA](http://go.pda.org/CAPA)**

**James L. Vesper**

**PDA**

**Bethesda, MD, USA**

**DHI Publishing, LLC**

**River Grove, IL, USA**

[www.pda.org/bookstore](http://www.pda.org/bookstore)

10 9 8 7 6 5 4 3 2 1

**ISBN: 978-1-942911-50-0**

**Copyright © 2020 by James L. Vesper**

**All rights reserved.**

This book is protected by copyright. No part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission from the publisher. Printed in the United States of America.

Where a product trademark, registration mark, or other protected mark is made in the text, ownership of the mark remains with the lawful owner of the mark. No claim, intentional or otherwise, is made by reference to any such marks in the book. Websites cited are current at the time of publication. The author has made every effort to provide accurate citations. If there are any omissions, please contact the publisher.

While every effort has been made by the publishers and the author to ensure the accuracy of the information contained in this book, this organization accepts no responsibility for errors or omissions. The views expressed in this book are those of the author and may not represent those of either Davis Healthcare International or the PDA, its officers, or directors.



*Connecting People, Science and Regulation®*



This book is printed on sustainable resource paper approved by the Forest Stewardship Council. The printer, Gasch Printing, is a member of the Green Press Initiative and all paper used is from SFI (Sustainable Forest Initiative) certified mills.

**PDA Global Headquarters**

Bethesda Towers, Suite 600  
4350 East-West Highway  
Baltimore, MD 20814  
United States  
[www.pda.org/bookstore](http://www.pda.org/bookstore)

**Davis Healthcare International Publishing, LLC**

2636 West Street  
River Grove, IL 60171  
United States  
[www.dhibooks.com](http://www.dhibooks.com)

[www.pda.org/bookstore](http://www.pda.org/bookstore)

# CONTENTS

FOREWORD	ix
ACKNOWLEDGMENTS	xiii
INTRODUCTION	xv
ABOUT THE AUTHOR	xxi
I WHY INVESTIGATIONS AND CORRECTIVE ACTIONS MATTER	I
A different industry	2
What other industries have done	3
High reliability organizations	7
What can we learn from others and apply to what we do?	8
Conclusion	10
References	10
2 REGULATORY REQUIREMENTS AND EXPECTATIONS	13
Differences in expectations between medical devices and drugs	14
What regulators have been finding	15
GMP expectations	17
References	29

3	ROLES AND RESPONSIBILITIES	31
	Competencies and competency-based training	31
	Specific competencies for those involved in investigations	33
	Developing competencies	36
	Who “owns” the problem?	37
	How big should the team be?	37
	What makes for a successful team?	38
	The value of a team	38
	How to be a good facilitator if you are leading an investigation	39
	Report writers	44
	Conclusion	45
	References	45
4	THE BIG PICTURE: INVESTIGATIONS AND CORRECTIVE ACTIONS	47
	The 14-step process	47
	Conclusion	61
	References	62
5	THE INITIAL DISCOVERY OF AN EVENT	63
	Psychological safety	64
	Direct observation	65
	Big data and data mining	71
	So what does this all mean?	73
	Conclusion	73
	References	73
6	APPLYING RISK-BASED THINKING TO QUALITY EVENTS AND DEVIATIONS	77
	The ICH Q9 process	80
	QRM and risk-based thinking	83
	Conclusion	90
	References	90
7	MODELS USED IN DESCRIBING INCIDENTS	93
	Single-event model	94

Chain-of-events models or domino theory	95
Hierarchical models	98
Factorial model	100
Individual and human factors	103
Conclusion	104
References	105
<b>8 HUMAN ERRORS AND HUMAN FACTORS</b>	<b>107</b>
Classifications	108
The person or the “system”?	109
Why such a high proportion of so-called human errors?	111
What about a “blameless” culture?	112
Five principles of human performance	114
Models and tools to identify causes that result in human error	116
Conclusion	133
Valuable resources	133
References	134
<b>9 METHODS AND TOOLS USED WHEN CONDUCTING INVESTIGATIONS</b>	<b>137</b>
Why use methods and tools?	137
Specific methods and tools	139
So what tool should be used? Tool selection guidance	162
Conclusion	163
References	163
<b>10 INTERVIEWS</b>	<b>165</b>
Interviews compared to interrogations	165
Fear	166
An interesting case study of how our memories can warp	166
How memories are created—and recreated	167
Ways to obtain the most accurate recounting of an incident	168
The cognitive interview process	169
Conclusion	173
References	174

11	IMMEDIATE ACTIONS AND CORRECTIONS	177
	Immediate actions	177
	Corrections	179
	Conclusion	179
12	CORRECTIVE ACTIONS AND PREVENTIVE ACTIONS	181
	Linking corrective actions to the causes	182
	Change control and risk assessment	183
	Looking ahead to an effectiveness check	183
	The range of corrective action options	184
	Corrective actions specific to causes categorized as “human error”	191
	Defining key terms	194
	Where do qualification and validation fit into corrective actions?	197
	When you cannot prevent, try to manage	198
	When the root causes cannot be found	199
	Short term vs. long term	199
	Residual risks of corrective actions	200
	Conclusion	203
	References	203
13	PROCEDURES: CAUSES OF PROBLEMS AND POTENTIAL CORRECTIVE ACTIONS	205
	Procedures as a cause and a contributor to unwanted events	205
	The biggest writing challenge: appropriate level of detail	209
	The information ecosystem	212
	Do we need a procedure for this?	213
	What should a procedure look like?	214
	Revising a procedure as a corrective action	215
	Checklists	216
	Conclusion	218
	References	218
14	TRAINING AS A CORRECTIVE ACTION	221
	Training as part of a system	221

Tacit and explicit knowledge	222
Instructional methods—ways to present knowledge and skills	223
Assessment and evaluation of the learning	232
Conclusion	232
References	233
<b>15 CORRECTIVE ACTION EVALUATION AND EFFECTIVENESS CHECKS</b>	<b>235</b>
Formative and summative evaluation	235
Timing and methods for effectiveness checks	236
Documenting the effectiveness checks	240
Evaluation and effectiveness checks related to training and performance	240
A caution	242
Conclusion	242
References	242
<b>16 WRITING THE REPORT</b>	<b>243</b>
General considerations of an investigation report	244
Conclusion	253
References	253
<b>17 REVIEW AND APPROVAL OF THE INVESTIGATION AND REPORT</b>	<b>255</b>
Stated requirements	256
Minimizing personal preferences	257
Giving feedback	258
Receiving feedback	259
Including the basis of the reviewers' and approvers' signatures	260
Churning metrics	261
Conclusion	261
References	266
<b>18 COMMUNICATION</b>	<b>267</b>
Who sees what?	268
Methods for incident communication	269



Communicating potential risks	270
Conclusion	272
References	272
<b>19 LEARNING FROM SUCCESSES AND FAILURES</b>	<b>273</b>
“Fail fast, fail often” (but fail safely)	274
Characteristics of organizations that learn from mistakes	275
What about a “blameless” culture?	276
After-action reviews	277
The role of leadership	280
Conclusion	280
References	280
<b>20 MANAGEMENT RESPONSIBILITIES</b>	<b>283</b>
What can leadership do?	285
Investigations and quality culture	287
Conclusion	289
References	289
<b>APPENDIX 1: DEFINITIONS</b>	<b>291</b>
<b>APPENDIX 2: INCIDENT INVESTIGATOR’S WORKSHEET</b>	<b>295</b>
<b>INDEX</b>	<b>303</b>