

ANALYSIS OF 2014 INMATE DEATH REVIEWS IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM

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TABLE OF CONTENTS

Table of Contents.....	i
List of Tables and Figures.....	ii
I. Introduction	1
II. Death review process	1
III. Definitions.....	2
IV. Classification for lapses in care.....	3
V. Advantages of the CCHCS Death Review Process.....	4
1. Inter-reviewer variability in identifying a preventable death.....	4
2. Onsite vs. centralized peer review.....	4
3. Separate process for review of suicide deaths and drug overdoses	4
4. Other Potential Advantages	4
VI. Study Findings	5
A. Causes of Inmate Death, 2014	5
B. Care Lapses 2014.....	8
C. Non preventable deaths in 2014.....	9
D. Possibly preventable deaths in 2014.....	10
E. Lapses by contracted specialists and outside facilities	13
F. Likely (Definitely) preventable deaths in 2014.....	14
VII. Discussion of trends	15
A. Trends in prison mortality rates in California and the United States	15
B. Trends in CCHCS Preventable Deaths 2006-2014	16
C. Trends in causes of mortality - suicides and homicides	17

D. Trends in Care Lapses	18
VIII. Targeted opportunities for improvement.....	20
A. The Primary Care Model 2009-2014.....	20
B. Specific Causes of Preventable Death	21
C. The California Health Care Facility.....	25
D. The 2013 - 2015 Performance Improvement Plan	25
E. DRC Referrals to Peer Review Committees.....	26
IX. Conclusions	27

LIST OF TABLES AND FIGURES

Table 1. Causes of death among all California inmates, 2014.	5
Table 2. Top nine causes of death among California inmates, 2007-2014.	7
Table 3. Ranges and average ages at death among all California inmates, 2014	7
Table 4. Summary of care lapses, 2014.....	8
Table 5. Causes of non-preventable death among California inmates, 2014.	9
Table 6. Causes of possibly preventable death among California inmates, 2014.	10
Figure 1. Possibly preventable deaths of California prison inmates involving lapses by contracted specialists or outside facilities, 2008-2014.	14
Figure 2. Trend in CCHCS Likely (Definitely) Preventable Deaths, 2006-2014.....	14
Table 7. Annual death rates among California And U.S. State Prison inmates, 2006- 2014.....	15
Figure 3. Trended death rates in the CCHCS, 2006-2014.	15
Table 8. Rates of preventable deaths among California inmates, 2006-2014.	16
Figure 4. Trend in preventable death rates in the California Correctional System, 2006-2014.....	17
Table 9. Numbers and rates of suicide-related deaths in California and all US State Prisons, 2006 2014.....	17

2014 CCHCS Death Review Analysis

Figure 5. Suicide death rates in the California Correctional System, 2006 – 2014.....	17
Table 10. Numbers of homicide-related deaths in California and all U.S. State Prisons, 2006-2014.	18
Figure 6. Homicide death rates in the California Correctional System, 2006 – 2014.....	18
Table 11. Number of lapses by category of preventability, 2014.....	19
Figure 7. Average number of lapses per case by preventability, 2007-2014.	19
Table 12. Number of lapses, by preventability, in California Correctional System deaths, 2007-2014.	19
Figure 8. Trend in Annual Average of Care Lapses per Death, CCHCS, 2007-2014.....	20
Table 13. Identifiable primary care in California inmate death cases, 2009 – 2014.....	21
Figure 9. Percentage of deaths in the California Correctional System with an identified primary care physician, 2009-2014.....	21
Table 14. Numbers and rates of preventable deaths from cardiovascular, end stage liver disease, and cancer in the California Correctional System, 2006-2014.....	22
Figure 10. Preventable cardiovascular deaths and rates in the California Correctional System, 2006 2014.....	22
Figure 11. Preventable end stage liver disease deaths and rates in the California Correctional System, 2006-2014.....	23
Figure 12. Preventable cancer deaths and rates in the California Correctional System, 2006-2014..	23
Table 15. Numbers and rates of drug overdose-related deaths in the California Correctional Healthcare System and in all U.S. prisons, 2006-2014.....	24
Figure 13. Drug overdose death rates in the California Correctional Healthcare System 2006-2014.	24
Table 16. Coccidioidomycosis related deaths in the California Correctional System, 2006-2014.....	25
Figure 14. Coccidioidomycosis related deaths and death rates in the California Correctional System, 2006-2014.....	25

I. INTRODUCTION

The California Correctional Healthcare System (CCHCS) has been in Federal Receivership since April 2006, when a Federal judge ruled that substandard medical care in California prisons had violated prisoners' rights under the eighth amendment to the US Constitution and had led to many unnecessary deaths.

Under the receiver, the previously broken healthcare system has been comprehensively redesigned, and the current system emphasizes a primary care model, systematic chronic disease management, access to appropriate care, and continuous quality improvement.

The CCHCS utilizes the death review process as a major piece of its quality improvement program. Every death in the California prisons is exhaustively reviewed to determine serious care lapses and to identify opportunities for system improvement. All preventable deaths are identified. Unsafe healthcare providers are identified, counseled, and if necessary, sanctioned.

This is the ninth annual analysis of the CCHCS inmate death reviews, and again focuses on identifying and trending of all causes of death, serious care lapses and preventable deaths. All prior reports are accessible at the CCHCS website (cphcs.ca.gov/Deathreviews.aspx).

II. DEATH REVIEW PROCESS

The death review process is described in the Receiver's Inmate Medical Services Policies and Procedures (Volume 3, Chapter 7), and has been described in detail in previous annual reports.

Every inmate death is reviewed by a trained Clinical Support Unit (CSU) physician and by a registered nurse consultant. Findings are recorded on a standardized death review template. Reviewers read the decedent's healthcare record, focusing on every clinical encounter that took place during the last six months of the patient's life.

The quality of patient triage and evaluation, the timeliness of access to care, the quality of all clinical evaluations, and results of and responses to all laboratory and diagnostic imaging studies are noted. The quality of care for any identified chronic medical condition is evaluated and reviewed for adherence to standardized and evidence based guidelines for care. All visits to specialty care, emergency departments and inpatient hospital facilities are reviewed. The quality of end of life care for terminal conditions is evaluated. The timing and quality of the responses to emergency "man down" situations are reviewed for compliance with emergency procedural guidelines.

In the past five years, reviewers have also determined whether there was an identifiable primary care physician involved in the patient's care.

In every case, the cause of death is determined, using autopsy findings when available. All care lapses are noted, even if such lapses did not contribute to the patient's death. The reviewer then makes a judgment as to whether the death was preventable or not preventable.

Completed death reviews are presented by the reviewer to the Death Review Committee (DRC), an interdisciplinary group appointed by the Statewide Chief Medical and Nursing Executives. The eight-member DRC, chaired by a physician and a nurse executive, includes three physicians, three nurses, one (non-voting) mental health representative and one custody representative. The DRC is charged with evaluating the entire context of care provided to the decedent including an evaluation as to the preventability of death. A vote is taken by the committee to achieve concurrence as to whether the death was Not Preventable, Possibly Preventable, or Definitely Preventable.

Other functions of the DRC are to identify opportunities for improvement in the health care system, to make recommendations for changes to Clinical Care Guidelines, to recommend statewide training or continuing medical education programs on specific issues, to identify and refer local issues to institution leadership, systemic issues to Statewide leadership, and to identify and refer deficiencies in clinical care to the appropriate Peer Review bodies.

The major purpose of the Death Reporting and Review Policy is to reduce the occurrence of preventable deaths.

III. DEFINITIONS

The following definitions are used in this report:

Care Lapse - In the judgment of the reviewers, a clinician has committed a departure from the standard of care that a reasonable and competent clinician would not have committed under the same of similar circumstances.

Not preventable death - In the judgment of the reviewers, the patient's death could not have been prevented or significantly delayed by more optimal care.

Possibly preventable death - In the judgment of the reviewers, better medical management or improvement in the system of care delivery might possibly have prevented or significantly delayed the patient's death.

Definitely preventable death - In the judgment of the reviewers, better medical management or improvement in the system of care delivery would definitely have prevented or significantly delayed the patient's death.

IV. CLASSIFICATION FOR LAPSES IN CARE

Based on the 2006 and 2007 CPHCS death reviews, a classification system describing fourteen different types of care lapse was proposed to the DRC. In 2008 it was incorporated into the death review template. After having been in use for a year, it was presented at the 2009 annual meetings of the National Commission on Correctional Health Care and the American Correctional Health Services Association.

As described at these meetings, the classification has been a useful quality improvement tool for identifying the common reasons for substandard healthcare and preventable deaths. It has been used to identify potentially unsafe clinical practice, gaps in the healthcare system, opportunities for system and process redesign, and educational strategies for CCHCS clinical staff.

The fourteen categories of lapse are:

Type 1 – Failure to recognize, evaluate and manage important symptoms and signs – so called clinical “red flags.”

Type 2 – Failure to follow clinical guidelines or departmental policies developed and endorsed by the medical department of the CCHCS. These include evidence based guidelines for the management of asthma, diabetes mellitus, hepatitis C infection, HIV/AIDS, chronic pain, and care at the end of life. Other guidelines include standards for the treatment of hypertension, acute coronary syndromes, congestive heart failure, cardiac arrhythmia, and anticoagulation.

Type 3 – Delay in access to the appropriate level of care, of sufficient duration as to result in harm to the patient.

Type 4 – Failure to identify and appropriately respond to abnormal test results.

Type 5 – Failure of appropriate communication between providers, especially at points where transfers of care occur (care transitions).

Type 6 – Fragmentation of care resulting from failure of an individual clinician or the primary care team to assume responsibility for the patient’s care (lack of a primary care model).

Type 7 – Iatrogenic injury resulting from a surgical or procedural complication.

Type 8 – Medication prescribing error, including failure to prescribe an indicated medication, failure to do appropriate monitoring, or failure to recognize and avoid known drug interactions.

Type 9 – Medication delivery error, including significant delay in a patient receiving medication or a medication delivered to the wrong patient.

Type 10 – Practicing outside the scope of one’s professional capability (may apply to nursing staff, midlevel practitioners, or physicians).

Type 11 – Failure to adequately supervise a midlevel practitioner, including failure to be readily available for consultation or an administrative failure to provide for appropriate supervision.

Type 12 – Failure to communicate effectively with the patient.

Type 13 – Patient non-adherence with suggestions for optimal care.

Type 14 - Delay or failure in emergency response, including delay in activation or failure to follow the emergency response protocol.

V. ADVANTAGES OF THE CCHCS DEATH REVIEW PROCESS

1. Inter-reviewer variability in identifying a preventable death

One study from the medical literature illustrates the problem of reviewer variability in determining preventability of death. In this study, 393 hospital deaths were reviewed by a group of internal medicine specialists. Initial reviews found that 23% of the deaths were possibly preventable and 6% definitely preventable. Every death was then reviewed by another physician member of the same group. Concordance in finding of preventability was 0.34 (the reviewers agreed only 34% of the time). The authors of this study concluded “preventability is in the eye of the reviewer.” (Journal of the American Medical Association. Volume 286, pages 415-423, 2001)

The DRC tries to mitigate the problem of reviewer variability by seeking consensus on the assignment of preventability.

2. Onsite vs. centralized peer review

Traditional peer review takes place at the site where care originated and is conducted by staff who work there. The CCHCS death reviews are conducted off site by a neutral group of physicians. Any review physician or DRC committee member who has ever been involved in the direct care of the decedent does not review that particular case and is exempted from voting on preventability.

3. Separate process for review of suicide deaths and drug overdoses

All suicides are reviewed separately by a multidisciplinary committee in the Mental Health Program, the Suicide Prevention and Response Focused Improvement Team (SPR FIT). All drug overdose deaths are also separately reviewed by the Mental Health Program.

4. Other Potential Advantages

Other advantageous aspects of the CCHCS death review process include the limited number of trained and experienced reviewers, the diligence expended in each review, and the discussion of

every death at the DRC. This kind of offsite review has the advantage of mitigating any subjective bias generated by a reviewer's personal knowledge of the onsite providers involved in the patient's care. The centralized process also helps in identifying systemic concerns and in standardizing the review process.

VI. STUDY FINDINGS

A. Causes of Inmate Death, 2014

There were 319 inmate deaths in 2014. Causes of death are shown in Table 1, and are listed by the primary condition that led to patient death. For example, if a patient died from systemic infection (sepsis) caused by a compromised immune system induced by chemotherapy for cancer, then that cancer is listed as primary cause of death.

TABLE 1. CAUSES OF DEATH AMONG ALL CALIFORNIA INMATES, 2014.

NUMBER OF CASES	CAUSE OF DEATH
88	CANCER – lung, 17; colon, 12; pancreas, 9; prostate, 6; kidney, 5; gall bladder, 5; lymphoma, 4; brain, 3; head & neck, 2; acute myeloid leukemia, 2; unknown primary, 2; bladder, 2; stomach, 2; tongue, 2; melanoma, 2; multiple myeloma, 2; tibial sarcoma, 1; sarcoma, 1; intestinal, 1; chronic myelogenous leukemia, 1; anus, 1; acute lymphoblastic leukemia, 1; tonsil, 1; rectum, 1; salivary gland, 1; esophagus, 1; nasopharynx, 1
68	LIVER DISEASE – end stage liver disease, 47; liver cancer, 21
54	CARDIOVASCULAR – sudden cardiac arrest, 25; congestive heart failure, 11; myocardial infarction, 8; acute coronary syndrome, 2; cardiomyopathy, 2; aortic dissection, 1; cardiac arrhythmia, 1; coronary artery disease, 1; constrictive pericarditis, 1; dissection aortic aneurysm, 1; recurrent venous thrombosis, 1
23	SUICIDE
19	DRUG OVERDOSE – heroin, 6; meth, 5; morphine, 2; opiate, 2; other, 2; methodone, 1; phenytoin, 1
15	PNEUMONIA
9	HOMICIDE
7	PULMONARY – chronic obstructive pulmonary disease, 4; bronchiolitis obliterans, 1; chronic interstitial pulmonary disease, 1; pulmonary embolism, 1
6 each	INFECTIOUS – shock-septic, 3; peritonsillar abscess, 1; castleman disease, 1; necrotizing fasciitis, 1 RENAL DISEASE – end stage renal disease on HD, 2; end stage renal disease, 2; acute renal failure, 1; chronic renal failure, 1 STROKE-HEMORRHAGIC – stroke-hemorrhagic, 3; subarachnoid hemorrhage, 1; intracerebral hemorrhage, 1; intracranial hemorrhage, 1

2014 CCHCS Death Review Analysis

NUMBER OF CASES	CAUSE OF DEATH
3 each	GASTROINTESTINAL – upper GI bleed, 2; ischemic colitis, 1 NEUROLOGIC – amyotrophic lateral sclerosis SEPSIS
2 each	ACCIDENTAL – self-inflicted injury – freon intoxication, 1; asphyxiation-accidental, 1 HIV/AIDS
1 each	CEREBROVASCULAR – traumatic head injury CIRCULATORY – shock-cardiogenic DIGESTIVE - enterocutaneous fistula with malnutrition HEMATOLOGIC – thrombocytopenia, idiopathic STROKE

In 2014, the top three causes of inmate death were cancer (88 cases, 28%), end stage liver disease (68 cases, 21%) and cardiovascular disease (54 cases, 17%).

In 2011, (the last year for which complete statistics are available) top three causes of death in the free living American male population were cardiovascular (24.6%), cancer (24.1%), and unintentional injury (6.3%). Chronic liver disease was tenth (1.8%). (www.cdc.gov/men/lcod/2011/index.htm)

Liver cancer as a consequence of cirrhosis from hepatitis C infection is actually the number one cancer killer in the inmate population, but it is included in end stage liver disease. Cancer of the lung and colon are the next most frequent. In the general male population of the United States in 2011 (the last year for which complete statistics are available), the order of cancer death is reversed, with lung, prostate and colorectal the top three and liver cancer fourth.

End stage liver disease is very common in the inmate population as a consequence of chronic hepatitis C infection. Although there have been recent advances in the treatment of this chronic infection, it will take years before the routine use of these antivirals will materially effect death rates from this cause. Cardiovascular disease, including sudden cardiac arrest (24 cases), congestive heart failure (11 cases) and acute myocardial infarction and acute coronary syndrome (9 cases) share a common underlying cause - coronary artery disease.

Table 2 shows the top causes of inmate deaths from 2007 - 2014. The top three causes accounted for 66% of all deaths. The only change in 2014 is that homicide deaths dropped to seventh (see later discussion).

TABLE 2. TOP NINE CAUSES OF DEATH AMONG CALIFORNIA INMATES, 2007-2014.

RANK	2014	2013	2012	2011	2010	2009	2008	2007
1	Cancer	Cancer	Cancer	Cancer	Cancer	Cancer	Cancer	Cancer
2	End Stage Liver Disease	End Stage Liver Disease	End Stage Liver Disease	End Stage Liver Disease	End Stage Liver Disease	End Stage Liver Disease	Suicide	End Stage Liver Disease
3	Cardiovascular Disease	Cardiovascular Disease	Cardiovascular Disease	Cardiovascular Disease	Cardiovascular disease	Cardiovascular disease	End Stage Liver Disease	Cardiovascular disease
4	Suicide	Suicide	Suicide	Suicide	Suicide	Suicide	Cardiovascular disease	Suicide
5	Drug Overdose	Drug Overdose	Homicide	Pneumonia	(tied) Drug Overdose; Homicide	Drug Overdose	Drug Overdose	Homicide
6	Pneumonia	Homicide	Drug Overdose	Homicide	Pneumonia	Pneumonia	Pneumonia	HIV/AIDS
7	Homicide	Sepsis	(tied) Sepsis; Infectious	Sepsis	Pneumonia	Congestive Heart Failure	HIV/AIDS	Stroke
8	Pulmonary	(tied) Pulmonary; Pneumonia		Drug Overdose	Congestive Heart Failure	Homicide	Congestive Heart Failure	Drug Overdose
9	(tied) Infectious; Stroke-Hemorrhagic		Stroke	Stroke	(tied) Coccidioidomycosis; End Stage Renal Disease, Stroke		Sepsis	Pneumonia

The average age of all decedents in 2014 was 56 years. Table 3 shows that drug overdoses, suicides and homicides affected a significantly younger population, averaging 39 years.

TABLE 3. RANGES AND AVERAGE AGES AT DEATH AMONG ALL CALIFORNIA INMATES, 2014

	Range	Average
Age of all decedents	20 - 94	56 yrs
Age of suicides, drug overdoses, and homicides	20 - 65	39 yrs
Suicide	23 - 60	38 yrs
Drug overdose	20 - 65	38 yrs
Homicide	23 - 63	44 yrs
Age excluding suicide, drug overdose, and homicide	24 - 94	60 yrs

The major factors which influenced mortality in prisoners in 2014 are no different from those in prior years.

1. Drug addiction. Intravenous injection of drugs with shared needles causes the transmission of hepatitis C virus, which is endemic in the prison population and which causes inflammatory liver disease culminating in cirrhosis. Liver cancer occurs in the setting of a cirrhotic liver. All of the 68

cases of liver cancer and end stage liver disease were caused by hepatitis C virus infection. In 2013, the prevalence of hepatitis C infection in the CCHCS was 14% of the total population.

2. Depression. Depression led to 23 suicides in 2014. Suicide has been the fourth leading cause of death in seven of the past eight years. Depression may also play a role in the patient who has repeated non adherence to medical advice contributing to death, and to some drug overdose deaths.

3. Violence. Prior and current violent lifestyles, crowding, and the prison gang subcultures contribute to the high incidence of homicide in the incarcerated.

4. Cigarette smoking. Twenty percent of American males smoke. (www.cdc.gov/tobacco). The prevalence is higher in those with lower education and lower income, as is found in the prison population. Smoking causes heart disease and lung cancer, both of which are disproportionately higher in the incarcerated.

B. Care Lapses 2014

Each death review identifies any serious lapses in care, whether or not these lapses contributed to preventable death. The classification system for medical error described in section IV provides a context for classifying, tracking and trending these care lapses. Table 4 shows the number of lapses by type identified in the 319 inmate deaths in 2014.

TABLE 4. SUMMARY OF CARE LAPSES, 2014.

LAPSES OF CARE TYPES	# OF LAPSES IN THE 295 NON PREVENTABLE DEATHS	# OF LAPSES IN THE 24 POSSIBLY PREVENTABLE DEATHS	TOTAL LAPSES IN ALL 319 DEATHS
#1 – Failure to recognize, identify or adequately evaluate important symptoms or signs	38	16	54
#2 – Failure to follow established guidelines for evaluation and/or management of a specific condition	18	3	21
#3 – Delay in access to care sufficient to result in harm to the patient	11	14	25
#4 – Failure to adequately pursue abnormal test results	9	6	15
#5 – Failure of provider-to-provider communications including botched handoffs	6	-	6
#6 – Fragmentation of care such that individual responsibility for patient is waived	10	7	17
#7 – Surgical or procedural complication resulting in iatrogenic injury	1	-	1
#8- Medication prescribing error	7	2	9
#9- Medication delivery error	3	-	3

LAPSES OF CARE TYPES	# OF LAPSES IN THE 295 NON PREVENTABLE DEATHS	# OF LAPSES IN THE 24 POSSIBLY PREVENTABLE DEATHS	TOTAL LAPSES IN ALL 319 DEATHS
#10- Practicing outside the scope of one's professional capabilities	-	-	-
#11- Unsupervised mid-level (nurse practitioner or physician assistant) care	1	1	2
#12 – Failure to communicate effectively with the patient	-	1	1
#13 – Patient non-adherence with recommendation for optimal care	6	1	7
#14 – Delay in emergency response or failure to follow emergency response protocol	10	2	12
#15 – other	-	-	-
All Types	120	53	173

There were 54 type 1 lapses, 25 type 3 lapses, and 21 type 2 lapses. Types 1, 2 and 3 accounted for 58% of all care lapses. There were 17 type 6 lapses, 15 type 4 lapses, and 12 type 14 lapses, accounting for another 25% of all lapses. Altogether these 6 types accounted for 83% of all lapses.

C. Non preventable deaths in 2014

There were 295 non preventable deaths during 2014. Table 5 shows numbers of, and causes for, these deaths. These 295 deaths represented 92.5% of all deaths in 2014.

TABLE 5. CAUSES OF NON-PREVENTABLE DEATH AMONG CALIFORNIA INMATES, 2014.

NUMBER OF CASES	CAUSE OF DEATH
82	CANCER – lung, 17; colon, 9; pancreas, 9; prostate, 6; gall bladder, 5; kidney, 4; lymphoma, 4; brain, 3; head & neck, 2; acute myeloid leukemia, 2; unk primary, 2; bladder, 2; stomach, 2; tongue, 2; melanoma, 2; multiple myeloma, 2; tibial sarcoma, 1; sarcoma, 1; intestinal, 1; chronic myelogenous leukemia, 1; anus, 1; acute lymphoblastic leukemia, 1; tonsil, 1; rectum, 1; salivary gland, 1
66	LIVER DISEASE – end stage liver disease-hepatitis C, 45; liver cancer, 20; end stage liver disease-alcoholic, 1
45	CARDIOVASCULAR – sudden cardiac arrest, 22; congestive heart failure, 8; myocardial infarction, 8; cardiomyopathy, 2; acute coronary syndrome, 1; aorta dissection, 1; constrictive pericarditis, 1; dissection aortic aneurysm, 1; recurrent venous thrombosis, 1
22	SUICIDE – hanging, 19; asphyxiation, 1; other, 2
17	DRUG OD – heroin, 6; meth, 4; morphine, 2; opiate, 2; methodone, 1; other, 2

2014 CCHCS Death Review Analysis

NUMBER OF CASES	CAUSE OF DEATH
14	PNEUMONIA – pneumonia, 12; pneumonia-aspiration, 2
9	HOMICIDE
6 each	PULMONARY – chronic obstructive pulmonary disease, 4; bronchiolitis obliterans, 1 chronic interstitial pulmonary disease, 1 RENAL DISEASE – end stage renal disease on HD, 2; end stage renal disease, 2; acute renal failure, 1; chronic renal failure, 1 STROKE-HEMORRHAGIC – stroke-hemorrhagic, 3; intracerebral hemorrhage, 1; intracranial hemorrhage, 1; subarachnoid hemorrhage, 1
5	INFECTIOUS – shock-septic, 3; castleman disease, 1; necrotizing fasciitis, 1
3 each	GASTROINTESTINAL – upper GI bleed, 2; ischemic colitis, 1 NEUROLOGIC – amyotrophic lateral sclerosis
2 each	ACCIDENTAL – asphyxiation-accidental, 1; self inflicted injury-freon intoxication, 1 HIV/AIDS – HIV/AIDS-pneumonia, 1; HIV/AIDS, 1 SEPSIS
1 each	CEREBROVASCULAR – traumatic head injury CIRCULATORY – shock-cardiogenic DIGESTIVE – enterocutaneous fistula with malnutrition HEMATOLOGIC – thrombocytopenia, idiopathic STROKE
295	Grand Total

With the exception of the 22 deaths by suicide, the 17 deaths by drug overdose, the nine homicide deaths, and the two deaths by accident, all were expected as a consequence of underlying chronic disease.

D. Possibly preventable deaths in 2014

There were a total of 24 possibly preventable deaths in 2014, representing 7.5% of all deaths. Table 6 shows the causes of these deaths.

TABLE 6. CAUSES OF POSSIBLY PREVENTABLE DEATH AMONG CALIFORNIA INMATES, 2014.

NUMBER OF CASES	CAUSE OF DEATH
9	CARDIOVASCULAR – chronic heart failure, 3; sudden cardiac arrest, 3; acute coronary syndrome, 1; cardiac arrhythmia, 1; coronary artery disease, 1
6	CANCER – colon, 3; esophagus, 1; kidney, 1; nasopharynx, 1
2 each	DRUG OD – meth, 1; phenytoin, 1 LIVER DISEASE – ESLD, 1; Liver cancer/ESLD-HepC, 1

NUMBER OF CASES	CAUSE OF DEATH
1 each	INFECTIOUS – peritonsillar abscess PNEUMONIA PULMONARY SEPSIS SUICIDE
24	Grand Total

Each of these 24 deaths is briefly described, according to the type of lapse which was most directly contributory.

Type 1 lapses - failures to recognize and manage signs and symptoms - contributed to the following eleven cases.

1. A 64 year old man died of sudden cardiac arrest. Failures to adequately evaluate symptoms of presyncope and signs of tachycardia and hypotension in the setting of known advanced cardiac disease contributed to this death.
2. A 27 year old woman died of subarachnoid hemorrhage precipitated by an acute methamphetamine overdose. Failure to respond to an altered mental status and resultant delay in sending the patient to a higher level of care contributed to her death.
3. A 63 year old man with esophageal cancer died of massive gastrointestinal hemorrhage. Failure to complete an evaluation for gastrointestinal bleeding led to a 7 month delay in diagnosis of the esophageal cancer. A pre-terminal three day delay in assessing recurrent hematemesis contributed to his death from uncontrolled bleeding.
4. An 86 year old man died of congestive heart failure. Failure to fully evaluate and appropriately manage hypoxia, tachycardia and weakness resulted in a 2 day delay in sending the patient to a higher level of care, contributing to his death.
5. A 58 year old man died of cancer of the colon. Multiple failures to assess blood in the stool and abdominal pain resulted in a two year delay in diagnosis which contributed to his death.
6. A 46 year old man with end stage liver disease and liver cancer died of acute respiratory distress syndrome. A failure to adequately evaluate the patient's fever and shortness of breath contributed to his death sooner than expected.
7. A 46 year old man with diabetes mellitus died of peritonsillar abscess. A failure to respond aggressively to symptoms of impending airway obstruction led to a one day delay in transfer to an acute care hospital and contributed to the patient's death.

8. A 58 year old man with multiple risk factors for heart disease including a recent coronary artery bypass died of sudden cardiac arrest. A failure to appropriately manage recurrent chest pain as well as the prescribing of atomoxetine (contraindicated in heart disease) for a mental health condition without communication between mental health and medical providers contributed to his death.

9. A 33 year old woman died of pulmonary embolism secondary to deep venous thrombosis of the leg. Failure to adequately evaluate unilateral leg edema with an urgent ultrasound contributed to her death.

10. A 58 year old man died of metastatic nasopharyngeal cancer. Delays in promptly evaluating nosebleed and in initiating definitive treatment contributed to a 16 month lapse between initial symptoms and treatment.

11. A 66 year old man with hypertension, diabetes mellitus and chronic obstructive pulmonary disease died of sudden cardiac arrest. Failure to adequately assess persistent tachycardia and exertional shortness of breath contributed to the patient's death.

Type 2 lapses - failure to follow established guidelines for care - were cited in the following two cases.

12. A 78 year old man died of congestive heart failure. Overaggressive management of the patient's diabetes mellitus and substandard evaluation and followup of exacerbations of CHF according to clinical guidelines contributed to his death.

13. A 58 year old man died of congestive heart failure. A failure to follow clinical guidelines for the appropriate management of CHF contributed to his death.

Type 3 lapses - delay in access to appropriate level of care - were thought to contribute to the following two cases.

14. A 28 year old woman with dilated cardiomyopathy died of sudden cardiac arrest. A fifteen minute delay in initiation of emergency response protocol contributed to her death.

15. A 36 year old man died of perforated bowel secondary to cancer of the colon. A fifteen hour delay in appropriately evaluating abdominal pain contributed to his death.

Type 4 lapses - failure to respond appropriately to an abnormal test result - contributed to death in the following five cases

16. A 55 year old man with hepatitis C cirrhosis died of cancer of the liver. Failure to refer to oncology for evaluation of a suspicious liver mass seen on ultrasound resulted in a seven month delay in diagnosis.

17. An 82 year old man died unexpectedly because of hyperkalemia caused by renal failure. Delay in evaluation of newly abnormal renal function and a failure to respond to an abnormally high potassium value contributed to this death.

18. A 56 year old man with a seizure disorder died of anticonvulsant medication overdose. A system delay in responding to a lab report indicating a toxic level of phenytoin contributed to this death.

19. A 62 year old man with hepatitis C died of renal cell cancer. A failure to follow up an incidental finding of a large incidental kidney mass found on ultrasound during a hospitalization for a liver biopsy resulted in a 3-4 month delay in diagnosis of kidney cancer. The delay allowed the tumor to double in size (from 7 to 14 cm.) and the cancer was inoperable.

20. An 86 year old man died of colon cancer. Abnormalities of the colon seen on colonoscopy 3-4 months before his death was not followed by biopsy because of initial patient refusal. Repeated failures to communicate with the patient were felt to contribute to death because of a delay in diagnosis.

Type 6 lapses - Fragmentation of care and the absence of a primary care model - contributed to death in the following case.

21. A 44 year old man with known hypertension and poor adherence to medication died of sudden cardiac arrest. He had not been seen by a physician for over a year prior to his sudden death. Failure to follow the primary care model guidelines contributed to this death.

A type 12 lapse - failure to adequately communicate with the patient - contributed to the following case.

22. A 77 year old man died of sepsis from diverticulitis. Failure to aggressively manage the patient's refusal to allow transfer to a higher level of care contributed to this death.

A type 14 lapse - failure to activate or follow the emergency response protocol - contributed to the following death

23. A 29 year old man died of suicide from multiple drug overdose. A 1 ½ hour delay in transporting the patient to an Emergency room and inadequate monitoring of vital signs after an initial heart rate of 130 was felt to have contributed to the patient's death from acetaminophen toxicity.

Multiple lapses (types 1, 4, and 6) were cited as important factors in the following case.

24. A 64 year old man with known coccidioidomycosis and diabetes mellitus died of bacterial pneumonia. Failure to adequately assess and followup the patient's fever and shortness of breath, delayed reporting of a positive bacterial blood culture, and the absence of a primary care model all contributed to the patient's death.

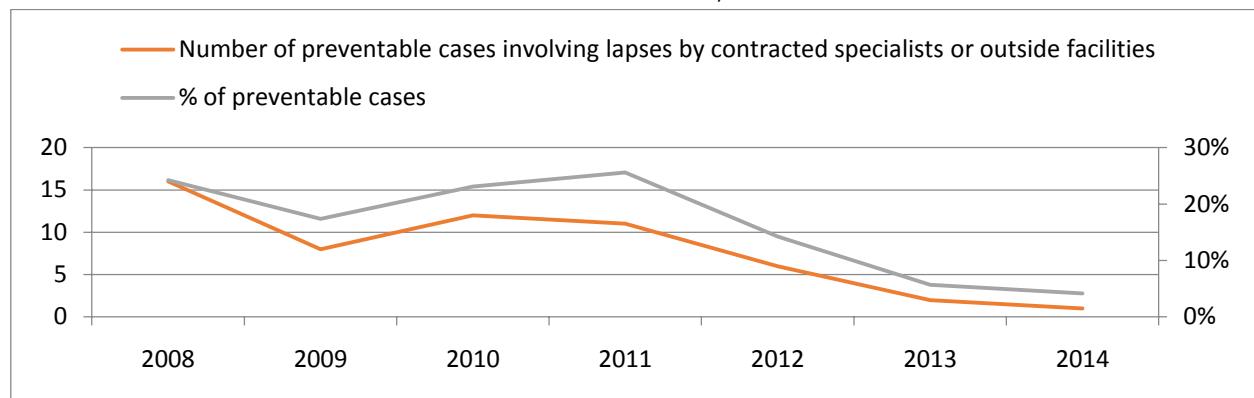
E. Lapses by contracted specialists and outside facilities

Cases of possibly preventable death are reviewed to identify contributory lapses by non-CCHCS specialists or outside facilities. In 2014, there was one such case, described previously.

In case 15, a 36 year old man housed at a contracted modified care facility experienced a significant delay in evaluation of abdominal pain and transfer to an appropriate level of care. He died unexpectedly of a perforated cancerous colon.

This one case represents only 4% of the 24 preventable cases, continuing a downward trend.

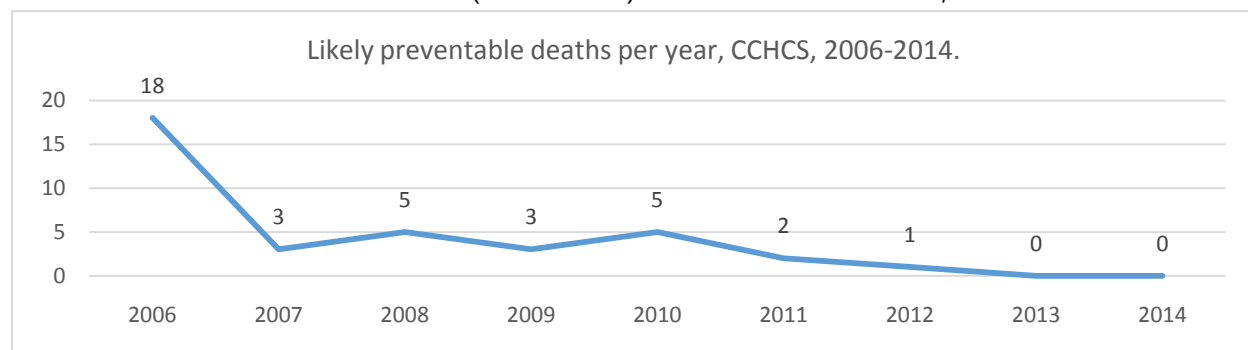
FIGURE 1. POSSIBLY PREVENTABLE DEATHS OF CALIFORNIA PRISON INMATES INVOLVING LAPSES BY CONTRACTED SPECIALISTS OR OUTSIDE FACILITIES, 2008-2014.



F. Likely (Definitely) preventable deaths in 2014

For the second consecutive year in the history of the Receivership, there were no definitely preventable deaths identified in 2014.

FIGURE 2. TREND IN CCHCS LIKELY (DEFINITELY) PREVENTABLE DEATHS, 2006-2014.



VII DISCUSSION OF TRENDS

A. Trends in prison mortality rates in California and the United States

Table 7 depicts annual death rates in the California Correctional Healthcare System from 2006-2014 and death rates for all state prisons from the US Bureau of Justice, which are available for the years 2001-2012. www.bjs.org

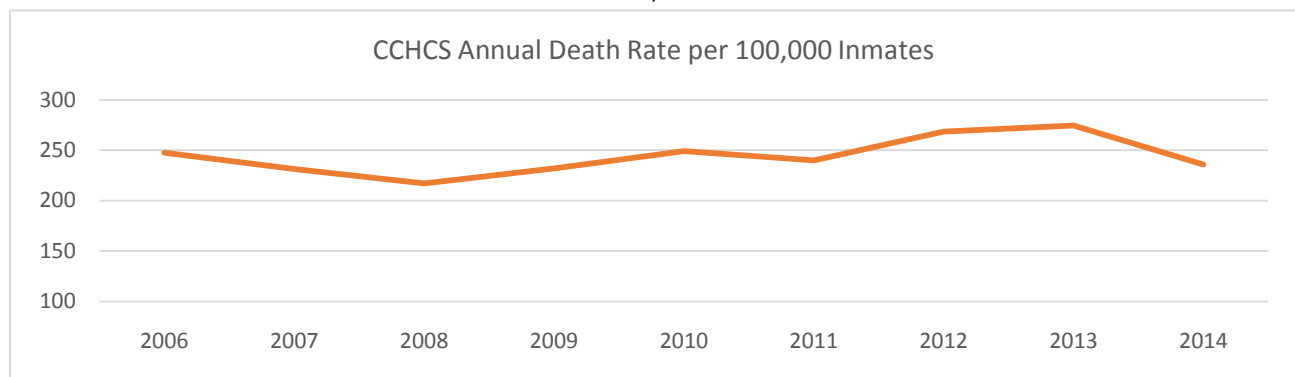
TABLE 7. ANNUAL DEATH RATES AMONG CALIFORNIA AND U.S. STATE PRISON INMATES, 2006-2014.

YEAR	CCHCS Number of Deaths	CCHCS Number of Inmates	CCHCS Death Rate per 100,000 Inmates	TOTAL U.S. State Prison Death Rate
2006	424	171,310	248	249
2007	395	170,786	231	256
2008	369	170,022	217	260
2009	393	169,459	232	257
2010	415	166,700	249	245
2011	388	161,843	240	260
2012	362	134,929	268	264
2013	366	133,297	275	NA
2014	319	135,225	236	NA

NA=Data not available

In 2014, the death rate was 236/100,000, lower than in any of the previous four years, reversing the rising trend that began in 2009. Figure 3 shows the trended death rates in the CCHCS from 2006-2014.

FIGURE 3. TRENDED DEATH RATES IN THE CCHCS, 2006-2014.



B. Trends in CCHCS Preventable Deaths 2006-2014

California is the only state prison system that makes a determination as to the number of preventable deaths that occur. The process has been explained in section II of this report.

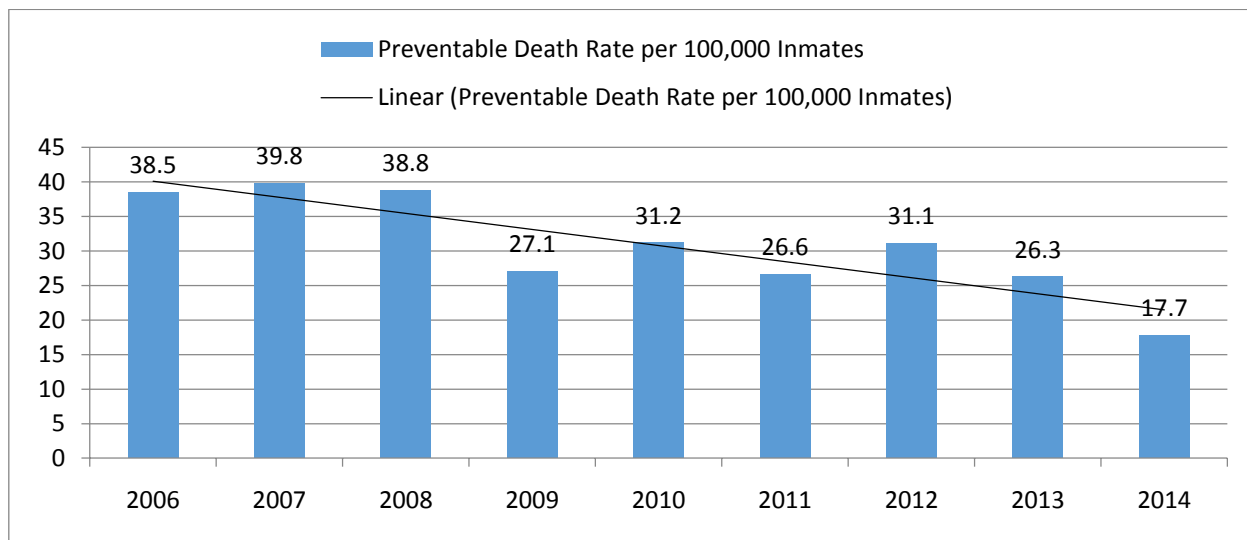
Table 8 shows the number of preventable deaths among California inmates from 2006-2014 and calculates the rate of preventable death/100,000 inmates in each year. The numbers of definitely preventable and possibly preventable deaths combined are shown in the middle column.

TABLE 8. RATES OF PREVENTABLE DEATHS AMONG CALIFORNIA INMATES, 2006-2014.

YEAR	RATE/100,000	ALL PREVENTABLE (LIKELY / POSSIBLY)	INMATE POPULATION
2006	38.5	66 total (18 / 48)	171,310
2007	39.8	68 total (3 / 65)	170,786
2008	38.8	66 total (5 / 61)	170,022
2009	27.1	46 total (3 / 43)	169,459
2010	31.2	52 total (5 / 47)	166,700
2011	26.6	43 total (2 / 41)	161,843
2012	31.1	42 total (1 / 40)	134,929
2013	26.3	35 total (0 / 35)	133,297
2014	17.7	24 total (0 / 24)	135,225

Figure 4 shows the continuing favorable trend in preventable death rates in the CCHCS from 2006-2014. In 2014, there were 24 possibly preventable deaths – a rate of 17.7/100,000. This is the lowest rate of preventable death since the inception of the receivership. For the second consecutive year, no definitely preventable deaths were found in the CCHCS death reviews.

FIGURE 4. TREND IN PREVENTABLE DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2014.



C. Trends in causes of mortality - suicides and homicides

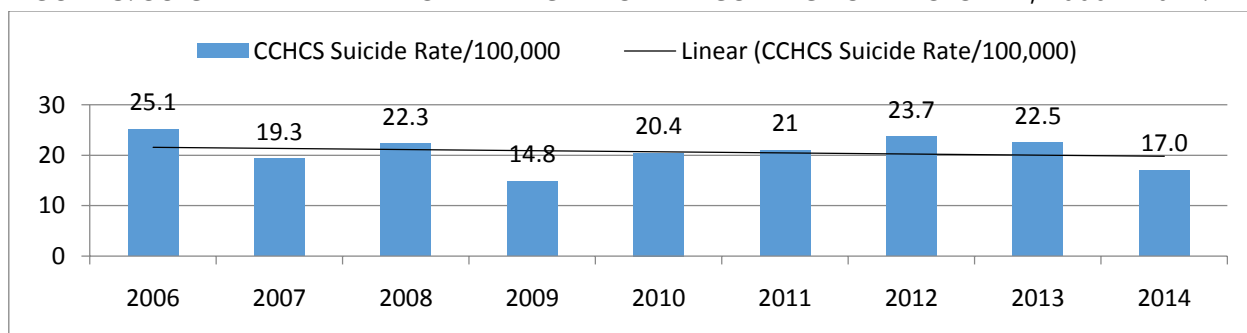
1. *Suicides* - There were 23 suicides in 2014, 7.2% of all deaths in the CCHCS. The rate of suicide deaths in California remains higher than the national rate, but may be trending slightly downward. Table 9 shows the number and rate of deaths by suicide in the CCHCS and nationally and Figure 5 trends the suicide death rates, which from 2006-2014 have averaged 21.1/100,000, 35% higher than the national average of 15.6/100,000 (statistics available for 2006-2012).

TABLE 9. NUMBERS AND RATES OF SUICIDE-RELATED DEATHS IN CALIFORNIA AND ALL US STATE PRISONS, 2006-2014.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	Avg
Suicides	43	33	38	25	34	34	32	30	23	33.5
CCHCS Suicide Rate/100,000	25.1	19.3	22.3	14.8	20.4	21	23.7	22.5	17.0	21.1
U.S. State Prison Rate	17	16	15	15	16	14	16	NA	NA	15.6

NA=Data not available

FIGURE 5. SUICIDE DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006 – 2014.



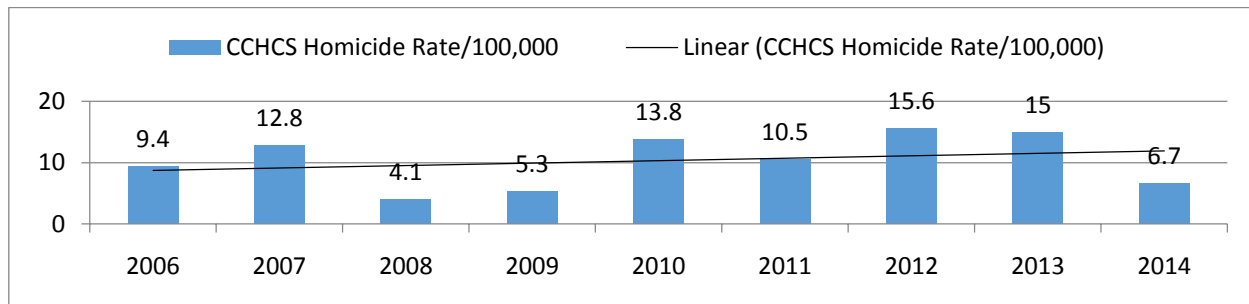
2. *Homicides* - There were nine deaths by homicide in 2014, 2.8% of all CCHCS deaths. The homicide mortality rate of 6.7/100,000 was significantly less than the average of the preceding four years, but the average rate from 2006-2014 is still double the national average and the rate has trended gradually upward since 2006. Table 10 shows the number and rate of homicide deaths in California state prisons and nationally and Figure 6 trends these rates.

TABLE 10. NUMBERS OF HOMICIDE-RELATED DEATHS IN CALIFORNIA AND ALL U.S. STATE PRISONS, 2006-2014.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	Avg
Homicides	16	22	7	9	23	17	21	20	9	16
CCHCS Homicide Rate/100,000	9.3	12.9	4.1	5.3	13.8	10.5	15.6	15.0	6.7	9.3
U.S. State Prison Rate	4	4	3	4	5	5	7	NA	NA	4.5

NA=Data not available

FIGURE 6. HOMICIDE DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006 – 2014.



D. Trends in Care Lapses

1. The relationship between lapses and preventable deaths

Although lapses in care occur frequently in medical practice, the vast majority are without significant clinical consequence because there is a lot of redundancy built into our medical systems of care and because most primary care patients are basically healthy. One recent study found 58% of significantly abnormal abdominal ultrasounds ordered to screen for aortic aneurysms were not documented in the patient's electronic medical records for over three months. The median time to recognition of the abnormal report was 237 days! Yet, none of these cases resulted in a bad outcome. (Annals of Internal Medicine, Vol 151, pp 21-27, 2009)

The number of lapses rises in proportion to the number of medical encounters. So patients at highest risk for experiencing care lapses are those that are older, sicker, or those who have a higher volume of encounters such as patients with chronic pain, recurrent symptoms or severe mental illness.

Previous CCHCS reports have demonstrated the relationship between the number of lapses occurring in a single case and a resultant cascade of events which can culminate in a preventable death.

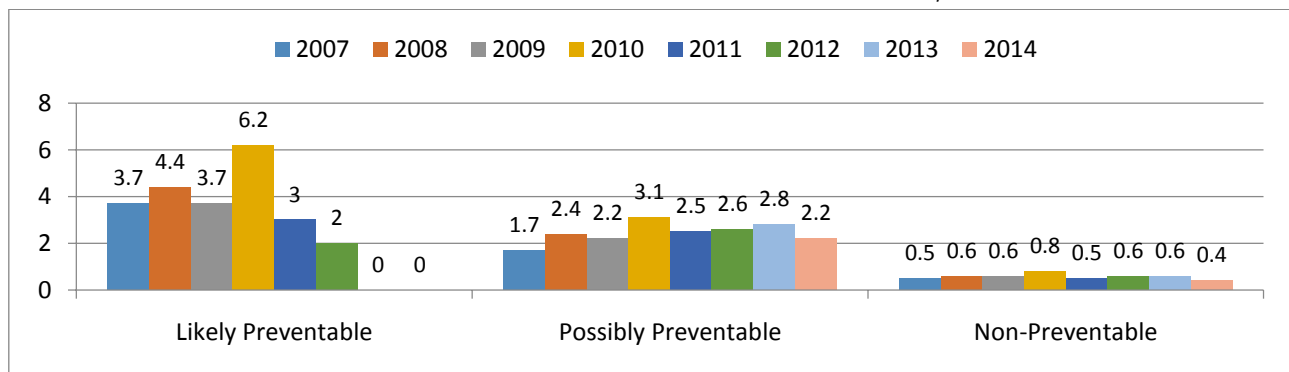
Table 11 and Figure 7 compare the average number of lapses in nonpreventable and possibly preventable deaths.

TABLE 11. NUMBER OF LAPSES BY CATEGORY OF PREVENTABILITY, 2014.

PREVENTABILITY	# DEATHS	# LAPSES	AVERAGE LAPSES/DEATH
Likely preventable	0	n/a	n/a
Possibly preventable	24	53	2.2
Not preventable	295	120	0.4

In 2014, nonpreventable deaths experienced one fifth the number of lapses per case than possibly preventable deaths.

FIGURE 7. AVERAGE NUMBER OF LAPSES PER CASE BY PREVENTABILITY, 2007-2014.



2. Trends in care lapses, 2007-2014

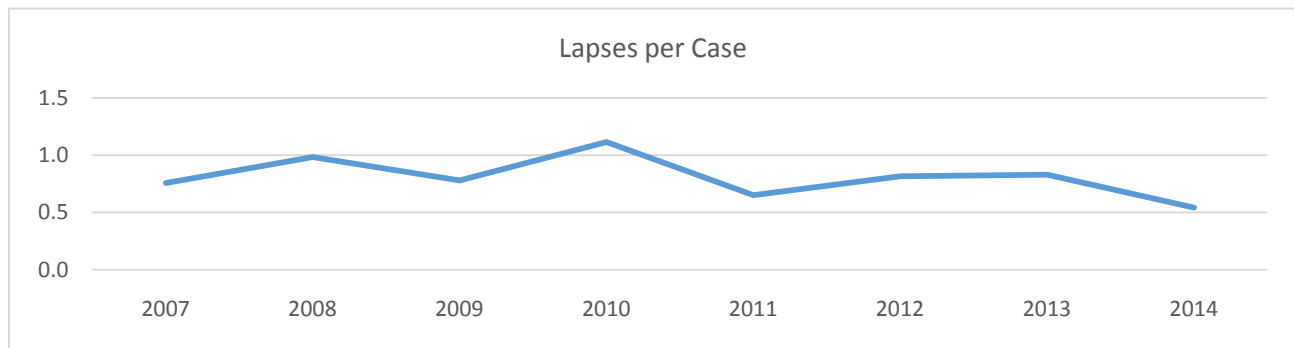
In the death reviews for 2014 there were significantly fewer identified care lapses. Table 12 shows the number of care lapses identified in each year and Figure 8 shows the trend in the rate of care lapses per death from 2007 - 2014.

TABLE 12. NUMBER OF LAPSES, BY PREVENTABILITY, IN CALIFORNIA CORRECTIONAL SYSTEM DEATHS, 2007-2014.

Year	Likely Preventable		Possibly Preventable		Non-Preventable		Total	Avg. Lapses per Case
	#	%	#	%	#	%		
2007	11	4%	109	36%	179	60%	299	0.8
2008	22	6%	147	41%	193	53%	362	1.0
2009	11	4%	90	29%	205	67%	306	0.8
2010	31	7%	147	32%	284	61%	462	1.1
2011	6	2%	92	37%	154	61%	252	0.6

Year	Likely Preventable		Possibly Preventable		Non-Preventable		Total	Avg. Lapses per Case
2012	2	1%	105	34%	198	65%	305	0.8
2013	0	0%	97	32%	206	68%	303	0.8
2014	0	0%	53	31%	120	69%	173	0.5

FIGURE 8. TREND IN ANNUAL AVERAGE OF CARE LAPSES PER DEATH, CCHCS, 2007-2014.



VIII. TARGETED OPPORTUNITIES FOR IMPROVEMENT

A. The Primary Care Model 2009-2014

Beginning in 2009, primary care teams were installed in all California prisons, creating a more identifiable level of accountability for patient health outcomes. The Primary Care Model is seen as the main strategy for ensuring continuous, integrated and coordinated care, especially for those patients who have chronic, complex physical and behavioral health conditions. The interdisciplinary primary care teams are expected to practice with high standards, to advocate for their patients, to use evidence based guidelines in the management of chronic medical conditions, to promote active patient involvement and self management, to be responsible for timely access to necessary care, and to follow and direct their patients' care during and after care transitions when they leave the prison for emergencies, hospitalizations, or specialist visits.

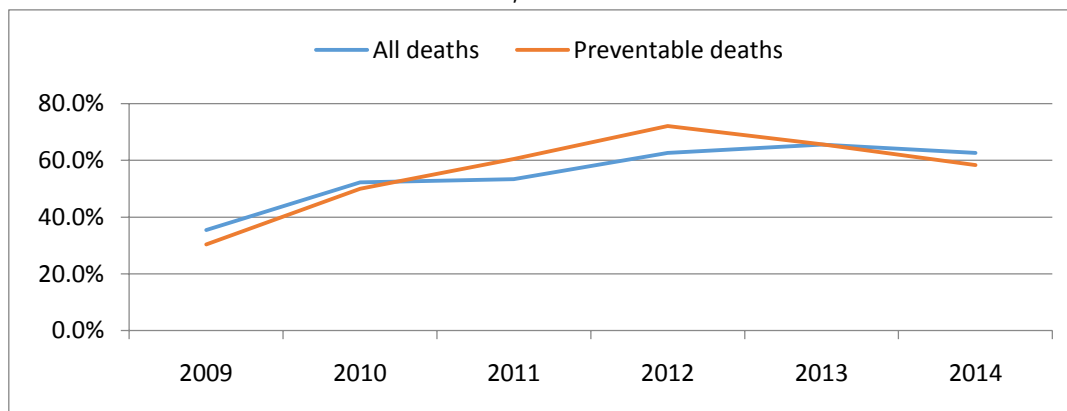
All death reviewers look for an identifiable primary care physician in the framework of the primary care model guiding the care for each patient. Table 13 and Figure 9 show the number and percentage of cases, both preventable and nonpreventable, in which a primary care physician could be identified by the reviewer.

The penetration of primary care in the prisons has nearly doubled, from 36% in 2009 to 66% in 2014. Somewhat surprisingly, primary care in the preventable deaths tracks at nearly the same rate as in the nonpreventable cases.

TABLE 13. IDENTIFIABLE PRIMARY CARE IN CALIFORNIA INMATE DEATH CASES, 2009 – 2014.

Cases with identified Primary Care Physician (% of total cases)	Preventable deaths (possibly and likely)	Non Preventable deaths	TOTAL DEATHS
2009	14 of 46	127 of 248	141 of 393
	30.4%	37.0%	35.5%
2010	26 of 52	191 of 363	217 of 415
	50.0%	52.6%	52.3%
2011	26 of 43	183 of 345	209 of 388
	60.5%	53.7%	53.4%
2012	31 of 43	199 of 324	230 of 367
	72.10%	61.40%	62.70%
2013	23 of 35	217 of 331	240 of 366
	65.7%	65.6%	65.6%
2014	14 of 24	186 of 295	200 of 319
	58.3%	63.1%	62.7%

FIGURE 9. PERCENTAGE OF DEATHS IN THE CALIFORNIA CORRECTIONAL SYSTEM WITH AN IDENTIFIED PRIMARY CARE PHYSICIAN, 2009-2014.



B. Specific Causes of Preventable Death

In 2013 and 2014, the CCHCS targeted specific action in the areas of preventable cardiovascular disease, care of end stage liver disease, improvement in cancer care, drug overdose prevention and the reduction of death caused by the fungal disease *coccidioides immitis*, or "Valley Fever."

In Table 14 are shown the mortality rates from preventable deaths from cardiovascular disease, end stage liver disease, and other cancers.

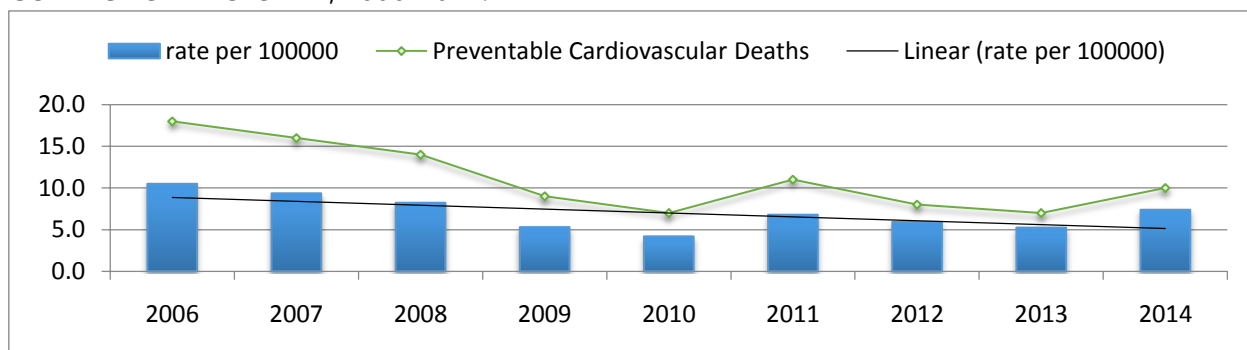
TABLE 14. NUMBERS AND RATES OF PREVENTABLE DEATHS FROM CARDIOVASCULAR, END STAGE LIVER DISEASE, AND CANCER IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2014.

YEAR	PREVENTABLE CARDIOVASCULAR DEATHS		PREVENTABLE ESLD DEATHS		PREVENTABLE CANCER DEATHS	
	Number	Rate per 100,000	Number	Rate per 100,000	Number	Rate per 100,000
2006	18	10.5	2	1.2	6	3.5
2007	16	9.4	6	3.5	7	4.1
2008	14	8.2	4	2.4	9	5.3
2009	9	5.3	4	2.4	10	5.9
2010	7	4.2	2	1.2	4	2.4
2011	11	6.8	1	0.6	6	3.7
2012	8	5.9	3	2.2	1	0.7
2013	7	5.3	4	3.0	4	3.0
2014	10	7.4	2	1.5	6	4.4

1. Preventable Cardiovascular Death Rates

Despite the slight increase in preventable cardiovascular disease in 2014, Figure 10 shows a slight trend towards reduction in preventable cardiovascular disease over the past nine years. This may be because of the continued emphasis on recognition of “red flag” symptoms of heart attack and on better management of chronic heart disease and identification and treatment of risk factors.

FIGURE 10. PREVENTABLE CARDIOVASCULAR DEATHS AND RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2014.

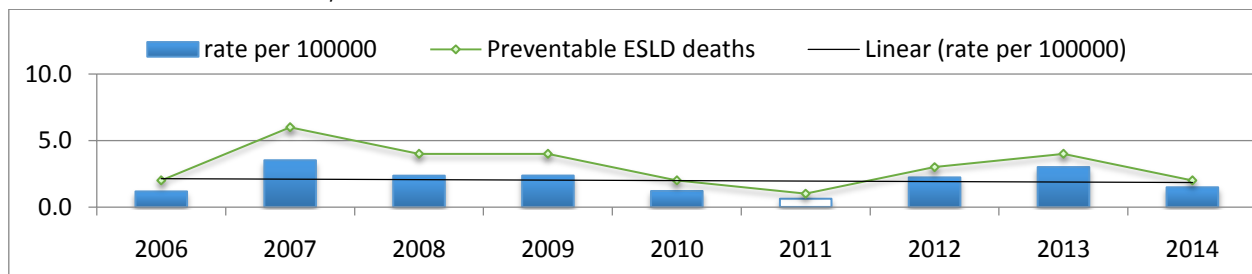


2. Preventable End Stage Liver Disease Death Rates

Guidelines for the management of chronic liver disease were first developed in 2008 and have undergone periodic review and updating because of advancements in the management of chronic hepatitis C viral infection, and widespread use of screening for early hepatic cancers in these patients. Perhaps because of the longstanding emphasis on training and adherence to CCHCS guidelines for the management of ESLD, the number of preventable deaths from end stage liver

disease (including liver cancer) remain relatively small (fewer than five deaths per year during each of the past seven years) and there has been no significant trend in preventable ESLD death rates (Figure 11). As previously mentioned, the recent advances in treatment of hepatitis C (which are incorporated into the guidelines) will probably take many years before significantly affecting death rates from this disease.

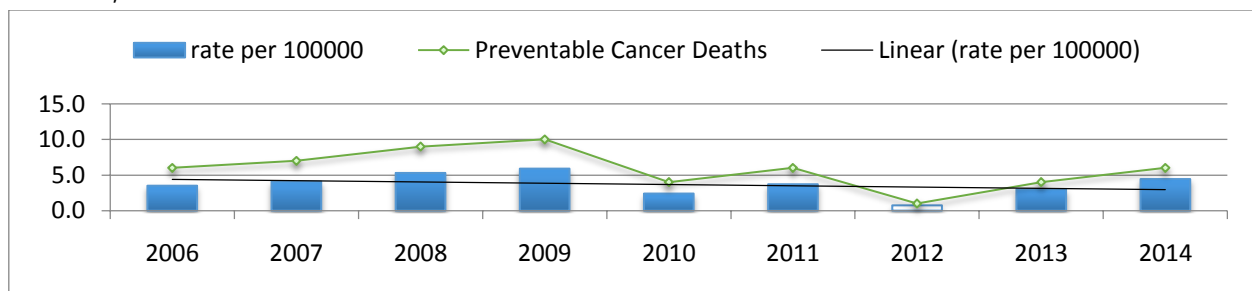
FIGURE 11. PREVENTABLE END STAGE LIVER DISEASE DEATHS AND RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2014.



3. Preventable Cancer Death Rates (excluding liver cancer)

Figure 12 shows trended death rates from preventable cancer. There has been a slight downward trend in the rate of death since 2009. This might be attributed to improved rates of routine cancer screening and/or improvements in chronic cancer care.

FIGURE 12. PREVENTABLE CANCER DEATHS AND RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2014.



4. Drug Overdose Death Rates

The mitigation of drug overdoses was addressed in the CCHCS 2010 Performance Improvement Plan with the creation of pain management and narcotic prescription guidelines, and education to prevent drug diversion and to limit the unnecessary prescription of opiates.

TABLE 15. NUMBERS AND RATES OF DRUG OVERDOSE-RELATED DEATHS IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM AND IN ALL U.S. PRISONS, 2006-2014.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	Avg
CCHCS drug overdoses	17	9	19	14	23	12	15	24	19	16.6
CCHCS rate/100,000	9.9	5.3	11.2	8.3	13.8	7.4	11.1	18.0	14.1	10.6
US State Prison Rate	4	3	4	4	3	4	3	NA	NA	3.6

NA=Data not available

FIGURE 13. DRUG OVERDOSE DEATH RATES IN THE CALIFORNIA CORRECTIONAL HEALTHCARE SYSTEM 2006-2014.

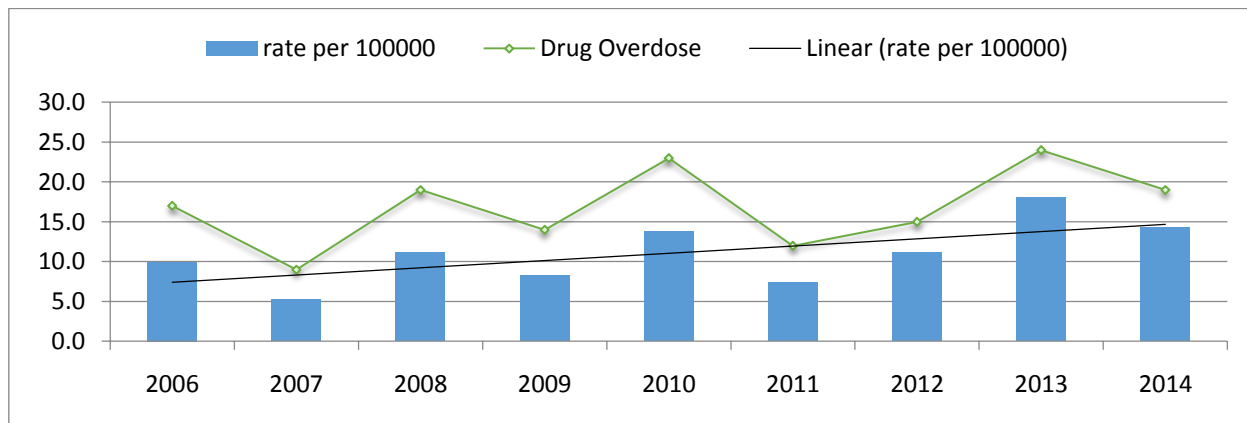


Table 15 and Figure 13 depict the numbers and rates of death from drug overdose from 2006-2014. There has been an average of 16.6 deaths per year from drug overdose from 2006-2014. There has been a continued increase in the rate of drug overdose death, which remains three times higher than the national average for state prisons.

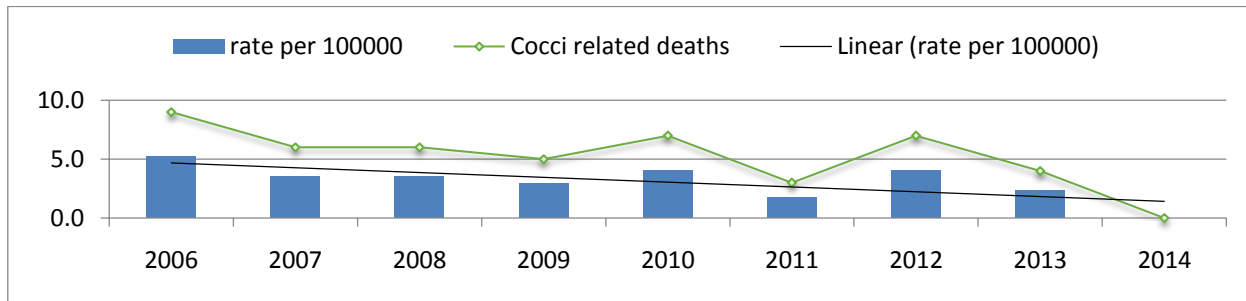
5. Coccidioidomycosis Death Rates

Coccidioidomycosis imititis is a fungal disease transmitted in dust borne spores in the Central California Valley, where eight California prisons are located. A Federal court order in September 2013 mandated the restricting of high risk patients from being housed in these prisons. Coupled with a system wide emphasis on early recognition and treatment for this disease, this has been effective in greatly reducing the number of cocci deaths. Table 16 and Figure 14 show the effectiveness of this program, which required the transfers of thousands of at risk patients. There were no reported deaths from cocci, preventable or not, during 2014.

TABLE 16. COCCIDIOIDOMYCOSIS RELATED DEATHS IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2014.

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cocci related deaths	9	6	6	5	7	3	7	4	0

FIGURE 14. COCCIDIOIDOMYCOSIS RELATED DEATHS AND DEATH RATES IN THE CALIFORNIA CORRECTIONAL SYSTEM, 2006-2014.



C. The California Health Care Facility.

The newest California prison, the California Health Care Facility (CHCF), opened in 2013. This is an Intermediate Institution prison designated for the care of more complex, high risk patients – those with high medical acuity, high nursing acuity and specialized nursing needs, whose illnesses require proximity to tertiary care resources (all renal dialysis patients, for example, are housed there). As of December 2014, there were 1,976 inmates housed at CHCF. This specialized facility is staffed by appropriately trained physicians and other healthcare personnel.

D. The 2013 - 2015 Performance Improvement Plan

1. The CCHCS Statewide Performance Improvement Plan was adopted in August 2013.

The priority improvement areas were in the areas of consistent care teams, population and care management, improved scheduling and access to care, medication management, health information management, and continuous evaluation and improvement.

- Improving the care given to “high risk patients” focused on integrating critical primary care model elements with the identification, classification and (based on numbers and types of medical and behavioral diagnoses) appropriate placement of these patients in Intermediate Institutions (settings designed for more specialized care such as the CHCF described above).
- Identification and management of patients with polypharmacy (patients receiving more than 10 medications and or two or more psychotropic medications) and use of a polypharmacy registry to improve their care coordination.
- A standardized enterprise wide Medical Scheduling and Tracking System to increase access and decrease variability.
- Identification and dissemination of best practices

- e. Use of a Master Patient Registry and subregistries such as for Chronic Hepatitis C , Tuberculosis, Gender Identification Disorder and HIV patients to track processes for patients who share common conditions and to incorporate population health management strategies into the CCHCS.
- f. A statewide patient safety program including training and statewide adoption of a culture of patient safety, root cause analysis training, a Health Care Incident Reporting system and regular patient safety reports.

2. CCHCS Care Guidelines

An integral part of the process for improving care in the CCHCS is the development, distribution and training on Care Guidelines. These guidelines are well written, well researched, evidence based, and well organized tools for physicians and care teams. Most of the high risk and high frequency conditions are covered by Care Guidelines. Front line providers and nursing staff are expected to use these tools to guide the day to day management of their patients. Each care guideline is organized into three major sections:

- A Clinical Summary section which includes goals, diagnostic criteria, alerts for special clinical situations, treatment options, monitoring recommendations,
- A Decision Support Section, which contains tools for real-time management of these patients according to the best evidence based practices, and, importantly,
- A Self Management section, with handouts for patients to enhance their understanding of the disease and recommendations and rationales for self management.

Twenty-two care guides are currently in use and they are frequently referenced when standards of care are determined in death review cases. Accessible online (cphcs.ca.gov/careguides.aspx), there are Care Guides for Anticoagulation, Asthma, Chest Pain, Coccidioidomycosis, Chronic Obstructive Pulmonary Disease, Cognitive Impairment/Dementia, Diabetes , End Stage Liver disease, Gender Dysphoria, Hepatitis C, HIV, Hunger Strike (Fasting and Refeeding), Hyperlipidemia, Hypertension, Major Depressive Disorder, Pain Management, Palliative Care, Seizure Disorders, Skin and Soft Tissue Infections, Tuberculosis, and Wound and Skin Ulcer Management.

3. The Clinical Spotlight

Used in targeted provider education, the *Clinical Spotlight* is a quarterly publication developed by the Clinical Support Unit and distributed to highlight brief clinical practice communications. The four Spotlights for 2014 were Performance Improvement, Hypokalemia, Alpha-fetoprotein, and Ebola.

E. DRC Referrals to Peer Review Committees

The DRC also makes referrals to Nursing and Physician Peer Review Committees for individual lapses, to the Mental Health Department, to the Quality Management and Utilization Management Committees, to specific regional and institutional CEOs, to the Emergency Management Committee and to other groups dealing with Ethics, Patient Safety, and Adverse Sentinel Events.

IX. CONCLUSIONS

The history of the Receivership of the California Prison system is one of evolution - from its initial years of identification and sanction of unsafe practicing physicians to its current emphasis on developing and maintaining a culture of quality improvement and patient safety with an emphasis on systemic problem identification and improvement. Clinically, the system has evolved from a reactive system which provided largely episodic care to a proactive highly integrated health care system with an emphasis on a primary care model of continuity, coordination of care, patient advocacy, and accountability and a systemic approach to the management of chronic disease and high risk conditions.

This ninth annual analysis of death reviews in the California Correctional Healthcare System has highlighted continual improvements in outcomes as measured by the significant reductions in the number and rate of care lapses, significant reductions in the number and rate of possibly preventable deaths and the disappearance of definitely preventable deaths.

CCHCS will continue to evolve its accountable Primary Care Model, improve access, and transform itself into a culture of quality improvement and patient safety. It has already begun the difficult work of improving care through population health management, using data to drive improvement, and using tools to support a transformed system of care. The ongoing concentration of high risk populations into medically oriented prison facilities and high risk case management should result in continued gains in quality and reductions in care lapses and preventable death, and ultimately to the dissolution of the Receivership.