

August 18, 2011

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Receiver
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Dear Clark:

Attached please find the external review of the Inmate Death Review results for 2010 prepared by Kent Imai, MD. This is the 5th year of external review using a standard methodology and complements our internal review process. This review of 415 inmate deaths illustrates the changes in mortality occurring within the California Correctional Health Care Services (CCHCS). The leading causes of death within the California Department of Corrections and Rehabilitation (CDCR), while including cancer and cardiovascular disease that leads mortality in the United States, also reflects the burden of substance abuse and mental illness in our patient population with suicide, end stage liver disease, and drug overdose disproportionately represented among the leading causes of death.



This external review of clinical lapses associated with these deaths reveals a pattern similar to that found in other large integrated health systems with failure to recognize, failure to effectively communicate and fragmentation of care associated with these cases. Access to care and patient refusal and/or non adherence to recommended care also contributed to the observed mortality within the system.

The absence of Standardized Mortality Ratios and varying inmate population makes comparisons across years difficult; it appears however that avoidable deaths have been reduced significantly and that the increase in the death ratio this year was due to expected deaths. This likely reflects the aging of the inmate population and the burden of cancer and chronic disease.

This report does highlight opportunities to further impact mortality within CDCR. Further developing the primary care system throughout the organization, taking advantage of the lowering of the inmate population over the next 18 months to redistribute our most complex patients into our medical hubs, and continued integration of behavioral health into the medical home model will leverage these opportunities in the most effective manner. These opportunities will be explored with clinical leadership at both headquarters and institutional level and incorporated into our quality and death review process.

Sincerely,

R. Steven Tharratt, MD, MPVM, FACP
Statewide Chief Medical Executive
Medical Services Department
CCHCS

ANALYSIS OF 2010 INMATE DEATH REVIEWS – CALIFORNIA PRISON HEALTHCARE SYSTEM

August 15, 2011
Kent Imai, MD
California Prison Receivership

**ANALYSIS OF YEAR 2010 INMATE DEATH REVIEWS
IN THE CALIFORNIA PRISON HEALTHCARE SYSTEM**

TABLE OF CONTENTS

I. Introduction	1
II. Death Review Process	1
III. Definitions	2
IV. Taxonomy for lapses in care	3
V. Limitations and benefits in the death review process.	4
VI. Study findings	5
A. Causes of inmate death – 2010	5
B. Lapses in care, 2010	7
C. Non preventable deaths – 2010	9
D. Possibly preventable deaths – 2010	10
E. Likely (Definitely) Preventable Deaths - 2010	12
F. Lapses by contracting specialists and outside hospitals (non CPHCS providers) - 2010	14
G. Primary Care - 2010	15
VII. Discussion	16
A. Trends in California Prison Death Rates 2006-2010	16
B. Lapses in Care, 2010	17
VIII. Opportunities	18
VIII. Conclusion	20

LIST OF TABLES AND FIGURES

<i>Table 1. Causes of Death Among All California Inmates, 2010.....</i>	<i>5</i>
<i>Table 2 . Top causes of death among California inmates 2007-2010.</i>	<i>7</i>
<i>Table 3. Summary of significant lapses in care, 2010.</i>	<i>8</i>
<i>Table 4. Causes of non preventable death among California inmates, 2010.</i>	<i>9</i>
<i>Table 5, Causes of possibly preventable death among California inmates, 2010.</i>	<i>10</i>
<i>Table 6. Causes of likely preventable death among California inmates, 2010.....</i>	<i>12</i>
<i>Table 7. Presence of Primary Care in California inmate death cases, 2009 and 2010.</i>	<i>15</i>
<i>Table 8. Annual death Rates among California inmates, 2006- 2009.</i>	<i>16</i>
<i>Figure 1. Number of deaths by preventability among California inmates, 2006-2010.</i>	<i>16</i>
<i>Table 9. Preventable, not preventable and suicide deaths among California inmates, 2006-2010.</i>	<i>17</i>
<i>Table 10. Number of lapses by preventability among California inmates, 2010.....</i>	<i>17</i>
<i>Figure 2. Average number of lapses per death by preventability among California inmates, 2007-2010.....</i>	<i>18</i>

I. INTRODUCTION

Since April 2006, the California Prison Healthcare System (CPHCS) has been in federal receivership. The Receivership has directed extensive changes in the healthcare system, including dramatic and demonstrable improvements in the quality of the professional staff. Evidence based guidelines have been introduced as standards of practice in several chronic conditions - asthma, hepatitis C infection, diabetes mellitus, chronic pain, and guidelines for care at the end of life. Clinical guidelines for specialty referral have been used to improve the access to specialty care. A team based system of primary care has been implemented across all thirty three of the California prisons to replace the former episodic complaint driven system.

This fifth annual analysis of California inmate deaths under the federal receivership will again highlight three major areas – trends in mortality, identification and trending of lapses in care (using standardized taxonomy) and identification and trending in the number of preventable deaths in the CPHCS. This will be followed by discussion of opportunities for improvement.

II. DEATH REVIEW PROCESS

Each inmate death is reviewed by one of a group of board certified physicians and one mid level provider. All reviewers have been trained to do death reviews according to a uniform procedure. A standardized death review template is used to record the findings. (All of the midlevel practitioner reviews are discussed with and countersigned by one of the physician reviewers.) In 2010 there were thirty reviewers –twenty-nine physicians and one certified physician’s assistant. Eighteen of these reviewers did 10 or more reviews, accounting for 87% of the total.

Each death review is based on a reading of the decedent’s healthcare record, with emphasis on all clinical encounters which occurred during the last six months of life. Reviewers spend an average of 6-8 hours preparing each review.

For each death, the reviewer is asked to

- determine the cause of death, using autopsy results when available;
- identify all lapses in care occurring during any of the clinical encounters, even if these lapses did not contribute to the patient’s death;
- make a judgment as to whether the death was preventable or not preventable; and
- recommend referrals for adverse findings.

Reviewers are also tasked with deciding whether the patient had an identifiable primary care physician and whether the patient had a Physician's Order for Life Sustaining Treatment (POLST) or an advanced directive in place.

Completed death reviews are presented to the Death Review committee (DRC). The DRC is composed of two nurse members, two physician members, a Division of Adult Institutions representative and a Bureau of Independent Review observer, and is jointly chaired by a nurse manager and a physician manager. After the death review is presented, the committee votes to accept or modify the report with respect to findings including cause of death, departures from the standard of care (lapses), and whether the death was preventable.

Systemic lapses such as delays in access, lack of a system for identifying and responding to abnormal test results, or breakdowns in emergency response protocol are referred to the clinical leaders of the prison in which the lapse was noted, and to the central Quality Management group. Lapses in care by individual nurses, physicians or mid level providers are referred to the appropriate peer review committee. Lapses occurring at contracted hospitals are discussed further at the Peer Review Committee and a letter is usually written to the hospital chief of staff.

In the opinion of this author, the rigorous process of death review employed by the Receivership exceeds similar peer review activity conducted in the civilian world.

III. DEFINITIONS

The following definitions are used by the Death Review Committee and in this analysis:

Lapse in Care (individual) – In the judgment of the reviewer, a clinician has committed a departure from the standard of care that a reasonable and competent clinician would not have committed under the same or similar circumstance.

Lapse in Care (systemic) – In the judgment of the reviewer, there was a lapse in the system of care delivery which departed from the usual standard seen in the medical community.

Non preventable death – In the judgment of the reviewer, the patient's death could not have been prevented or significantly delayed by more optimal health care.

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

Likely (or definitely) preventable death – In the judgment of the reviewer, better medical management or improvement in the system of care delivery would likely or definitely have prevented or significantly delayed the patient's death.

IV. TAXONOMY FOR LAPSES IN CARE

Previous annual reports have described how a taxonomy for grouping lapses in care was developed. In 2007, a classification system (taxonomy) for fourteen different types of care lapses was proposed to the DRC. In 2008, the taxonomy was further refined and incorporated into the death review template. In 2009, after the taxonomy had been in use for a year, it was presented to the April meetings of the National Commission on Correctional Health Care (NCCHC) and to the September meetings of the American Correctional Health Services Association (ACHSA).

The taxonomy has proven to be a useful tool for identifying potentially problematic clinicians, gaps in the healthcare system, opportunities for system redesign, and educational activities for CPHCS staff.

The fourteen categories of lapse are:

- Type 1— Failure to recognize, evaluate and /or manage important symptoms and signs — so called clinical “red flags”.
- Type 2— Failure to follow clinical guidelines or departmental policies. These include evidence based guidelines for the screening, evaluation, monitoring and management of asthma, diabetes mellitus, hepatitis C infection, HIV/AIDS, and chronic pain. Other guidelines include national standards for the treatment of hypertension, coronary heart disease syndromes, and congestive heart failure.
- Type 3— Delay in access to the appropriate level of care. Such delay should be of sufficient duration as to result in harm to the patient.
- Type 4— Failure to recognize, identify, or appropriately react to abnormal test results.
- Type 5— Failure of appropriate provider to provider communication, especially at points where transfers of care (handoffs) occur.
- Type 6— Fragmentation of care resulting from failure of an individual clinician or the primary care team to assume responsibility for patient care. (In 2010 the reviewers were asked whether a patient’s primary care physician could be identified from the medical record)
- 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 delay in patients receiving medication or receiving medications intended or written for another patient.
- Type 10— Practicing outside the scope of one’s professional capabilities.

Type 11— Failure to supervise a midlevel provider, including failure to be readily available for consultation and /or administrative failure to arrange 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/failure in emergency response, including delay in activation or failure to follow the emergency response protocol.

V. LIMITATIONS AND BENEFITS IN THE DEATH REVIEW PROCESS.

There are significant limitations in the process of death review. These include the absence of a system wide electronic medical record, peer review that is conducted off site (at the central offices of the CPHCS rather than at the prison where the death took place.) and inter reviewer variability.

The problem of inter reviewer variability is potentially significant. A study from 2001 analyzed 393 hospital deaths in a Veterans Administration hospital. These analyses were all conducted by board certified internists. Initial reviews found 23% of deaths to be possibly preventable and 6% of deaths to be definitely preventable. When subjected to re- review, inter reviewer concordance was found to be only 0.34 (reviewers agreed with one another 34% of the time). *Hayward, etal. "Estimating hospital deaths due to medical errors: preventability is in the eye of the reviewer . " Journal of the American Medical Association, Vol. 286, pp 415-423, 2001.*

The Death Review Committee takes steps to mitigate inter -reviewer variability. Following each review, a vote of the committee is taken to achieve consensus on cause of death, preventability of the death and the assignation of lapses in care. The committee also wants the reviewer to identify a clear relationship between a lapse or multiple lapses in care and a preventable death.

Suicides and homicides are reviewed by groups other than the DRC. Because of this separate review process, the DRC classifies suicides and homicides as not preventable deaths, unless in the judgment of the reviewer and with concurrence of the DRC, a lapse in medical management has resulted in or contributed to a preventable death.

Benefits of the CPHCS death review process include the limited number of trained reviewers to conduct reviews, the diligence expended conducting each review, and the discussions which take place at the DRC proceedings in order to achieve consensus in findings. Off site review may also be beneficial in removing potentially subjective bias generated by a reviewer's personal knowledge of the on site providers involved in the care of the patient.

VI. STUDY FINDINGS

A. CAUSES OF INMATE DEATH – 2010

There were 415 inmate deaths in 2010.

The causes of death are seen in Table 1. The cause listed represents the underlying condition that led to the patient's death. For example, if a patient dies of severe bloodstream infection (sepsis or septicemia) because chemotherapy for a cancer created a compromised immune system which made the patient susceptible to severe infection, then the cause of death is attributed to the cancer.

Table 1. Causes of Death Among All California Inmates, 2010

Number of Cases	Cause of Death
132	Cancer Lung (41), Liver (22), Colon (12), Lymphoma (8), Head/neck (7), Bladder (6), Pancreas (6), Prostate (4), Stomach (4), Esophagus (3), Unknown Primary (3), Testis (2); 1 each: Acute Lymphocytic Leukemia, Acute Myelogenous Leukemia, Anus, Cholangiocarcinoma, Gall Bladder, Glioblastoma Multiforme, Kidney, Multiple Myeloma, Neuroendocrine, Ovary, Rhabdomyosarcoma, Ewing sarcoma, Peripheral Nerve Sheath sarcoma, Osteogenic Sarcoma
47	End Stage Liver Disease (ESLD) This includes 4 cases of upper gastrointestinal bleeding caused by portal hypertension, a consequence of ESLD.
41	Sudden Cardiac Arrest /Acute Myocardial Infarction
34	Suicide
23 each	Drug Overdose, Homicide
15 each	Pneumonia (includes 4 cases of chronic obstructive pulmonary disease or emphysema, and 3 cases of aspiration pneumonia), Congestive Heart Failure (includes 1 case of acute aortic valve insufficiency)
7 each	Coccidioidomycosis, Disseminated (includes 2 cases each of coccidioidomycosis meningitis and coccidioidomycosis pneumonia), End Stage Renal Disease, Stroke (includes 4 cases of ischemic stroke and 3 cases of hemorrhagic stroke)
6 each	Coronary Artery Disease, Septicemia
4 each	Chronic Obstructive Pulmonary Disease (COPD), Endocarditis, HIV/AIDS
3 each	Bowel Perforation, Pulmonary Embolism
2 each	Amyotrophic Lateral Sclerosis, Clostridium Difficile Colitis, Pulmonary Fibrosis, Pulmonary Hemorrhage, Small Bowel Infarction

1 each	Retropharyngeal Abscess, Acute Renal Failure, ARDS/ Pancreatitis, Acute Renal Failure, Cryptococcosis, Dementia, Diabetes Mellitus with hypoglycemia, Esophageal Rupture, Gangrene, Immune Thrombocytopenia, Incarcerated Stomal Hernia, Motor Vehicular Accident, Multiorgan Failure, Necrotizing Fasciitis, Nephrotic Syndrome, Neuroleptic Malignant Syndrome, Obstructive Sleep Apnea, Prolactinoma, Rheumatoid Arthritis/ Crohn Disease, Sarcoidosis, , Shock (Hypovolemic Hemorrhagic), Stevens-Johnson Syndrome, Thoracic Aortic Aneurysm Rupture, Traumatic Brain Injury
415	TOTAL DEATHS

Of the cancer related deaths, cancer of the lung was most common (41 deaths) followed by cancer of the liver or hepatoma (22 deaths) and colorectal cancer (12 deaths).

Cancer of the liver (22 deaths) and end stage liver disease or cirrhosis (47 deaths) share a common underlying condition, chronic hepatitis C infection. Thus, a total of 69 patients died because they were infected with the hepatitis c virus.

Sudden cardiac arrest and acute myocardial infarction (42 deaths) are grouped together because they have in common an underlying condition, coronary artery disease (six other deaths). Well known risk factors for coronary artery disease— hypertension, smoking, hyperlipidemia or diabetes mellitus—were present in the majority of these patients.

Smoking was also a major underlying cause of almost all cases of lung cancer and chronic obstructive pulmonary disease.

Drug overdose caused 22 deaths. Post mortem toxicology studies attributed 14 of these deaths to opiates and seven to methamphetamine.

For the second year in a row, asthma accounted for no deaths. This is significant because in 2006 during the first year of the Federal Receivership, asthma was responsible for 6 preventable deaths. This triggered a statewide initiative which trained all providers in a chronic disease management approach to asthma — including the use of asthma registries, and widespread dissemination of guidelines for the recognition, classification, treatment and follow-up of all asthmatic patients.

The average age of the decedents in 2010 was 54 years (range: 22 - 88). There was a slight bimodal distribution, with suicides, homicides and drug overdoses together averaging 41 years and all others averaging 56 years.

Table 2 compares the top causes of inmate deaths from 2007 to 2010.

Table 2 . Top causes of death among California inmates 2007-2010.

Rank	2010	2009	2008	2007
1	Cancer	Cancer	Cancer	Cancer
2	End Stage Liver Disease	End Stage Liver Disease	Suicide	End Stage Liver Disease
3	Sudden Cardiac Arrest/ Acute Myocardial Infarction	Sudden Cardiac Arrest/ Acute Myocardial Infarction	End Stage Liver Disease	Sudden Cardiac Arrest/ Acute Myocardial Infarction
4	Suicide	Suicide	Sudden Cardiac Arrest/ Acute Myocardial Infarction	Suicide
5	(tied) Drug Overdose; Homicide	Drug Overdose	Drug Overdose	Homicide
6		Pneumonia	Pneumonia	HIV/AIDS
7	Pneumonia	Congestive Heart Failure	HIV/AIDS	Stroke
8	Congestive Heart Failure	Homicide	Congestive Heart Failure	Drug Overdose
9	(tied) Coccidioidomycosis, End Stage Renal Disease, Stroke		Sepsis	Pneumonia

The top three underlying causes of death in the inmate population are:

1. **Drug addiction leading to chronic hepatitis C infection** causing end stage liver disease (cirrhosis) and liver cancer (hepatoma),
2. **Tobacco addiction** causing lung cancer and contributing to coronary heart disease, and
3. **Depression** contributing to suicide.

B. LAPSES IN CARE, 2010

The process of death review forms the basis for a meticulous search for medical errors, or lapses in care. By analyzing in detail each medical encounter in the six months preceding a death, reviewers are able to provide a biopsy sampling of the entire system of care provided in the California prison system.

The consensus driven identification of significant lapses becomes the framework upon which a program for the improvement of care can be developed. As noted, the use of a taxonomy or classification of fourteen types of medical error has been helpful in this process.

Table 3. Summary of significant lapses in care, 2010.

Lapses of Care Types	# of Lapses in the 363 Non Preventable Deaths	# of Lapses in the 47 Possibly Preventable Deaths	# of Lapses in the 5 Likely Preventable Deaths	Total Lapses in all 415 deaths	Cumulative Percent
#1 – Failure to recognize, identify or adequately evaluate important symptoms or signs	48	29	7	84	18.2%
#2 – Failure to follow established guidelines for evaluation and/or management of specific condition	42	20	4	66	32.5%
#3 – Delay in access to care sufficient to result in harm to the patient	30	18	10	58	45.0%
#4 – Failure to adequately pursue abnormal test results	23	12	3	38	53.2%
#5 – Failure of provider-to-provider communications including botched handoffs	18	7	1	26	58.9%
#6 – Fragmentation of care such that individual responsibility for patient is waived	16	7	2	25	64.3%
#7 – Surgical/procedural complication resulting in iatrogenic injury	4	9	2	15	67.5%
#8- Medication prescribing error	30	10	1	41	76.4%
#9- Medication delivery error	7	3	0	10	78.6%
#10- Practicing outside the scope of one's capabilities	3	1	0	4	79.4%
#11- Unsupervised mid-level (nurse practitioner or physician assistant) care	4	0	0	4	80.3%
#12 – Failure of communication with patient	7	5	0	12	82.9%
#13 – Patient non-adherence with recommendation for care	34	14	0	48	93.3%
#14 – Delay in emergency response or failed to follow emergency response protocol	18	7	0	25	98.7%
#15 - Other (including unavailability of medical record)	0	5	1	6	100.0%
TOTAL LAPSES	284	147	31	462	

Table 3 shows the number of lapses of each type identified during review of the 415 deaths in 2010.

Lapse type 1 (failure to recognize or properly evaluate important clinical signs or symptoms), type 2 (failure to follow established clinical guidelines for care), and type 3 (delay in access to appropriate care) again were the most frequently noted, accounting for nearly half of all lapses. But in 2010, other types of lapses stood out. These included type 4 (failure to pursue abnormal test results), type 5 (failure of provider to provider communication), type 6 (fragmentation of care), type 8 (medication prescribing errors), and type 13 (patient non adherence with recommendations for optimal care). The increase in type 13 lapses may be indicative of the high burden of underlying behavioral illness in the prison population.

C. NON PREVENTABLE DEATHS – 2010

Of the 415 deaths in 2010, 363 (87.5%) were judged by the Death Review Committee to be not preventable. Table 4 shows the causes of death in these cases.

Table 4. Causes of non preventable death among California inmates, 2010.

Number of Cases	Cause of Death
128	Cancer
45	End Stage Liver Disease
35	Sudden Cardiac Arrest/Acute Myocardial Infarction
33	Suicide
20 each	Drug Overdose, Homicide
13	Congestive Heart Failure
9	Pneumonia
7	End Stage Renal Disease
6 each	Coronary Artery Disease, Stroke
4 each	Chronic Obstructive Pulmonary Disease, HIV/AIDS, Septicemia
3 each	Bowel Perforation, Coccidioidomycosis
2 each	ALS, Endocarditis, Trauma
1 each	C. Difficile Colitis, Cryptococcosis, Dementia, Gangrene, Incarcerated Stomal Hernia, Motor Vehicle Accident, Necrotizing Fasciitis, Neuroleptic Malignant Syndrome, Pulmonary Hemorrhage, Pulmonary Embolism, Pulmonary Fibrosis, Rheumatoid Arthritis/ Crohn Disease, Sarcoidosis, Small Bowel Infarction, Stevens-Johnson Syndrome, Thoracic Aortic Aneurysm Rupture, Traumatic Brain Injury
363	TOTAL NON PREVENTABLE DEATHS

Except for suicides, homicides and drug overdoses and the cases of accidental trauma, all of these deaths were natural and expected.

HIV/AIDS caused 4 deaths in 2010, the same number as in 2009. As in previous years, these deaths were also reviewed separately by University of California experts in HIV/AIDS care and were found to be well managed by the CPHCS and within the community standard of care.

D. POSSIBLY PREVENTABLE DEATHS – 2010

Of the 415 deaths in 2010, 47 (11%) were judged to be possibly preventable.

Table 5 shows cause of death in these 47 cases.

Table 5, Causes of possibly preventable death among California inmates, 2010.

Number Of Cases	Cause Of Death
6	Sudden Cardiac Arrest/Acute Myocardial Infarction
5	Pneumonia
4	Coccidioidomycosis
3 each	Drug Overdose, Homicide
2 each	Cancer, Congestive Heart Failure (incl. 1 acute aortic valve insufficiency), Endocarditis, End Stage Liver Disease, Pulmonary Embolism, Septicemia
1 each	Abscess, ARDS/Pancreatitis, C. Difficile Colitis, Diabetes Mellitus hypoglycemia, ImmuneThrombocytopenia, Multiorgan Failure, Nephrotic Syndrome, Obstructive Sleep Apnea, Prolactinoma, Pulmonary Hemorrhage, Shock (Hypovolemic Hemorrhagic), Small Bowel Infarction, Stroke (Hemorrhagic), Suicide (by Overdose)
47	TOTAL POSSIBLY PREVENTABLE DEATHS

Initially the death review committee labeled 53 deaths as possibly preventable, but in 4 of these cases there were no lapses in care identified . In a fifth case, the death was marked “preventable” on the front page but in his narrative the reviewer stated the death was “not preventable.” In a sixth case, a delay of six weeks in making a diagnosis of a metastatic lymph node seemed insufficient to have caused a preventable death from metastatic lung cancer .Thus, for this report there were 47 possibly preventable deaths identified in 2010.

Brief summaries of representative cases follow:

A 27 year old man with known aortic valve replacement died of acute myocardial infarction complicating unrecognized endocarditis.

A 65 year old man with chronic renal failure died of acute myocardial infarction precipitated by a rapid and unmonitored rise in red blood cell mass after he was given epogen (a red blood cell stimulator).

A 69 year old man died of clostridium colitis after failure to look for the root cause of recurrent urinary tract infections. Proper evaluation might have led to the diagnosis of treatable obstructive prostate hypertrophy.

A 48 year old man died after failure to evaluate his anemia led to a ten month delay in the diagnosis of multiple myeloma.

A 52 year old man died of congestive heart failure, which went unrecognized in part because of lack of coordinated care.

A 35 year old man died of unrecognized severe aortic valve insufficiency after multiple clinicians had failed to promptly evaluate the appearance of a new heart murmur.

A 25 year old man died of meningeal coccidioidomycosis. Several complaints of headache, nausea, vomiting and malaise were poorly evaluated.

A 58 year old man with known coccidioidomycosis of the spine died of disseminated coccidioidomycosis after delayed evaluation of new symptoms and patient nonadherence with recommendations for therapy because of his underlying severe behavioral illness.

A 35 year old brittle diabetic died of recurrent hypoglycemia while being poorly monitored in the general population.

A 54 year old man with known osteomyelitis and endocarditis died after failure to evaluate a new fever.

A 55 year old victim of assault died after poor management of the suction machine during attempts at resuscitation.

A 47 year old man was not offered therapy for hepatitis c infection. He died of gastrointestinal bleeding which complicated his cirrhosis.

A 58 year old man with known severe obstructive sleep apnea (3 prior intubations for respiratory failure) died suddenly after delay in receiving a replacement BIPAP machine.

A 74 year old man with a pneumonia index of 104 (high risk, indicating need for hospitalization) was not managed in hospital and died in the prison.

A 57 year old patient with history of cancer of the larynx and paraplegia died of pneumonia after delay in evaluation of fever, shortness of breath and low oxygen saturation.

A 62 year old man died of pneumonia and empyema. A five day delay in recognition of an abnormally elevated white blood cell count led to a delay in indicated hospitalization.

A 47 year old man died of pulmonary embolism after a third episode of chest pain, hypertension and shortness of breath, and a delayed call to 911.

A 37 year old man with complaints of shortness of breath and dizziness died of pulmonary embolism. Unilateral leg edema was being incorrectly treated as cellulitis rather than as deep vein thrombosis.

A 45 year old man with hypertension died of sudden cardiac arrest. There had been no indicated screening for cardiac risk.

A 61 year old man died of sudden cardiac arrest. An abnormal electrocardiogram indicating significant coronary artery disease had not been acted upon.

A 50 year old man died of sudden cardiac arrest. Defibrillation had not been attempted during initial emergency response.

A 60 year old man died of staphylococcal septicemia after a three day delay in evaluation of facial swelling and rash, signs of facial cellulites.

A 40 year old man died after a long delay initiating definitive treatment of a large pituitary tumor.

A 42 year old man died of hemorrhagic stroke while on chronic anticoagulation. Underlying behavioral illness, poor patient education and sub standard monitoring of anticoagulant therapy all contributed to excessive anticoagulation.

A 45 year old man committed suicide after months of inadequate pain control treated episodically without guideline directed management.

These 25 cases illustrate how failure to recognize and manage clinical red flag symptoms, poorly coordinated care or absence of coordinated care, lack of recognition or failure to pursue abnormal test results, poor communication with other providers, poor monitoring of known medication effects, failure to follow clinical guidelines, delays in access to appropriate evaluation and treatment, and failure to optimally manage severe behavioral illness might contribute to preventable deaths.

E. LIKELY (DEFINITELY) PREVENTABLE DEATHS - 2010

There were 5 deaths which reviewers and the Death Review committee called likely (or definitely) preventable in 2010. Table 6 shows the causes of death in these 5 cases.

Table 6. Causes of likely preventable death among California inmates, 2010.

Number of Cases	Cause of Death
2	Cancer
1	Acute Renal Failure
1	Pneumocystis pneumonia in a patient with undiagnosed HIV/AIDS
1	Pneumonia in a patient chronic obstructive pulmonary disease
5	TOTAL LIKELY PREVENTABLE DEATHS

Case 1. A 60 year old man with complex medical problems was followed sporadically by at least 6 physicians. Although he was a difficult patient with significant mental health issues, he experienced repeated delays in evaluation of recurrent nausea and vomiting (type 1 and type 3 lapses). Escalating abnormal laboratory values were not evaluated (type 4) until the

patient was in acute renal failure. Hospitalization could not prevent his death from severe electrolyte abnormalities. The reviewer noted that the record indicated repeated instances in which physician orders for follow up were either delayed or ignored, multiple hospitalizations “after which it might be expected that the patient would be followed more closely, whereas the reverse happened”. The reviewer also cited “no mechanism for critical lab results to be reported to providers”. This patient died “due to problems with access to care and failure of nursing and medical staff to recognize red flag signs and symptoms”

Case 2. A 48 year old man with lymphoma was transferred from one prison to another while undergoing a course of chemotherapy. The reviewer thought that failure to hold the patient for completion of his chemotherapy (type 5) also resulted in a significantly delayed evaluation of hematochezia (type 3). The patient submitted 4 requests over a 15 day period requesting evaluation of bloody stools. Without actually seeing the patient, a physician ordered a “routine” request for colonoscopy (type 1 lapse). Following the patient’s transfer, the receiving physician failed to advocate for expeditious oncology consultation despite the patient having missed recommended cycles of therapy (type 3). Colonoscopy was not obtained. Nine days after transfer the patient experienced hypotension and hypoxemia and was transferred to a local hospital where he died on the evening of admission. No autopsy was obtained.

Case 3. A 47 year old man died of pneumocystis pneumonia, “a treatable condition with excellent survival rate.” The underlying diagnosis of HIV/AIDS was missed because of failure to evaluate a weight loss of 28 pounds in 5 months (type 1 lapse). The diagnosis of pneumocystis pneumonia was missed because of failure to recognize multiple “classic signs and symptoms” (type 1) compounded by a 7 day delay in the reporting of a diagnostic bronchoscopy specimen with clearly demonstrated pneumocystis organisms (type 4). The report was received by clinicians on the day of the patient’s death, and indicated therapy was not received by the patient.

Case 4. A 26 year old man died of metastatic testicular cancer. The diagnosis of cancer was delayed by at least 9 months because a “rock hard” inguinal mass was misdiagnosed as an inguinal hernia (type 1 lapse). The reviewer thought the delay in diagnosis (type 3) allowed a highly treatable malignancy with over 90% survival in early stages I – II to become (by the time of eventual diagnosis), a late stage IV 10 cm testicular mass with diffuse retroperitoneal, pulmonary and perirenal metastases which did not respond to chemotherapy.

Case 5. A 52 year old man with underlying chronic obstructive pulmonary disease died of aspiration pneumonia after surgery for adenocarcinoma of the lung. The diagnosis of lung cancer was delayed by 7 months after a suspicious nodule was noted on chest x ray (type 4). This delay was due to a number of lapses including absence of medical records at times of patient visits with his physicians, administrative failure to delay transfer from one prison to another in midst of work up (type 5), and several cancelled or delayed appointments because of inappropriate triage of the patient’s repeated requests for care (type 3 lapses).

As in past years' examples, these cases illustrate how multiple lapses in a single case can lead to unnecessary suffering and preventable death. Recurrent symptoms especially can offer opportunities for effective intervention.

F. LAPSES BY CONTRACTING SPECIALISTS AND OUTSIDE HOSPITALS (NON CPHCS PROVIDERS) - 2010

As in the past two years, all of the cases of preventable death in 2010 were reviewed to determine whether there were significant contributory lapses by non CPHCS providers or hospital systems.

In 2010, 12 of the 52 cases (23%) had contributory lapses by non CPHCS providers. This is not significantly changed from previous years— 17% (8 of 46 cases) in 2009 and 24% (16 of 66 cases) in 2008.

Brief summaries of these twelve cases are presented:

Case 1. A 62 year old man with severe pancreatitis was discharged prematurely from hospital and died, despite a predicted mortality of less than 1% based on the initial severity of the pancreatitis .

Case 2. A 62 year old man died of sepsis from a retropharyngeal abscess which complicated a dental procedure.

Case 3. A 61 year old man died of peritonitis following a bowel perforation which complicated a difficult colonoscopy with a partially obstructing carcinoma of the cecum.

Case 4. A 68 year old man with diabetes, COPD and a history of "Valley fever" died of poorly managed pulmonary coccidioidomycosis. A pulmonary or infectious disease specialist was not consulted until the patient was preterminal, and a unilateral "do not resuscitate/do not intubate order" was written by hospital physicians without documentation of having consulted the patient.

Case 5. A 45 year old man died of congestive heart failure precipitated by a severe postoperative infection complicating surgical enucleation of a traumatized eye.

Case 6. A 49 year old man with immune thrombocytopenia died in hospital from poorly managed anaphylactic reaction to a platelet infusion.

Case 7. A 48 year old man died of overwhelming infection which complicated a cholecystectomy.

Case 8. A 71 year old man died of a sudden cardiac arrest shortly after an inadvertent right coronary artery occlusion caused by extravasation of contrast dye during a cardiac catheterization.

Case 9. A 48 year old man with septic arthritis in a previously operated knee was prematurely discharged from hospital and died without having had indicated surgical drainage.

Case 10. A 48 year old woman died two weeks after aortic valve replacement surgery which was complicated by a severe wound infection, leading to gram negative blood stream infection.

Case 11. A 58 year old man with renal failure died one day after a cardiac catheterization complicated by a large groin hematoma. It was thought that anticoagulation in preparation for his routine hemodialysis led to unrecognized extension of the hematoma into the retroperitoneal area, causing hypovolemic shock and death.

Case 12. A 57 year old man with small bowel obstruction was sent out of the hospital emergency room. His bowel obstruction worsened, leading to bowel infarction, sepsis, aspiration pneumonia and death.

Five of these cases (cases 1, 4, 9, 11, and 12) point to the continuing need for good systems of communication between the primary care prison physicians and their colleagues in emergency rooms and hospitals.

G. PRIMARY CARE - 2010

In 2009, in an effort to improve accountability for patient outcomes, primary care teams were installed in all 33 California prisons. Prior to creation of the receivership in 2006, care at the prisons was widely held to be episodic rather than systematic, reactive rather than proactive and idiosyncratic rather than guideline driven. Now, by policy, each inmate is assigned to a specific primary care team which is held to a high standard of practice — responsible for timely access, efficient and appropriate care, and for using guidelines in the management of chronic diseases such as asthma, diabetes, hepatitis C and end of life care, with adequate pain management and hospice care for patients with terminal illnesses.

As shown in Table 7, there has been an impressive increase in the penetration of primary care practice in the California prison system, from 36% of all patients who died in 2009 to 52% of patients who died in 2010.

Table 7. Presence of Primary Care in California inmate death cases, 2009 and 2010.

	2009		2010	
	Cases with an identified Primary Care Physician	% of total cases	Cases with an identified Primary Care Physician	% of total cases
Cases with no lapses	80 of 210	38%	114 of 221	51.6%
Possibly Preventable deaths	13 of 43	30%	23 of 47	49%
Non Preventable deaths	127 of 248	37%	191 of 363	52.6%
TOTAL DEATHS	141 of 393	35.5%	217 of 415	52.3%

There has been an impressive increase in the identification of primary care physicians involved in the care of these patients, from 35.5% in 2009 to 52.3% in 2010. However, there is as yet no systematic monitoring of indicators which can show how effectively these primary care practice teams are operating in the CPHCS. Furthermore, as in past years, detailed reading of the death reviews indicates an extremely high rate of serious underlying mental illness in the prison population. The presence of concurrent severe mental illness in these patients can make even routine management extremely challenging to the best intentioned of primary care teams.

VII. DISCUSSION

A. TRENDS IN CALIFORNIA PRISON DEATH RATES 2006-2010

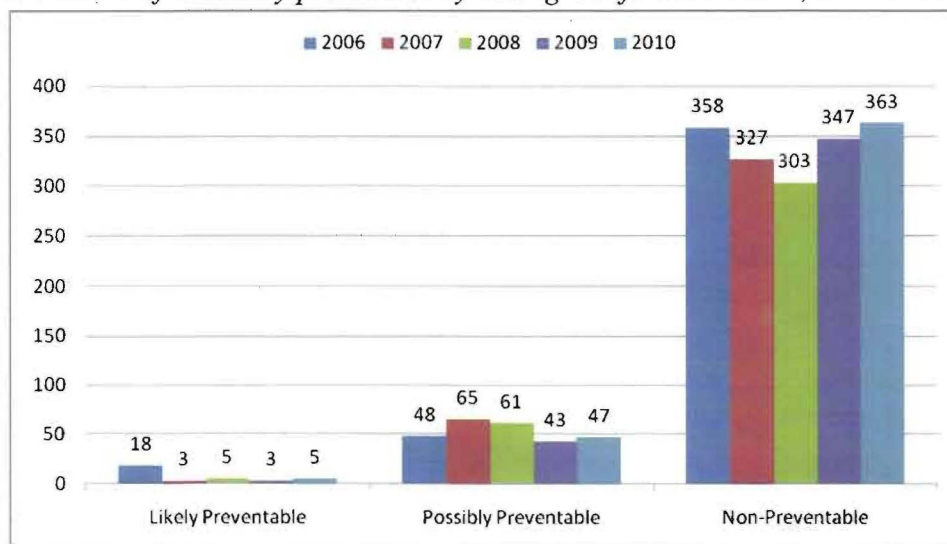
Table 8. Annual death Rates among California inmates, 2006- 2009.

Year	Number of Deaths	Number of Inmates (on Dec. 31)	Death Rate Per 100,000 Inmates
2006	426	171,310	249
2007	397	170,452	233
2008	369	170,283	217
2009	396	167,922	236
2010	415	162,200	256

Table 8 shows the California prison death rates from 2006-2010. During 2009 and 2010, the death rates were nearly as high as in 2006, reversing a downward trend seen in 2007 and 2008.

Figure 1 shows trends in the number of deaths in the years 2006-2010. The deaths are separated into likely (definitely) preventable, possibly preventable, and not preventable.

Figure 1. Number of deaths by preventability among California inmates, 2006-2010.



As shown in Figure 1, the increase in death rates in the past two years is entirely due to an increase in **not preventable** deaths. There has been a significant decrease in the number of **preventable** deaths during 2009 and 2010. And there has been a highly significant decrease in the number of **likely or definitely preventable deaths** in the years since 2006.

Table 9 (below) shows the number of all cause preventable deaths, all cause non preventable death, and trends in suicides from 2006 to 2010.

Table 9. Preventable, not preventable and suicide deaths among California inmates, 2006-2010.

Year	All Preventable (Likely Plus Possibly)	All Not-Preventable	Suicides
2006	66 total (18 / 48)	358	43 total
2007	68 total (3 / 65)	327	33 total
2008	66 total (5 / 61)	303	38 total
2009	46 total (3 / 43)	348	25 total
2010	52 total (5 / 47)	363	34 total

Significantly, the number of all cause (possibly plus likely) **preventable** deaths was lower in 2009 and 2010 (average of 49 cases) than for the years 2006- 2008 (average 67 cases).

The number of suicides (with the exception of 2009) has remained relatively unchanged since 2006.

B. LAPSES IN CARE, 2010

In prior annual reports, it was noted that lapses in care occur commonly in medical practice. Most of these lapses do not lead to serious injury or death but all are capable of doing so, especially if they occur in patients with serious underlying medical conditions.

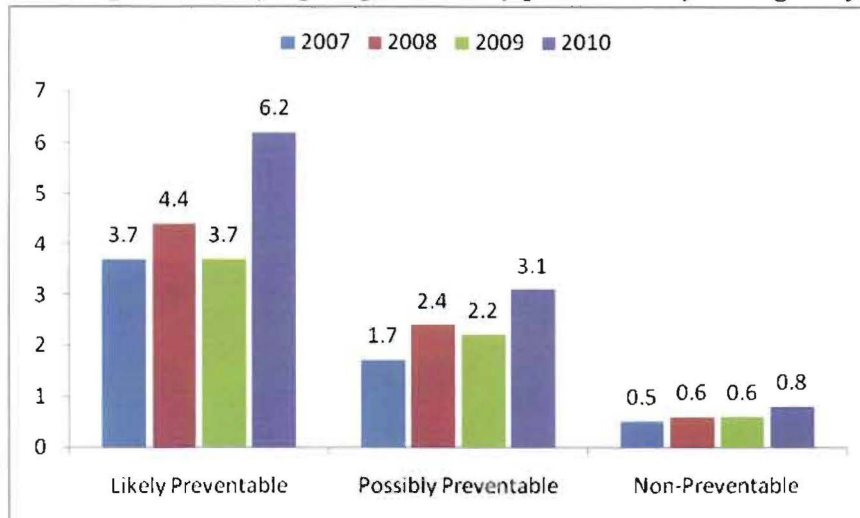
In 2010, there were a total of 462 lapses noted. 284 occurred in the 363 not preventable cases, 147 occurred in the 47 possibly preventable cases, and 31 occurred in the 5 likely (definitely) preventable cases. Table 10 shows that there are fewer than one lapse per case of not preventable death, whereas there are an average of 3 lapses in cases that lead to possibly preventable death, and over 6 lapses in the average case of likely preventable death.

Table 10. Number of lapses by preventability among California inmates, 2010.

	Lapses	Number of Deaths	Average Lapses per death
Likely Preventable	31	5	6.2
Possibly Preventable	147	47	3.1
Non-Preventable	284	363	0.8

Figure 2 shows trends from 2006-2010 in the number of lapses/case according to attributed preventability.

Figure 2. Average number of lapses per death by preventability among California inmates, 2007-2010.



As seen in Figure 2, this pattern has been consistent through all annual reports, 2006-2010, demonstrating again how adverse outcomes are often a consequence of multiple lapses lining up in a single case.

VIII. OPPORTUNITIES

This fifth consecutive annual death review analysis again suggests many opportunities for improving care in the CPHCS.

In the executive summary of the quality improvement (QI) report of 2010, a methodology was described for targeting QI activities. The top four causes of death in 2009 were identified and for each cause, the most common types of lapse were noted. Detailed descriptions of lapses were followed by specific recommendations for follow up actions.

- For cardiovascular diseases, case conferences for recognition and management of acute coronary syndrome, adherence to clinical guidelines for treatment of high risk patients with aspirin, and periodic revisiting of those guidelines were recommended.
- For improving emergency response to possible drug overdoses, a policy change was recommended which would allow first responders to administer the narcotic antagonist naloxone. Education regarding naloxone administration in any emergency which involved altered mental status was also recommended. Unfortunately, a recent clinical study which reviewed the administration of naloxone in civilian emergency cases in which there was a

high index of suspicion of overdose failed to show either a conclusive significant beneficial effect or significant harm .(Saybolt, et al, “ Naloxone in cardiac arrest with suspected opioid overdoses”, *Resuscitation* Volume 81;pp 42 - 46, 2010) More importantly, the 2010 quality improvement report reinforced adherence to the CPHCS pain management and medication management guidelines in order to mitigate opiate diversion and the opportunity for drug overdose.

- For improving cancer care, the quality management group recommended the development of performance reports and exception reports on screening for cancer in accordance with nationally recognized guidelines, and standardization of timeframes for potential cancer evaluations and treatments, including the judicious use of medical holds to prevent interruption of cancer therapy..
- For liver disease, steps were recommended to increase adherence to existing policy and guidelines for hepatitis C virus infection and management of end stage liver disease. This recommendation is supported by a recent study in which treatment outcomes for hepatitis c infected patients in New Mexico prisons and other rural sites was compared to similarly infected patients at the University of New Mexico Hepatitis C Clinic. The prison patients fared as well as the university patients and both groups achieved sustained viral response (cure) rates of up to 50%. (Arora, et al. “Outcomes of treatment for hepatitis C virus infection by primary care providers”, *New England Journal of Medicine*. Volume 364, pp 2199-2207, 2011)

All of these recommendations are supported by the findings in this annual report. In addition, the findings in this 2010 analysis suggest other specific recommendations that can be considered by the CPHCS.

The continued high rate of suicides and the high incidence of severe behavioral illness in the prison population is an indication that it is time for the medical leadership to work with behavioral health leaders and correctional staff in order to improve the communication between mental and physical health providers and to work toward integration of behavioral health into the primary care system.

A renewed emphasis on the strengthening of the primary care model of team based practice will allow the clinical leadership of CPHCS to strategize improvement by

- revisiting chronic disease management models and the use of registries, guidelines and other population management strategies to improve the care of patients with chronic conditions.
- identifying patients at high risk for sudden cardiac arrest and myocardial infarction by screening for patients with hypertension, diabetes mellitus, hyperlipidemia and prior cardiac events and treating these high risk patients with aspirin, ace inhibitors, statins for control of cholesterol and beta blockers (in those without contraindications). This strategy has been shown to significantly lower mortality rates from heart attacks and stroke and is being widely adopted in civilian communities.

- identifying more patients with early chronic hepatitis C infection who might be candidates for antiviral therapy and developing a prison model for care using inmate peer education strategies and other best practices.
- improving provider to provider communication and the quality of clinical handoffs when patients are transferred to and from their primary care sites to local emergency departments, hospitals, specialists, and other prisons.

VIII. CONCLUSION

The Federal Receivership for California Prison Healthcare continues to conduct rigorous peer review of all deaths. The adoption of a standard taxonomy for identifying lapses in care has contributed to a systematic approach to targeting lapses. Although the overall death rate for California prisoners has remained relatively stable, the number of preventable cases of death has decreased significantly. This review suggests opportunities for further improvement in care, highlighting the continued evolution of a primary care team based approach to systematic care, population management strategies to improve outcomes in chronic medical conditions, and suggesting a need for strategies which can better integrate behavioral health into the primary care system.