

Analysis of 2012 Inmate Death Reviews in the California Prison Healthcare System

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I. Introduction

Since April of 2006, the State of California's Prison Healthcare System (CPHCS) has been operating under federal receivership. The receiver has had responsibility for improving a broken healthcare system and has overseen a comprehensive system redesign. A system which had been driven by episodic complaints and little organized care for chronically ill patients has been replaced by a system which emphasizes more primary care and patient advocacy. Healthcare teams assume responsibility for patient outcomes and use evidence based guidelines to guide care for chronic medical conditions.

The receiver's quality improvement program identifies and targets specific areas for clinical improvement.

A major piece of the quality improvement program is the death review. Rigorous peer review of all prison deaths identifies serious lapses in care and records and tracks numbers of preventable deaths. The death review has also been used to find opportunities for systemic improvement and to identify, counsel, and in extreme cases, sanction any unsafe providers.

This is the seventh annual analysis of the California state prison system inmate death reviews. It will focus on the following areas – identifying causes of and trends in mortality, identification and trending of serious lapses in care, and identification and trending of preventable deaths.

II. Death Review Process

The death review reporting and review policy and procedure is described in the Receiver's Quality Management Policy and Procedural Manual, Volume 3, Chapter 7, Patient Safety, section 7.3 (Death Reporting and Review Policy) and section 7.8 (Death Reporting and Review Procedure) and has been described in previous annual reports. Each inmate death is reviewed by a board certified Clinical Support Unit 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 all of the clinical encounters that took place during the last six months of the patient's life.

All patient requests for healthcare are noted, as well as the responsiveness of the system to such requests. The quality of patient triage and evaluation, the timeliness of access to primary care, the quality of evaluations, timeliness and quality of any indicated specialty care, results and responses to all laboratory and diagnostic imaging studies are all noted. The quality of care for any identified chronic medical condition is evaluated – these include diabetes, asthma, emphysema,

hypertension, cancer, chronic pain, chronic congestive heart failure, chronic kidney failure, chronic infection with the human immunodeficiency virus (HIV) or the hepatitis viruses (hepatitis C and B). 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 response to emergency “man down” situations is reviewed for compliance with emergency procedural guidelines.

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

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

Completed death reviews are presented to the Death Review Committee (DRC). The DRC is 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 care provided to the decedent, evaluating the preventability of death with concurrence as to whether the death was Not Preventable, Possibly Preventable, or Definitely Preventable, identifying opportunities for improvement in the health care system, making recommendations for changes in clinical Care Guidelines, recommending statewide training or continuing medical education programs on specific issues, identifying and referring local issues to institution leadership, systemic issues to Statewide leadership and other programs or committees, and identifying and referring deficiencies in clinical care to the appropriate Peer Review bodies.

The underlying 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.

Lapse in Care – 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 or 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 have prevented or significantly delayed the patient’s death.

Definitely (or likely) preventable death – In the judgment of the reviewers, better medical management or improvement in the system of care delivery would definitely or likely 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. This classification system describing fourteen different types of care lapse was proposed to the DRC in 2007, so that reviewers might be able to use a common language when discussing potential errors in clinical management or systemic processes of care. In 2008 the taxonomy was incorporated into the death review template. After having been in use for a year, the taxonomy was presented at the April 2009 meeting of the National Commission on Correctional Health Care and at the September 2009 meeting of the American Correctional Health Services Association.

As described at these meetings, the taxonomy has been a useful quality improvement tool for identifying potentially unsafe clinicians, gaps in the healthcare system, opportunities for system and process redesign, and educational strategies for CPHCS 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 by the medical department of the CPHCS. 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 national 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 react 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.

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 LVNs, RNs, 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 13 – 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. Limitations and Benefits in the Death Review Process

1. Inter-reviewer variability

One study from the medical literature addresses the problem of reviewer variability. 393 hospital deaths in a Veteran’s Administration hospital were first reviewed by a group of board certified internal medicine specialists. These initial reviewers judged that 23% of the deaths were possibly preventable and 6% definitely preventable. When each 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 that “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 inter reviewer variability by seeking consensus on the assignment of preventability and the identification of lapses in care.

2. Offsite peer review

Traditional peer review usually takes place at the site where care originated and is conducted by staff who work there. The CPHCS death reviews are conducted off site by a designated group of physicians. Any review physician involved in the direct care of the decedent is exempted from reviewing that particular case. Any DRC member who has been involved in the supervision or care of a patient whose death is being reviewed 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. All drug overdose deaths are also separately reviewed by the Mental Health Program.

4. Potential benefits

Benefits of the CPHCS death review process include the limited number of trained and experienced reviewers, the diligence expended in each review, and discussion of each death at the DRC. This kind of offsite review has the potential benefit of mitigating 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.

VI. Study findings

A. Causes of inmate death, 2012

There were 367 deaths in 2012. Table 1 shows the causes of death in all cases. These listed causes represent the underlying condition that led to the patient’s death. For example, if a patient died of sepsis or septicemia (bloodstream infection) because chemotherapy for an underlying cancer compromised the patient’s immune system, then the underlying cancer is listed as cause of death.

Table 1. Causes of Death Among All California Inmates, 2012

NUMBER OF CASES	CAUSE OF DEATH
81	Cancer (except Liver Cancer) – includes (20) lung; (7) colon; (6) esophagus; (5 each) prostate, lymphoma; (4 each) pancreas, melanoma, unknown primary; (3 each) brain, multiple myeloma, rectum, (2 each) gall bladder, kidney, tongue; (1 each)

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	acute myeloid leukemia, anus, duodenum, face, larynx, oropharynx, ovary, peritoneal, sarcoma, scrotum, tonsil
72	Liver Disease — includes end stage liver disease (47), and liver cancer (25)
43	Cardiovascular Disease — includes sudden cardiac arrest/acute myocardial infarction (28), congestive heart failure (11), coronary artery disease (3), aortic dissection (1)
32	Suicide
21	Homicide
15	Drug Overdose
13 each	Sepsis, generalized; other Infection —(includes endocarditis (4), staphylococcal septicemia (2), and 1 each bacterial meningitis, diabetic gangrene, pacemaker infection, retropharyngeal abscess, septic arthritis, septic UTI, West Nile virus encephalitis)
12	Stroke
11	Pulmonary (includes chronic obstructive pulmonary disease (7), pulmonary fibrosis (3) and interstitial lung disease (1))
10	End stage renal disease;
9	Gastrointestinal
8	Pneumonia (includes 5 cases of aspiration pneumonia)
7	Coccidioidomycosis
3 each	Pulmonary embolism; Trauma (1 case each of accidental trauma/moving vehicle accident, accidental closed head trauma, subdural hematoma)
2 each	Diabetic ketoacidosis; encephalopathy
1 each	Amyotrophic lateral sclerosis; dementia; heat stroke; HIV/AIDS; hypothermia; hypoglycemia; myelodysplasia; myelofibrosis; seizure disorder; ulcer
367	TOTAL DEATHS

In 2012, the three top causes of death were cancer, end stage liver disease, and cardiovascular disease. Cancer was again the most common cause of death, accounting for 22% of the total. Liver cancer is excluded from this total and included in the category end stage liver disease (cirrhosis), because both liver cancer and cirrhosis in this population are the consequence of underlying chronic hepatitis C virus infection. Cardiovascular disease includes sudden cardiac arrest, congestive heart failure and acute myocardial infarction because all three frequently share a common underlying condition – coronary artery disease. And in most of these cases, the patients had one or more risk factors for coronary disease – smoking, hypertension, hypercholesterolemia, or diabetes mellitus.

Table 2 shows the average age of decedents in 2012. Suicides, homicides and drug overdoses usually affect a younger population, so the average ages for these conditions are shown separately.

Table 2. Average ages at Death Among All California Inmates, 2012

55 yrs	average age of all decedents	
44 yrs	average age of suicides, drug overdoses, and homicides	
	41 yrs	suicide
	43 yrs	drug overdose
	49 yrs	homicide
57 yrs	average age excluding suicide, drug overdose, and homicide	

The average age excluding suicides homicides and drug overdoses was 57 (range 20 to 90).

Of three major factors in inmate deaths, two are related to lifestyle choices and the third to the incarceration environment.

1. Drug Addiction. Intravenous injection using shared needles causes chronic hepatitis C infection, which causes progressive inflammatory liver disease culminating in end stage liver disease - cirrhosis. Hepatocellular cancer (hepatoma) almost always occurs only in the setting of a cirrhotic liver. All but one of the 72 cases of liver cancer and end stage liver disease in 2012 were caused by chronic hepatitis C infection. The prevalence of hepatitis C virus infection in CPHCS inmates is 14%.

2. Tobacco addiction. Smoking causes lung cancer (20 cases), chronic obstructive pulmonary disease or emphysema (7 cases) and contributes to cardiovascular disease (43 cases) and stroke (12 cases). Together these cases numbered 82 in 2012.

3. Depression. Depression is endemic in prisoners. There were 32 suicides in 2012. In addition, many of the 15 drug overdose deaths may in fact have been suicides. Depression also is a significant factor in repeated patient nonadherence to medical advice, which is a contributing factor in many non suicide deaths.

In 2012, the population of the California prison system by gender was 95.3% male and 4.7% female.

The average inmate life expectancy of 55 is some twenty years younger than that of the average American male, reflecting the higher prevalence of addiction to drugs and tobacco, chronic hepatitis C infection, depression and other severe mental illness, and other social, racial and economic factors.

Table 3 compares the top causes of inmate death from 2007-2012. There have been no significant changes or trends. By comparison, the top five causes of death in all Americans in 2011 were heart disease, cancer, chronic lung disease, stroke, and accidental death. Suicide was 10th and end stage liver disease ranked 12th.

Table 3. Top causes of death among California inmates 2007-2012

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

* Cardiovascular disease includes sudden cardiac arrest, myocardial infarction, and congestive heart failure.

B. Lapses in care 2012

The death review process focuses on finding serious lapses in medical care, both those that are contributing causes in cases of preventable death and those that occur without ultimate serious consequence. The taxonomy for medical error described previously provides a framework for classifying, tracking and trending these lapses.

Table 4 shows the number of lapses by type identified in the 367 inmate deaths in 2012.

Table 4. Summary of lapses of care, 2012.

LAPSES OF CARE TYPES	# OF LAPSES IN THE 324 NON PREVENTABLE DEATHS	# OF LAPSES IN THE 42 POSSIBLY PREVENTABLE DEATHS	# OF LAPSES IN THE 1 LIKELY PREVENTABLE DEATH	TOTAL LAPSES IN ALL 367 DEATHS
#1 – Failure to recognize, identify or adequately evaluate important symptoms or signs	50	27		77
#2 – Failure to follow established guidelines for evaluation and/or management of a specific condition	50	8	1	59
#3 – Delay in access to care sufficient to result in harm to the patient	18	12		30
#4 – Failure to adequately pursue abnormal test results	14	10		24
#5 – Failure of provider-to-provider communications including botched handoffs	12	10		22
#6 – Fragmentation of care such that individual responsibility for patients is waived	7	8		15
#7 – Surgical/procedural complication resulting in iatrogenic injury	1	4	1	6
#8- Medication prescribing error	15	9		24
#9- Medication delivery error	3			3
#10- Practicing outside the scope of one’s professional capabilities	1	2		3
#11- Unsupervised mid-level (nurse practitioner or physician assistant) care		2		2
#12 – Failure of communication with the patient		1		1
#13 – Patient non-adherence with recommendation for optimal care	6			6
#14 – Delay in emergency response or failure to follow emergency response protocol	10	10		20

LAPSES OF CARE TYPES	# OF LAPSES IN THE 324 NON PREVENTABLE DEATHS	# OF LAPSES IN THE 42 POSSIBLY PREVENTABLE DEATHS	# OF LAPSES IN THE 1 LIKELY PREVENTABLE DEATH	TOTAL LAPSES IN ALL 367 DEATHS
#15 – other	11	2		13
TOTAL LAPSES	198	105	2	305

There were 77 type 1 lapses – failure to recognize or adequately evaluate important symptoms or signs.

There were 59 type 2 lapses – failure to follow established guidelines for evaluation and/or management of a specific condition.

There were 30 type 3 lapses – important delays in access to an appropriate level of care.

Altogether types 1, 2, and 3 lapses were 54.6% of the total.

There were also significant numbers of types 4, 5, 6, 8, and 14.

The total number of identified lapses was a bit higher than in 2011 but significantly lower than in 2010.

C. Non preventable deaths in 2012

Table 5 shows the cause of non preventable deaths in 2012. With the exception of suicides, homicides, drug overdoses, and trauma these were all natural and expected as a consequence of chronic illness.

Table 5. Causes of non-preventable death among California inmates, 2012.

NUMBER OF CASES	CAUSE OF DEATH
80	Cancer — most frequent types: lung (20), colon (7), lymphoma (5), prostate (5), other types had 4 or fewer cases each
69	Liver disease — includes end stage liver disease (44) and liver cancer (25)
36	Cardiovascular disease (includes sudden cardiac arrest, myocardial infarction, congestive heart failure)
32	Suicide
18	Homicide
13	Drug overdose
11	Pulmonary (COPD, pulmonary fibrosis, Interstitial lung disease)

9 each	End stage renal disease; Stroke; Infectious (endocarditis and others)
8 each	Pneumonia; Sepsis
4 each	Coccidioidomycosis; Gastrointestinal
3 each	Pulmonary embolism; Trauma
2	Diabetic ketoacidosis
1 each	ALS; Encephalopathy; Dementia; HIV/AIDS; Myelodysplasia; Myelofibrosis
324	TOTAL NON PREVENTABLE DEATHS

D. Possibly preventable deaths in 2012

Table 6 shows the causes of possibly preventable deaths in 2012.

Table 6. Causes of possibly preventable death among California inmates, 2012.

NUMBER OF CASES	CAUSE OF DEATH
8	Cardiovascular disease, including sudden cardiac arrest and acute myocardial infarction
5	Sepsis
4	Gastrointestinal (bowel obstruction, perforated bowel)
3 each	Coccidioidomycosis; End stage liver disease; Homicide; Infectious (Endocarditis, Staph. septicemia, Septic arthritis); Stroke
2	Drug Overdose
1 each	Cancer – gall bladder; Encephalopathy; End stage renal disease; Hypoglycemia; Hypothermia; Pneumonia; Seizure disorder; exsanguination
42	TOTAL POSSIBLY PREVENTABLE DEATHS

Each of these 42 deaths are described briefly below –

The first group of 15 cases illustrate how type 1 lapses – failures to recognize and manage signs and symptoms - can seriously compromise patient outcomes.

1. A 69 year old patient with a history of prior stroke and resultant hemiparesis died of recurrent stroke caused by complete occlusion of a carotid artery. In the three months preceding death, the patient had been seen at least six times by the same provider who failed to properly evaluate or manage progressive and new neurological symptoms - dizziness, frequent falls, and slurred speech.

2. A 47 year old patient died of peritonitis from perforated duodenal ulcers. The ulcers were probably caused by chronic indomethacin therapy for back pain. In the week prior to death, the patient was seen six times for recurrent abdominal pain, vomiting and tachycardia.

3. A 65 year old patient died of peritonitis from an incarcerated and perforated ventral hernia. Nine days of recurrent vomiting and increasing abdominal pain were treated incorrectly as gastroenteritis, and transfer to a higher level of care in the hospital was delayed. Death occurred three weeks after laparotomy showing extensive peritonitis, which did not respond to aggressive therapy.
4. A 60 year old patient died of traumatic brain injury following assault by a cellmate. There were at least three requests for transfer to another cell because of fear of violence, which went unheeded by medical personnel.
5. A 44 year old patient died of intracranial hemorrhage from a ruptured aneurysm which was missed for two weeks despite complaints of severe headaches and a “family history of aneurysm.”
6. A 60 year old patient with cirrhosis died of massive upper gastrointestinal hemorrhage. A delay of 36 hours in responding with appropriate urgency to a complaint of hematemesis (vomiting blood) was felt to contribute to death.
7. A 55 year old patient died of disseminated coccidioidomycosis infection. The patient experienced a 3 month delay in diagnosis despite continuing cough, weight loss, and anemia.
8. A 45 year old patient died of coccidioidomycosis meningitis. There was a 3 month delay in diagnosis resulting from failure to consider the diagnosis despite cough, fever and weight loss.
9. A 54 year old patient with known cancer of the colon receiving chemotherapy through a Mediport venous catheter, died of Staphylococcal septicemia after a 5 day delay in diagnosis resulting from inadequate assessment of signs and symptoms, including a swollen red tender Mediport site.
10. A 38 year old patient with congenital heart disease died after a failed attempt to surgically replace a poorly functioning (surgically replaced) aortic valve. There had been a several month delay in definitive treatment because of failure of several providers to recognize, evaluate, and treat progressive heart failure.
11. A 65 year old patient died of cardiogenic shock arising from severe coronary artery disease. Diagnosis had been delayed because of failure to recognize angina equivalent symptoms. An earlier diagnosis might have prevented the acute coronary syndrome that precipitated the patient’s death.

12. A 48 year old patient died unexpectedly of intestinal obstruction. Complaints of abdominal pain and distension and recurrent vomiting were incompletely evaluated in the two days preceding death, causing a delay in diagnosis and appropriate treatment.

13. A 63 year old patient with hypertension, diabetes mellitus and localized prostate cancer died of fulminant pneumonia. Complaints of a new cough and malaise were not evaluated for three days, during which time the patient worsened considerably. By the time of evaluation, the patient was critically ill and death occurred shortly after arrival at the community hospital.

14. A 66 year old patient died of sudden cardiac arrest. This patient with multiple risk factors for coronary artery disease had complained of progressive chest pain, nausea and shortness of breath precipitated by exertion on at least two occasions in the eight days prior to death. On each occasion this was treated incorrectly as gastrointestinal dysfunction.

15. A 65 year old patient died of congestive heart failure precipitated by a severe anemia. Several providers delayed in evaluating persistent tachycardia, and when anemia was diagnosed, there was failure to mount an appropriately aggressive search for cause.

The following 3 cases show how a type 2 lapse – failure to follow established guidelines for care – contributed to a possibly preventable death.

16. A 56 year old patient with severe mental illness on psychoactive medication (risperadol) died of hypothermia. Despite having been seen several times in the previous months with a low body temperature (ranging from 96 degrees F. to as low as 84.3 degrees F. on the day of death), providers and nursing staff did not adequately monitor or manage the patient's hypothermia.

17. A 56 year old patient with schizophrenia and chronic constipation died of acute bowel obstruction secondary to large fecal impaction. The constipation was attributed to antipsychotic medication, but the patient's chronic constipation was poorly managed during the several months preceding death.

18. A 44 year old patient with paranoid schizophrenia died of bowel obstruction caused by chronic constipation, which was a side effect of the medications prescribed for mental illness. There was poor communication between mental health and medical providers, poor management of the chronic constipation, and a three hour delay in transport to the emergency room on the day of death. (These last two cases prompted a system wide training on management of chronic constipation and known side effects of antipsychotic drugs.)

Type 3 lapses – delays in access to appropriate level of care – were thought to contribute to possibly preventable deaths in the following six cases.

19. A 72 year old patient died of drug overdose. The patient had not been adequately evaluated for intoxication and was infrequently monitored in the prison's triage and treatment area during the 8 hours preceding death. Initial emergency response did not include the administration of a narcotic antagonist.

20. A 65 year old patient with known infected right knee experienced a one month delay in referral to an orthopedic surgeon despite evidence of ongoing infection in the knee. This delay was thought to contribute to death from septic arthritis.

21. A 50 year old patient died of hemorrhagic stroke. Access to emergency neurosurgical care at a local hospital was delayed by 22 minutes because of a failure to respond in a timely fashion to an emergency situation.

22. A 50 year old patient with a long history of intravenous heroin drug use died of methicillin resistant staphylococcal septicemia. The patient was held in the TTA with signs of severe septic shock for two hours before transport to the local ED. In the week prior to death, the patient was seen with abnormal vital signs (tachycardia) which were incompletely evaluated.

23. A 48 year old patient with psoriatic arthritis and chronic hepatitis C with cirrhosis died of septic shock. The patient had been receiving long term therapy for arthritis with methotrexate and etanercept (two potentially toxic drugs with known side effects of susceptibility to severe infection), but there had not been appropriate monitoring and there had been no rheumatology consultation for at least two years prior to his death. When the patient became critically ill, transfer to a higher level of care was delayed for three hours.

24. A 22 year old patient with known HIV/AIDS died of opportunistic infection. Following an initial diagnosis and treatment for pulmonary coccidioidomycosis, there was failure to respond to continued fever and shortness of breath, a two month delay in referral to infectious disease specialists and a three-month delay in scheduling of bronchoscopy, all contributing to the patient's death from disseminated coccidioidomycosis.

A type 4 lapse – failure to adequately pursue an abnormal test result – contributed to the following two cases of possibly preventable death.

25. A 60 year old patient died of cancer of the gall bladder. Failure to follow up on an abdominal ultrasound suspicious for malignancy resulted in a 6 month delay in diagnosis.

26. A 59 year old patient died of sepsis and respiratory failure after providers failed to follow up on abnormal laboratory tests which indicated a chronic metabolic acidosis, and the patient received episodic care rather than the continuous chronic care which was indicated.

Type 5 lapses – failed provider to provider communication – was identified as one factor in the following two cases.

27. A 51 year old patient died of a ruptured spleen caused by assault. There were at least five missed opportunities for staff in various areas (Mental Health, Medical, Nursing, and Custody) to recognize signs of victimization (traumatic rectal bleeding) and to intervene prior to the patient's death.

28. A 34 year old patient with insulin dependent diabetes mellitus died of prolonged hypoglycemia which resulted in anoxic brain injury. The hypoglycemia was recognized but poorly managed. Lapses in communication resulted in the on call physician not being informed of the patient's hypoglycemia, and treatment was significantly delayed.

A Type 6 lapse - fragmentation of care - was contributory in the following case.

29. A 51 year old patient with known severe hypertension (BP 180/118) died of sudden cardiac arrest 7 ½ months after last having seen a physician. Despite repeated refusals to keep medical appointments and refusals to take medication as prescribed the patient was not followed closely and no provider assumed responsibility for his care.

Type 8 lapses – medication prescribing error – contributed to the following five cases.

30. A 61 year old patient with end stage kidney disease and chronic hepatitis died of upper gastrointestinal hemorrhage. Inappropriate prescription of naproxen and a 2.5 hour delay in transfer to hospital after signs of UGI bleeding were thought to contribute to death.

31. A 53 year old patient with end stage liver disease died of upper gastrointestinal hemorrhage three weeks after being prescribed ibuprofen, which is contraindicated in cirrhotic patients.

32. A 50 year old patient died of multiple intra abdominal abscesses, a complication of surgery for a perforated duodenal ulcer felt to be caused by long term prescription of ibuprofen without appropriate evaluation.

33. A 48 year old patient with known seizure disorder on multiple anticonvulsants died of recurrent seizures four days after a provider failed to write an order restarting one of the patient's anticonvulsants at the planned dose.

34. A 68 year old patient died of an overdose of an antidepressant. Against policy, the patient had been allowed to keep refills of this medication "on person," which might have contributed to death. The case was referred to Mental Health as a possible suicide.

Delay in emergency response or failure to follow the emergency response protocol – a type 14 lapse – contributed to the following cases.

35. A 38 year old patient collapsed during a basketball game and died of sudden cardiac arrest. There was a nine minute delay in emergency transport from the yard to the Triage and Treatment Area.

36. A 52 year old patient died of sudden cardiac arrest. The emergency protocol was violated when, during emergency resuscitation, the patient's shockable arrhythmia was not acted upon, and the patient received cardiac medications instead of countershock.

E. Lapses by contracted specialists and outside facilities

As in the past four years, all cases of possibly preventable death were reviewed to identify contributory lapses on the part of non-CPHCS specialists or outside facilities. In 2012 there were six such cases.

37. A 48 year old patient died of an encephalopathy of undetermined cause. The reviewers felt that the neurological evaluation was incomplete, and that the patient should have been transferred by the consulting neurologist to a tertiary care hospital for further diagnostics in search of a treatable condition.

38. A 43 year old patient died of traumatic brain injury after a homicidal assault. Staff at a contracted community hospital failed for two days to note the report of an abnormal MRI. This lapse contributed to a significant delay in diagnosis of extensive brain injury which was possibly treatable.

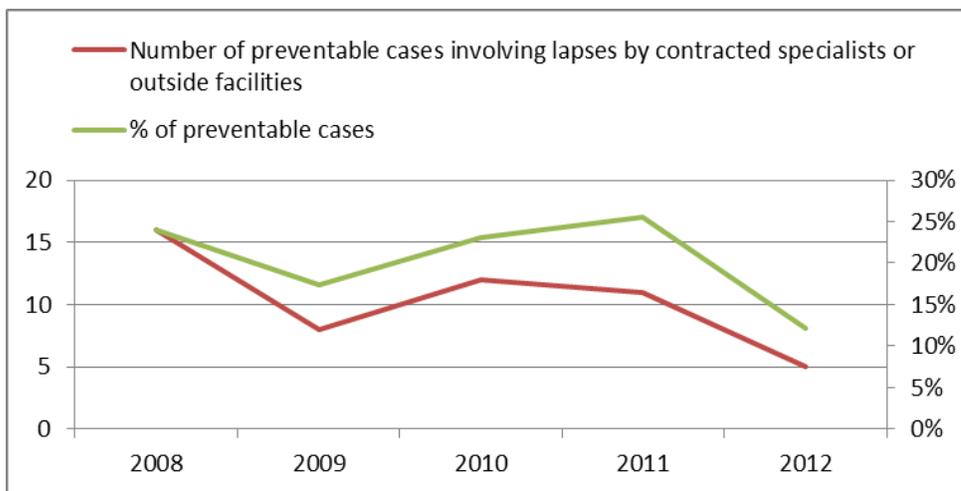
39. A 69 year old patient died of acute myocardial infarction. The patient had been transferred from a local county jail to prison despite having signs and symptoms of an acute coronary event. The transfer was felt to be clinically inappropriate and contributed to a significant delay in treatment.

40. A 53 year old patient died after falling and sustaining intracerebral hemorrhage. Staff at a local hospital failed to note a worsening head CT scan resulting in a 24 hour delay in definitive treatment. Earlier recognition and intervention might have prevented this death.

41. A 57 year old patient with known metastatic liver cancer and retroperitoneal fibrosis was being treated for obstructive renal failure. An attempted stenting of the occluded right ureter resulted in accidental bleeding into the abdominal cavity (hemoperitoneum). It was also noted that the consulting urologist had attempted to stent the incorrect side. The patient died of exsanguination.

42. A 48 year old patient with known seizure disorder and end stage liver disease died of toxic encephalopathy. Symptoms of an altered level of consciousness were poorly evaluated by emergency room providers, who failed to diagnose and appropriately manage dilantin toxicity complicating hepatic encephalopathy.

Figure 1. Possibly preventable deaths of California prison inmates involving lapses by contracted specialists or outside facilities, 2008-2012.



These 6 cases are 14% of the 42 preventable cases, which may signal the beginning of a downward trend. There were 11 of 43 cases in 2011 (26%), 12 of 52 cases in 2010 (23%), 8 of 46 cases in 2009 (17%) and 16 of 66 cases in 2008 (24%).

F. Likely (Definitely) preventable deaths in 2012

There was only one death in 2012 which was called definitely preventable by the Death Review Committee.

Table 7. Causes of definitely preventable death among California inmates, 2012.

NUMBER OF CASES	CAUSE OF DEATH
1	Infectious (Urinary Tract Infection – Sepsis)
1	TOTAL DEFINITELY PREVENTABLE DEATHS

A 62 year old patient developed bladder outlet obstruction and was treated with a Foley catheter. The catheter remained in place for the next eight weeks and there was no attempt to definitively treat the patient’s urinary obstruction. The case was felt to be preventable because the standard of care, definitive therapy and/or a trial of catheter removal would likely have eliminated the need for a catheter and prevented the death from urinary tract infection.

G. Primary Care – 2012

Primary Care teams were installed in all 33 California prisons in 2009 in order to establish a high level of accountability for patient outcomes. Primary care teams are now held to high standards of practice, expected to advocate of behalf of patients, to be responsible for timely access, for efficient and appropriate care, and for using evidence based guidelines for managing chronic diseases and conditions.

The next table shows the penetration of primary care as measured by the number of cases in which a primary care physician could be identified by the reviewers. Since 2009, there has been a significant increase in the percentage of patients who have identifiable primary care physicians. In 2009, 36% of the patients had identifiable primary care physicians. By 2012, the number of patients with PCPs had increased to 63%.

Table 8. Presence of Primary Care in California inmate death cases, 2009 – 2012.

	2012		2011		2010		2009	
	Cases with identified Primary Care Physician	% of total cases	Cases with identified Primary Care Physician	% of total cases	Cases with identified Primary Care Physician	% of total cases	Cases with identified Primary Care Physician	% of total cases
Preventable deaths (possibly and likely)	31 of 43	72.1%	26 of 43	60.5%	26 of 52	50%	14 of 46	30.4%
Non Preventable deaths	199 of 324	61.4%	183 of 345	53.7%	191 of 363	52.6%	127 of 248	37%
TOTAL DEATHS	230 of 367	62.7%	209 of 388	53.4%	217 of 415	52.3%	141 of 393	35.5%

VII. Discussion

A. Trends in California prison death rates from 2006- 2012

Table 9. Annual death rates among California inmates, 2006- 2012.

Year	NUMBER OF DEATHS	NUMBER OF INMATES	DEATH RATE PER 100,000 INMATES
2006	426	166,844	255
2007	397	170,786	232
2008	369	170,022	217
2009	396	169,459	234
2010	415	166,700	249
2011	388	161,843	240
2012	367	134,929	272

The benchmark state prison death rates from the US Bureau of Justice statistics is available for the years 2001 -2010. Details are available at their website. ([www.bjs.gov/ index](http://www.bjs.gov/index)). For the years 2006 – 2010 , the first five years of the Receivership in California, the national state prison death rates averaged 253.4 – ranging from a high of 260 in 2008 to a low of 245 in 2010.

Table 10. A Comparison of Total U.S. State Prison and California Prison Death Rates per 100,000; 2006-2010.

	Total U.S.	California
2006	249	255
2007	256	232
2008	260	217
2009	257	226
2010	245	249

The total number of California prison deaths in the years 2006 – 2010 was 2003 (see Table 9). The number of deaths in state prisons reported nationally in that same five year period was 16,718. Therefore, California prison deaths accounted for 12% of the total.

California’s death rates were slightly lower than the national death rates for prisoners incarcerated in state prisons. The average US rate for 2006-2010 was 253.4. The average rate in California for the years 2006 – 2010 was 235.8.

The annual death rate of California state prisoners in 2012 was 272/100,000. This is compared to death rates in the years 2006 – 2011 which averaged 238/100000 (ranged from a low of 217 in

2008 to a high of 255 in 2006.) This increase for 2012 in the overall death rate is not explicable, but may be related to the aging of the California prison population, or a rising prevalence of chronic disease, or both.

B. Trends in Preventable Deaths from 2006-2012

Figure 2. Trend in Preventable Death Rates in the California Prison System, 2006-2012.

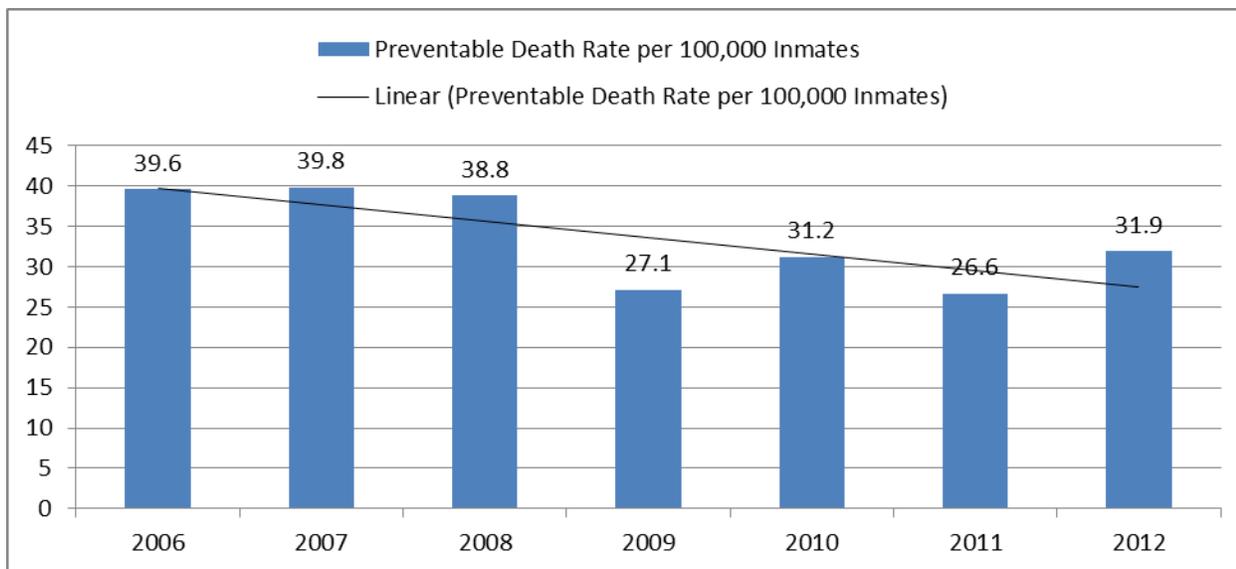


Figure 2 shows the favorable trend in preventable death rates for the past seven years. In 2012, there were 43 total preventable deaths – 1 definitely and 42 possibly preventable. This is a rate of 31.8/100000 for all preventable deaths.

Table 11 shows the rates of preventable deaths among California inmates from 2006- 2012. It also shows the total number of possibly preventable and likely preventable deaths in each year.

Table 11. Rates of preventable deaths among California inmates, 2006-2012.

YEAR	ALL PREVENTABLE (LIKELY / POSSIBLY)	INMATE POPULATION	RATE/ 100,000
2006	66 total (18 / 48)	166,844	39.6
2007	68 total (3 / 65)	170,786	39.8
2008	66 total (5 / 61)	170,022	38.8
2009	46 total (3 / 43)	169,459	27.1

2010	52 total (5 / 47)	166,700	31.2
2011	43 total (2 / 41)	161,843	26.6
2012	43 total (1 / 42)	134,929	31.9

Looking only at the definitely preventable deaths, there has been a consistent reduction during the past seven years. There were 26 such deaths in the first three years, averaging 8.7/year and only 11 in the past four years, averaging 2.8 per year. There was only one definitely preventable death in 2012, the lowest number in the seven years of the Receivership.

C. Trends in causes of mortality

1. *SUICIDES*– There were 32 suicides in 2012.

Table 12. Numbers of suicide-related deaths in the California Prison System, 2006-2012.

	2006	2007	2008	2009	2010	2011	2012
Suicide	43	33	38	25	34	34	32

There were 32 deaths by suicide in 2012. Overall, the rate of death/100000 from suicide during 2006 – 2011 was 20.6. In 2012, it was 23.7%, essentially unchanged. However, the California rate is 33% higher than the 15.8 benchmark rates of death from suicide in the total US prison population from 2006 – 2010 (www.bjs.gov/index).

2. *DRUG OVERDOSES* – Because drug overdoses have caused a significant number of deaths in the younger inmate population, the Quality Management Program in 2010 launched a project intended to mitigate these deaths by reinforcing adherence to the CPHCS pain management and medication management guidelines, better controlling opiate diversion and insuring good indications for narcotic prescription. The 15 drug overdose deaths in 2012, a rate of 11.1, was not appreciably lower than in prior years, however. The cumulative death rate from 2006 – 2010 was 9.5/100000. The death rate from narcotic overdose in 2012 was 11.1. The national benchmark from 2006 – 2010 was 3.6 (www.bjs.gov/index)

Table 13. Numbers and rates of Drug Overdose-related deaths in the California Prison Healthcare System 2006-2012.

	2006	2007	2008	2009	2010	2011	2012
CPHCS drug overdoses	17	9	19	14	23	12	15
Rate/100000	10.2	5.3	11.2	8.3	13.8	7.4	11.1

3. **COCCIDIOIDOMYCOSIS** – Coccidioidomycosis is endemic in the California San Joaquin Valley, where eight of the state’s 33 prisons are located. A program intended to reduce morbidity and mortality caused by this fungal disease has included a number of educational presentations to clinicians and a policy which restricts high risk or immune suppressed patients from being housed in these prisons. From 2006 – 2011 there were 36 deaths from coccidioidomycosis. Of the seven cases in 2012, three were called possibly preventable because of delayed recognition. One of the three cases in 2011 was also deemed possibly preventable for the same reason.

Figure 4. Coccidioidomycosis related deaths in the California Prison System, 2006-2012.

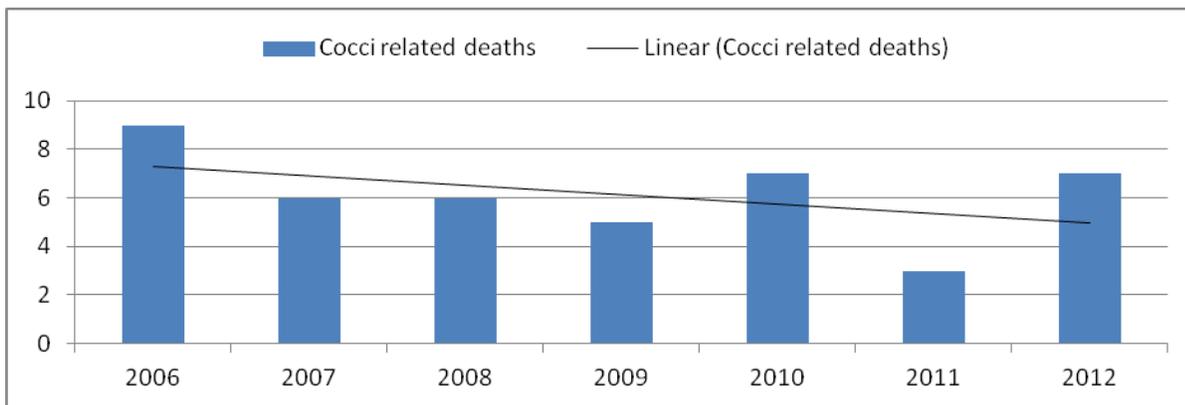


Table 14. Cocci-related deaths in the California Prison System, 2006-2012.

Year	2006	2007	2008	2009	2010	2011	2012
Cocci related deaths	9	6	6	5	7	3	7

The continued occurrence of death from coccidioidomycosis prompted the Receivership to mandate the transfer of several thousand at risk patients in 2013.

4. **HOMICIDES** – The number of homicides and corresponding rate/100000 from 2006 – 2012 in California is shown in Table 15. This cumulative rate of homicidal death is 9.3, and is more than double the Bureau of Justice Statistics national benchmark rate of 4.0.

Table 15. Numbers of Homicide-related deaths in California and All U.S. State Prisons, 2006-2012.

	2006	2007	2008	2009	2010	2011	2012	Avg
No. of CPHCS cases	16	22	7	9	23	17	21	16.4
CPHCS Rate/100000	9.5	12.8	4.1	5.3	13.8	10.5	11.1	9.3
U.S. State Prison rate/100000	4	4	3	4	5	*	*	4.0

*data not available

D. Trends in lapses in care – 2012

1. The relationship between number of lapses and preventable deaths.

Lapses in care occur commonly in medical practice. A 2009 study in a large VA hospital system with an electronic medical record found that 58% of significantly abnormal abdominal ultrasounds ordered to screen for aortic aneurysm were not documented in the patients’ medical records for over three months. The median time to recognition of the missed abnormal report was 237 days. Interestingly, none of these cases resulted in an adverse outcome. (**Annals of Internal Medicine, Volume 151, pages 21-27, 2009**) Although most lapses do not lead to serious injury or death, the risk of adverse consequence rises when lapses occur in vulnerable patients, such as those with underlying medical conditions. The number of lapses rises in proportion to increasing numbers of medical encounters. Therefore, the patients at highest risk for experiencing lapses in care are those that have the most medical needs, such as the chronically ill, the elderly, and other patients with high numbers of medical encounters such as those with chronic pain and severe behavioral illness.

Prior annual reports have shown that there is a relationship between the number of lapses in care occurring in a single case and a cascade of events that can lead to preventable death.

This relationship held for 2012 as well, showing 2.5 lapses per preventable death, but only 0.6 lapses per non preventable death.

Table 16 shows this relationship for 2012 deaths.

Table 16. Number of Lapses by Category of Preventability, 2012.

PREVENTABILITY	# DEATHS	# LAPSES	AVERAGE LAPSES/DEATH
Likely preventable	1	2	2.0
Possibly preventable	42	103	2.5
Not preventable	324	199	0.6

Figure 5. Average Number of Lapses per case by Preventability, 2007-2012.

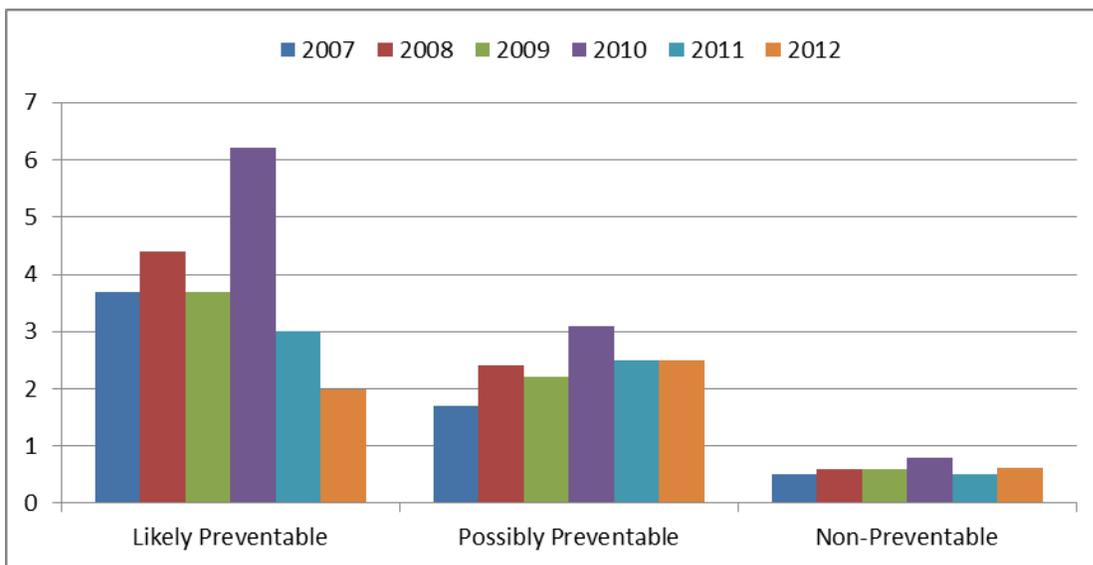


Figure 5 shows the relationship between numbers of lapses and preventability over six years of analysis. In every year, lapses in preventable death averaged five times higher than lapses in non preventable deaths.

2. Trends in total numbers of lapses in care, 2007 – 2012

Table 17. Number of lapses, by preventability, in California Prison System deaths, 2007-2012.

Year	Likely Preventable		Possibly Preventable		Non-Preventable		Total
	#	%	#	%	#	%	
2007	11	4%	109	36%	179	60%	299
2008	22	6%	147	41%	193	53%	362
2009	11	4%	90	29%	205	67%	306
2010	31	7%	147	32%	284	61%	462
2011	6	2%	92	37%	154	61%	252
2012	2	1%	105	34%	198	65%	305

Table 17 shows the trend in total numbers in lapses identified by the DRC over the past seven years. In 2012, there were a total of 305 lapses. There is a problem in analyzing these numbers, because in 2011, the Death Review Committee stopped distinguishing between extreme lapses (which were the only kind counted in prior years’ death review analyses) and simple lapses, electing to treat all lapses as opportunities for improvement, The higher number of total lapses in 2012 might reflect this change.

For the same reason, this analysis of 2012 will not discuss trends in types of lapses or subsets of lapses, as had been done in prior years.

VIII. Targeted Opportunities for improved performance

A. Performance Improvement Plan

The Receiver’s 2010 Performance Improvement Plan was described in the 2011 version of this report. Four specific areas for improved quality of care were targeted. These were in the areas of cardiovascular disease, chronic hepatitis C, improved cancer care, and drug overdose prevention. Trends in drug overdose were discussed previously. The next table, Table 18, trends the numbers of preventable deaths in the three other areas - cardiovascular, end stage liver disease, and cancer.

Table 18. Numbers of preventable Cardiovascular, End Stage Liver Disease, and Cancer deaths in the California Prison System, 2006-2012.

Year	Preventable Cardiovascular Deaths	Preventable ESLD deaths	Preventable Cancer Deaths
2006	18	2	6
2007	16	6	7
2008	14	4	9
2009	9	4	10
2010	7	2	4
2011	11	1	6
2012	8	3	1

There is a trend towards a reduction of preventable deaths due to cardiovascular disease, which may be related to the emphasis on educating medical staff on better recognition of “red flag” symptoms of coronary ischemia, and on better management of chronic heart disease and risk factors for coronary artery disease.

The numbers for ESLD are probably too small to justify a conclusion, although the average number of cases in the past two years (2.0) is slightly smaller than in the previous five years (3.6). An improvement in preventable deaths from ESLD might result from better adherence to guidelines of management of chronic hepatitis C infection, with improved screening for liver cancer, improved rates of treatment with antiviral therapy, and improved management of complications of cirrhosis – prophylaxis of portal hypertension, early recognition of spontaneous bacterial

peritonitis, and the avoidance of contraindicated medications like non steroidal anti inflammatory drugs.

There also appears to be a trend in reduction of preventable cancer deaths. This might result from improved practices in cancer screening recommendations and earlier recognition of red flag symptoms in order to reduce delays in cancer diagnosis. Improvements in chronic cancer care (after the diagnosis is made) would not necessarily result in a reduction of preventable mortality.

The next Performance Improvement Plan is scheduled to be released later in 2013.

B. Recommendations and Referrals of the Death Review Committee

The DRC makes referrals to both Nursing and Physician Peer Review Committees, to Mental and Dental Health Departments, to the Quality Management and Utilization Management committees, to specific regional institutional CEOs, medical, and nursing leadership, to the Emergency management committee and other groups.

The DRC has now begun tracking total numbers of referrals to the various peer review and quality improvement committees. In future years, trending the pattern of referral should become a useful indicator of overall system performance.

The DRC also makes recommendations to the Clinical Support Unit (CSU) for changes in existing guidelines and suggestions for topics for targeted provider education. An example of one such activity is the publication, the Clinical Spotlight, developed by the CSU in order to distribute clinical practice communications. A number of these Spotlight topics have been developed in direct response to specific cases discussed at the DRC-, among them -Hypertensive Crisis, Use of the Advanced Directive, Intraosseous Access (during emergency response), Hypothermia, Hepatic Encephalopathy, and the appropriate use of NSAIDs (non steroidal anti-inflammatory drugs).

C. Evidence Based Guidelines for Chronic Conditions

The Receivership in the past several years has developed and distributed a large number of Guidelines. These are well researched, detailed guidelines for the management of many of the important chronic conditions seen in clinical practice. They are an important decision support tool for frontline providers and nursing staff, who are expected to use them in the day to day management of patients. Guidelines in current use are for Anticoagulation, Asthma, Chronic Obstructive Pulmonary Disease, Diabetes Mellitus, Gender Identity Disorder, Hepatitis C Virus infection, HIV/AIDS, Hyperlipidemia, Hypertension, Major Depressive Disorder, Pain Management, Palliative Care, Seizure Disorder, and Tuberculosis.

IX. Conclusions

The California Prison Healthcare System has used the death review as a major instrument for improving the quality of healthcare. The death review process is extremely rigorous, has become highly structured, is well integrated into the overall quality improvement program, and informs much of that program's activities.

During the first years of the Receivership, death reviews and the peer review activity that it activated, were largely responsible for identifying the need for more clinical accountability which led to the development of a systemic primary care patient centered infrastructure and a culture of quality improvement.

Although the overall rate of death in the California prisons is stable, there has been a slight increase in the past year.

Possibly preventable deaths have trended favorably downward during the past seven years, and there was only a single definitely preventable death in 2012.

Going forward, the continued emphasis on more primary care, the focus on ongoing clinical education and training through the use of guidelines and other tools, the planned concentration of patients with severe chronic diseases into new medically oriented prison facilities, and the continued mandated reductions in overall prison population, should continue to promote measurable gains in the prevention of unnecessary suffering and death.