

June 7, 2012

J. Clark Kelso  
Receiver  
California Correctional Health Care Services  
501 J Street, Suite 600  
Sacramento, CA 95814

Dear Clark:

Attached please find the external assessment of the Inmate Death Review process for 2011 prepared by Kent Imai, M.D. This is the 6<sup>th</sup> year of external review using a standard methodology and it complements our internal review process. This report on the 388 inmate deaths in 2011 comprehensively examines the mortality review process within the California Correctional Health Care Services (CCHCS). The leading four causes of death within the California Department of Corrections and Rehabilitation (CDCR) remain unchanged in 2011. Drug overdose deaths in 2011 fell from the 5<sup>th</sup> to 8<sup>th</sup> most common cause of death.

The external review of clinical lapses associated with these deaths reveals a reduction of 25 percent over the years 2007-2011. The most common lapses remain unchanged and are similar to those found in other large integrated health systems with failure to recognize, failure to effectively communicate, and fragmentation of care associated with these cases. Patient refusal and/or non adherence to recommended care also contributed to the observed mortality within the system.

This report does highlight opportunities to further impact mortality within CDCR. The Clinical Support Unit in partnership with the Quality Management Unit are developing a focused educational program specifically directed at the most prevalent clinical lapses. The anticipated rollout of CCHCS' enhanced safety analysis processes may also contribute to further gains in possibly avoidable mortality reduction. These opportunities are anticipated to be incorporated at both headquarters and the institutional level in 2012-2013.

Sincerely,



R. Steven Tharratt, M.D., MPVM, FACP  
Statewide Chief Medical Executive  
Medical Services Division  
California Correctional Health Care Services

# **Analysis of 2011 Inmate Death Reviews in the California Prison Healthcare System**

May 12, 2012  
Kent Imai, MD

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## **I. Introduction**

The California Prison Healthcare System has been under federal receivership since April of 2006. The Receiver has overseen incremental improvements in health care, resulting ultimately in a wholesale system redesign, replacing a system driven by episodic complaints with a system within which healthcare teams bear responsibility for patient outcomes, and use proactive and guideline driven care for chronic medical conditions. An extensive quality Improvement program identifies and targets specific areas for clinical improvement.

Since the beginning of the receivership, a rigorous process of peer review has used the death review to identify serious individual and systemic lapses in care and to record and track the numbers of preventable deaths. The death review tool has been used to identify and sanction unsafe practitioners, and to find opportunities for system improvement.

This sixth annual analysis of all inmate death reviews in the California state prison system once again focuses on the following areas – trends in mortality, identification and trending of serious lapses in care, and identification and trending of preventable deaths.

This report shows improvements in several areas, discusses how these might have been achieved, and makes recommendations.

## **II. Death Review Process**

As described in prior reports, each inmate death is reviewed by a board certified physician who has been trained to do death reviews using a uniform procedure. Findings are recorded on a standardized death review template form

For each death review, the reviewer reads the decedent's healthcare record focusing on all clinical encounters that took place during the last six months of life. All patient requests for healthcare are noted, as well as the thoroughness of initial evaluation at time of intake into the system (if it occurred within the last six months), responsiveness of the system to the patient requests for healthcare, the quality of the evaluations, the timelines of access to indicated specialty care, the results of all laboratory and diagnostic imaging studies, the quality and thoroughness of the care of any identified chronic medical condition such as diabetes, asthma, emphysema, cancer, chronic pain, liver or kidney failure, chronic infection with the human immunodeficiency virus (HIV) or chronic hepatitis. All visits to specialists, emergency departments and inpatient hospitals are reviewed. The quality of terminal care for fatal conditions is noted. The timing and quality of responses to emergency situations is also reviewed.

Reviewers also determine whether there was an identifiable primary care physician involved in the patients care, cite the cause of death (using post mortem autopsy results

when available), identify all lapses in care (even if those lapses did not contribute to a patient's death), judge whether the death was preventable or not preventable, and recommend referrals for any adverse findings. Reviewers spend an average of 6-8 hours preparing each review. . In 2011, there were 17 reviewers, who averaged 22.8 reports (range 1- 43).

Completed death reviews are presented to the Death Review Committee (DRC), where the reviewer's conclusions are discussed. The eight member DRC is composed of a physician chair, three physician executives, three nurse executives and one custody representative. After discussion, the DRC votes to accept or modify the report (the chair and custody representative do not vote).

Systemic lapses such as delays in access or breakdowns in emergency response are referred to the Chief Medical Executive of the appropriate prison and to the receiver's Quality Management group. Lapses in care by individual nurses, physicians or mid level providers are referred to the appropriate peer review committee. Lapses which occur at contracted hospitals or specialist offices are referred to the contracting entity or to the appropriate peer review body.

This extensive and rigorous death review process meets or exceeds similar peer review activities conducted in the non prison world.

### **III. Definitions**

These 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 circumstances.

Lapse in care (systemic) – In the judgment of the reviewer, there was a lapse in the system of care delivery which departed significantly 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 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 the taxonomy for grouping lapses in care was developed. The 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 California Correctional Health Care Services (CCHCS) clinical staff. The fourteen categories of lapse are:

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

Type 2 – Failure to follow clinical guidelines or departmental policies developed by the medical department of the CCHCS. These include evidence based guidelines for the management of asthma, diabetes mellitus, hepatitis C infection, HIV/AIDS, chronic pain, and care at the end of life. Other guidelines include 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.

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 reviewed by a group of board certified specialists in internal medicine. Initially 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). *Hayward, et.al. “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 DRC tries to mitigate inter reviewer variability by seeking consensus on the assignment of preventability and the severity of lapses in care.

In this year’s analysis, as in past years, the author of this review also requires that the reviewer identify a clear relationship between a lapse or lapses in care and a preventable death. If such a lapse is not identifiable, the case is counted as a non preventable death, despite the consensus of the DRC.

## 2. Off site peer review

Traditional peer review takes place at the site where care originated and is conducted by staff who work there. The CCHCS death reviews are conducted off site by a designated cadre of physicians who are not involved in direct care of the decedent whose case is being reviewed.

## 3. Separate process for review of suicide deaths

All suicides are reviewed by a separate multidisciplinary committee in the California Department of Corrections and Rehabilitation, Mental Health Program by the Suicide Prevention and Response Focused improvement Team. This separate review is not integrated into the DRC, so that review findings and recommendations may not be facilitated.

## 4. Potential benefits

Benefits of the CCHCS death review process include a limited number of trained and experienced reviewers, the diligence expended in each review, and discussion of each death at the DRC. Off site review also has the potential benefit of removing 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 – 2011

All causes of death are shown in Table 1. The causes listed represent the underlying condition that led to the patient death. For example, if a patient died of severe bloodstream infection (sepsis or septicemia) because chemotherapy for cancer created a compromised immune system, then the cause of death was attributed to the cancer.

Table 1. Causes of Death Among All California Inmates, 2011

NUMBER OF CASES	CAUSE OF DEATH
94	Cancer (except Liver Cancer) Lung (30); esophagus, lymphoma (6 each); colon, leukemia and multiple myeloma (5 each); 3 each of bladder, breast, kidney, melanoma, pancreas, stomach; 2 each of cholangiocarcinoma, prostate, gall bladder, unknown primary; 1 each of anus, cervix, larynx, nasopharynx, rectum, tongue, sigmoid colon, SCC neck, synovial sarcoma, testicle, thyroid
76	Liver Disease — includes hepatitis C-related end stage liver disease (53), and liver cancer (23)
47	Cardiovascular Disease — includes sudden cardiac arrest/acute myocardial infarction (38), congestive heart failure (8), coronary artery disease (1)
34	Suicide
21	Pneumonia (includes 13 patients with chronic obstructive pulmonary disease, 2 aspiration pneumonias, 1 methicillin resistant staph. aureus pneumonia)
17	Homicide
16	Sepsis
12	Drug overdose
9	Stroke
6	End stage renal disease (dialysis dependent)
5	Pulmonary embolism
4	Dementia
3 each	AIDS, coccidioidomycosis, seizure disorder, upper gastrointestinal bleeding
2 each	Abdominal aortic aneurysm, dilated cardiomyopathy, endocarditis, ischemic bowel, necrotizing fasciitis, pancreatitis, post-operative death, shock
1 each	Amyotrophic lateral sclerosis, aspergillosis, asphyxiation (food bolus), cellulitis, clostridium difficile colitis, closed head injury, demyelinating disease, incarcerated umbilical hernia, cryptococcal meningitis, mesenteric thrombosis, myasthenia gravis, myelodysplasia, Parkinson disease, pulmonary fibrosis, ruptured iliac artery aneurysm, spontaneous bacterial peritonitis, thoracic aortic aneurysm, vasculitis, unknown
388	TOTAL DEATHS

As in prior years, lung cancer (30 deaths) and liver cancer (23 deaths) were the most common types of malignancy. Cancer of the liver and end stage liver disease with cirrhosis (53 deaths) share the underlying condition of chronic hepatitis C infection.

Sudden cardiac arrest and acute myocardial infarction are grouped with congestive heart failure because all three often share a common underlying condition - coronary artery disease. In most of these cases, the patients had other identifiable risk factors for coronary disease – smoking, hypertension, hypercholesterolemia, or diabetes mellitus.

Smoking was the major underlying cause for almost all cases of lung cancer (30 deaths) and chronic obstructive pulmonary disease (13 deaths).

The average age of the decedents in 2011 was 55 years (range 18 to 93). Suicides, homicides and drug overdoses were younger, averaging 38 years. Male inmates' average life expectancy is thus about twenty years less than that of the average American male.

38	average age of suicides, homicides, and drug overdoses
38	suicide
42	homicide
32	drug overdose

Table 2 compares the top causes of death from 2007-2011.

Table 2. Top causes of death among California inmates 2007-2011

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

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

Two of the top three underlying causes of death in the inmate population are related to lifestyle choices and the third is no doubt a consequence of incarceration.

1. DRUG ADDICTION. Intravenous injection with shared needles causes chronic hepatitis C infection which causes progressive inflammatory liver disease which ends in cirrhosis and which predisposes to the development of liver cancer. Shared needle use can also cause HIV/AIDS.

2. TOBACCO ADDICTION. Smoking causes lung cancer, chronic obstructive lung disease and accelerates coronary heart disease.

3. DEPRESSION contributes to suicide.

### ***B. Lapses in Care, 2011***

During the death review process, there is a meticulous search for medical error. By analyzing every medical encounter in the six months preceding each death, reviewers are able to review a representative sample of the entire system of care provided in California state prisons.

Discussion in the DRC provides consensus driven identification of significant lapses in care. The classification of these lapses into a taxonomy of medical error allows comparison from one year to the next.

Table 3 shows the number of lapses by type identified during review of the 388 deaths in 2011.

*Table 3. Summary of lapses of care (extreme departures), 2011.*

<b>Lapses of Care Types (Extreme Departures)</b>	<b># of Lapses in the 345 Non Preventable Deaths</b>	<b># of Lapses in the 41 Possibly Preventable Deaths</b>	<b># of Lapses in the 2 Likely Preventable Deaths</b>	<b>Total Lapses in all 388 deaths</b>
#1 – Failure to recognize, identify or adequately evaluate important symptoms or signs	56	30	1	87
#2 – Failure to follow established guidelines for evaluation and/or management of a specific condition	24	6	1	31

Lapses of Care Types (Extreme Departures)	# of Lapses in the 345 Non Preventable Deaths	# of Lapses in the 41 Possibly Preventable Deaths	# of Lapses in the 2 Likely Preventable Deaths	Total Lapses in all 388 deaths
#3 – Delay in access to care sufficient to result in harm to the patient	18	7	0	25
#4 – Failure to adequately pursue abnormal test results	14	6	0	20
#5 – Failure of provider-to-provider communications including botched handoffs	9	7	0	16
#6 – Fragmentation of care such that individual responsibility for patient is waived	4	2	0	6
#7 – Surgical/procedural complication resulting in iatrogenic injury	1	5	1	7
#8- Medication prescribing error	7	8	1	16
#9- Medication delivery error	0	3	1	4
#10- Practicing outside the scope of one’s professional capabilities	4	6	0	10
#11- Unsupervised mid-level (nurse practitioner or physician assistant) care	1	1	0	2
#12 – Failure of communication with the patient	1	3	0	4
#13 – Patient non-adherence with recommendation for optimal care	7	2	0	9
#14 – Delay in emergency response or failure to follow emergency response protocol	8	6	1	15
#15 – other	0	0	0	0
<b>TOTAL LAPSES</b>	<b>154</b>	<b>92</b>	<b>6</b>	<b>252</b>

Type 1 lapses (failure to recognize or properly evaluate important clinical signs or symptoms) account for 35% of the total.

Type 2 (failure to follow established guidelines for care), type 3 (delay in access to appropriate care) and type 4 (failure to pursue abnormal test results) together account for another 30%.

There are also significant numbers of type 5 (failure of provider to provider communication), type 8 (medication prescribing errors), and type 14 (lapses in emergency response protocols) lapses.

It is important to note that there has been an impressive 45% reduction in the total number of identified lapses from the previous year. Possible reasons for this improvement will be discussed later in this report.

### ***C. Non preventable deaths 2011 –***

*Table 4. Causes of non-preventable death among California inmates, 2011.*

<b>Number of Cases</b>	<b>Cause of Death</b>
88	Cancer — most frequent types: lung (30), esophagus (5), colon (4), multiple myeloma (5); other types had 3 or fewer cases each
74	Liver disease — includes end stage liver disease (51) and liver cancer (23)
35	Cardiovascular disease (includes sudden cardiac arrest, myocardial infarction, congestive heart failure)
34	Suicide
18	Pneumonia (includes chronic obstructive pulmonary disease)
17	Homicide
12	Drug overdose
11	Sepsis
9	Stroke
6	End stage renal disease
5	Pulmonary embolism
4	Dementia
3	HIV/AIDS
2 each	Coccidiomycosis, endocarditis, ischemic bowel, seizure disorder
1 each	Abdominal aortic aneurysm, amyotrophic lateral sclerosis, aspergillosis, C. difficile colitis, cellulitis, closed head injury, demyelinating disease, incarcerated umbilical hernia, fungal meningitis (cryptococcal), mesenteric thrombosis, myelodysplasia, necrotizing fasciitis, pancreatitis, Parkinson disease, pulmonary fibrosis, ruptured iliac artery aneurysm, shock, vasculitis, unknown, upper gastrointestinal hemorrhage
345	TOTAL NON PREVENTABLE DEATHS

Table 4 shows the causes of death in the 345 non preventable deaths in 2011. These deaths were all natural and expected with the exception of suicides, homicides and drug overdoses.

#### ***D. Possibly Preventable deaths – 2011***

Of 388 deaths in 2011, 41 (10.6%) were judged to be possibly preventable. Table 5 shows the causes of death in these cases.

*Table 5. Causes of possibly preventable death among California inmates, 2011.*

<b>Number Of Cases</b>	<b>Cause Of Death</b>
11	Cardiovascular disease, including sudden cardiac arrest
6	Cancer
5	Sepsis
3	Pneumonia
2	Upper gastrointestinal hemorrhage
1 each	Abdominal aortic aneurysm, asphyxiation (food bolus), coccidiomycosis, end stage liver disease, myasthenia gravis, necrotizing fasciitis, pancreatitis, pneumonia, post-operative death (ventral hernia repair), seizure disorder, shock, spontaneous bacterial peritonitis, stroke, thoracic aortic aneurysm
41	TOTAL POSSIBLY PREVENTABLE DEATHS

Initially the DCR labeled 54 cases as possibly preventable. As in previous annual reports, the author has removed from this list all cases in which there were no lapses in care identified by the reviewer, in which the care was noted to be reasonable and the lapses were unrelated to the cause of death, and in which delays in care or any other lapses seemed insufficient to have caused a preventable death. In some cases, there were several extreme lapses in care, and overall care of the patient was compromised, but no logical chain tied the lapses in care to preventability. Following this process, in 2011 there were 41 possibly preventable deaths.

Capsule summaries of representative possibly preventable deaths follow:

Case 1. A 50 year-old man died of a ruptured thoracic aortic aneurysm after a consultant’s recommendation for imaging studies was delayed by at least six months during which the patient was never advised against continuing his regular vigorous exercise routine. The delay in timely evaluation and the failure to caution the patient against vigorous exercise contributed to a possibly preventable death.

Case 2. A 70 year-old man died of sudden cardiac arrest following inadequate evaluation of exertion induced chest pain and palpitations. A written prescription for nitroglycerin was never distributed to the patient and cardiac stress tests were not done. These lapses in evaluation and management of a patient with symptoms suggesting ischemic heart disease contributed to a preventable death.

Case 3. A 40 year-old with diabetes mellitus died because inadequate evaluation and treatment of a leg ulcer led to gangrene and systemic infection.

Case 4. A 73 year-old with diabetes mellitus on hemodialysis for renal failure died of septicemia from a gangrenous foot ulcer. In the three months before death, medical staff failed to do foot exams as recommended by diabetic care guidelines. Had this guideline been followed routinely, gangrene might have been prevented.

Case 5. A young man with known seizure disorder died after missing five days of anticonvulsant medication. He was found unresponsive in an outpatient housing unit that was later found to have a non functioning call system. Had the patient received anticonvulsants as prescribed or had the call system been functional, this death might have been avoided.

Case 6. A 45 year-old man died of septic shock after a series of delayed responses to abnormal vital signs (hypotension and tachycardia) by an LVN and an on call physician led to a 2 1/2 hour delay in indicated urgent transfer to the emergency room. The delay in transfer to a higher level of care was key in the attribution of possible preventability.

Case 7. A 60 year-old man died of malignant melanoma after a suspicious skin lesion and order for biopsy was not done, leading to an 11 month delay in diagnosis, and a lost opportunity for effective treatment.

Case 8. A 70 year-old man with steroid dependent chronic lung disease died of necrotizing fasciitis. There was a 12 hour delay in evaluation for a fall probably caused by severe hypotension related to his infection. This delay allowed the infection to progress rapidly, and the patient did not survive despite aggressive in hospital management.

Case 9. A 45 year-old man with severe congestive heart failure died after receiving double his usual dose of medication. This contributed to a prolonged period of hypotension (low blood pressure) culminating in unresponsiveness. An eight minute delay in initiation of cardiac resuscitation also contributed to this possibly preventable death.

Case 10. A 60 year-old man died unexpectedly of sudden cardiac arrest after several episodes of chest pain were attributed to anxiety, an abnormal electrocardiogram was

interpreted as normal by a nonphysician, and activation of the emergency protocol was delayed by 20 minutes. All three of these lapses contributed to this possibly preventable death.

Case 11. A 61 year-old man died of metastatic malignant melanoma after a nine month delay in a requested skin biopsy for a suspicious neck lesion. This delay prevented possibly effective treatment for this skin cancer.

Case 12. A 67 year-old man with a history of stroke and severe congestive heart failure died suddenly. For several months, he had not been treated with adequate medication as recommended by evidence based nationally accepted treatment guidelines for congestive heart failure. Had he been treated according to guideline recommendations, the death might have been prevented.

Case 13. A 53 year-old man chronically disabled by anoxic brain injury stemming from a failed suicide attempt died by choking on a large bolus of food when signs of his acute distress went unrecognized or unheeded. A well known dystonic reaction to his neuroleptic medication was not noted and probably contributed to an inability to clear his upper airway, contributing to his death from asphyxiation.

Case 14. A 27 year-old man died suddenly. A recent history of recurrent syncope (fainting) brought on by exertion was inadequately evaluated. This symptom of exertional syncope is known to be indicative of occult cardiovascular disease.

Case 15. A 63 year-old man died of spontaneous bacterial peritonitis caused by liver failure. A prolonged period (seven days) of hypotension (low blood pressure) and tachycardia (rapid heart rate) was inadequately evaluated and poorly managed. Better care might have facilitated an earlier diagnosis and life prolonging treatment of this well known complication of severe liver disease.

Case 16. A 60 year-old man with diabetes mellitus died of pneumonia. The diagnosis was delayed in part because inter-facility transfer led to a failure to identify and respond to an abnormally high white blood cell count (24,000), which was indicative of a severe systemic infection.

Case 17. A 79 year-old man with congestive heart failure and arrhythmia died six days after inter-facility transfer. Transfer medications failed to include the antiarrhythmic drug which the patient had been taking.

Case 18. A 69 year-old man died of unspecified colitis and acidosis after three days of recurrent visits to the Triage and Treatment Area for being unable to walk. On each

occasion his low blood pressure was managed solely with intravenous fluid boluses and was inadequately evaluated and resulted in a significant delay in transferring him to a higher level of care.

Case 19. A 75 year-old man with myasthenia gravis treated chronically with corticosteroids died of pneumonia after recurrent symptoms of shortness of breath and low oxygenation, were poorly managed.

Case 20. A 37 year-old man with multiple cardiac risk factors (diabetes mellitus, hypertension and abnormal cholesterol) had sudden death. Medical staff missed several opportunities to evaluate this patient for occult cardiovascular disease.

Case 21. A 47 year-old man had a sudden cardiac arrest after three days of severe and unremitting back pain and an altered mental status, both of which were inadequately evaluated. The severe and unremitting pain was possibly related to an underlying condition (ischemic heart disease, aortic aneurysm) of which the patient died.

Case 22. A 52 year-old man died of acute myelogenous leukemia. Multiple opportunities to evaluate abnormal high white blood cell counts were missed, causing a 10 month delay in diagnosis. The patient died before treatment could be initiated.

Case 23. A 49 year-old man with advanced liver disease died of spontaneous bacterial peritonitis. His symptoms were mistakenly attributed to constipation rather than to the actual diagnosis of intra abdominal infection. Hospitalization where appropriate therapy could be given was delayed for nine days.

As in past years' analyses, these cases illustrate how type 1 failures to recognize, evaluate, and manage clinical "red flag symptoms and signs" can lead to possibly preventable mortality. This is especially true in high risk patients - those with chronic diseases, older patients, and patients with known compromising conditions (immunosuppressive therapy). Several of these cases show how lack of recognition or inertia in following up on abnormal tests or abnormal findings such as suspicious skin lesions can lead to significant delays in diagnosis and missed opportunities for effective treatment. Other contributions to preventable death include poor communication with other medical staff — especially when a patient's care is being transferred back and forth from one facility to another, inattention to clinical guidelines, and delays in access. The high incidence of behavioral illness and chronic pain in the incarcerated population add to the difficulty of making proper evaluations and treatment decisions.

For the third consecutive year, asthma caused no preventable deaths. This continues a significant trend, since in 2006, the first year of the Receivership, asthma caused six

preventable deaths. A statewide initiative was adopted in 2007. All medical staff were trained in the chronic disease model of care, using asthma registries and evidence based guidelines for the recognition, classification, proper treatment, patient education and regular follow-up of all asthmatic patients. Improved asthma care and no deaths from asthma has been the result.

### ***E. Likely (Definitely) Preventable Deaths – 2011***

There were two deaths in 2011 which reviewers and the DRC called likely (definitely) preventable.

Table 6. Causes of likely preventable death among California inmates, 2011.

<b>Number of Cases</b>	<b>Cause of Death</b>
1	Cardiovascular Disease (Acute Myocardial Infarction)
1	Post-Operative Death (cervical spine fusion)
2	TOTAL LIKELY PREVENTABLE DEATHS

Case 1. A 50 year-old man with diabetes, hypertension, coronary artery disease, congestive heart failure, cardiac arrhythmias and severe peripheral vascular disease died of acute myocardial infarction. His care had been compromised five months before death, when, after receiving a replacement pacemaker, his maintenance anticoagulation therapy was not resumed on return to the prison despite physician orders to do so (*type 9 lapse - failure to receive ordered medication*). One week later he developed bilateral severe leg pain. He was not evaluated promptly by the physician on call (*type 1 lapse - failure to appreciate red flag symptoms of severe leg pain in a patient with a history of severe peripheral vascular disease*). When seen 48 hours later, he had developed blood clots in both legs which necessitated bilateral amputation. On the day of his death, he presented to the prison emergency treatment area with severe chest pain and shortness of breath, with an abnormal electrocardiogram and low oxygenation. Although this acute coronary syndrome was an indication for immediate transfer to the local hospital, the patient was poorly managed in the local prison and transfer was delayed for five hours. (*type 1 lapse – substandard management of severe chest pain*). When he arrived at the local hospital he was moribund and death ensued quickly.

Case 2. A 52 year-old man died unexpectedly one day after extensive cervical spine surgery for degenerative disc disease. He had been referred to a consultant neurosurgeon for chronic neck pain. The consultant recommended surgery without an adequate period of conservative therapy, without an adequate examination and despite evidence of recent improvement in symptoms (*type 2 failure to manage chronic neck pain according to guidelines*). Extensive and aggressive surgery was performed rather than a simple

procedure. The patient was found unresponsive in his hospital bed on the day following surgery (*type 7 lapse – iatrogenic death resulting from surgery*). Emergency resuscitation was initiated but there was a significant delay before the arrival of cardiac monitoring and medical staff and resuscitation was unsuccessful (*type 14 lapse – delay in emergency response*). This case was referred to appropriate peer review.

Both of these cases again illustrate how multiple lapses can lead to unnecessary suffering and preventable death.

### ***F. Lapses by contract specialists and outside hospitals (non CCHCS staff) 2011***

As in the past three years, all of the cases of preventable or likely preventable death were reviewed to determine the burden of significant contributory lapses by non-CCHCS specialists or hospital systems.

In 2011 there were 11 such cases. One (1) case was likely preventable and was presented as case 2 in the previous section. Ten other cases involving were judged to be possibly preventable, and are briefly described here.

Case 1. A 42 year-old man with HIV infection and progressive pneumonia was not completely evaluated for opportunistic infection by an infectious disease consultant and died of disseminated coccidioidomycosis. This was felt to be a lapse in judgment by the specialist.

Case 2. A 59 year-old man died suddenly after elective repair of a large minimally symptomatic ventral hernia. He was a patient at high risk for post operative complications, with end stage kidney disease on hemodialysis, severe coronary heart disease, chronic lung disease and recent pneumonia. Indications for surgery were not compelling.

Case 3. A 46 year-old man died of septicemia. Failure of an outside contracting laboratory to report an abnormally high white blood cell count contributed to a delay in diagnosis which possibly led to his death. (this system failure has since been corrected)

Case 4. A 56 year-old man died of fulminant pancreatitis, which was a complication of an endoscopic extraction of common bile duct stones performed by a consulting gastroenterologist.

Case 5. A 58 year-old man with chronic renal failure died of hemorrhagic shock from blood loss following iatrogenic laceration of the superior vena cava during a procedure for placement of a catheter for dialysis.

Case 6. A 62 year-old man died shortly after being inappropriately discharged from the hospital with abnormal vital signs (tachycardia and tachypnea) following a cardiac catheterization.

Case 7. A 54 year-old woman died of rectal cancer seven months after a consultant had done a colonoscopy and found abnormal perirectal tissue but failed to do a biopsy, which led to a significant delay in diagnosis and treatment.

Case 8. A 76 year-old man died of uncontrolled hemorrhage one day after surgical repair of an abdominal aortic aneurysm. He had a known coagulation disorder which had been incompletely evaluated preoperatively. Had the coagulation disorder been evaluated, appropriate precautions might have prevented this death from exsanguination.

Case 9. A 25 year-old man with liver cirrhosis due to a hereditary enzyme deficiency suffered an in hospital death resulting from failure to control massive upper gastrointestinal bleeding after an esophagogastric endoscopic procedure.

Case 10. A 61 year old man with end stage liver disease was sent to an Emergency Department at a local hospital because of abdominal pain and a large amount of ascites. The ED physician removed six liters of peritoneal fluid, but the patient was sent back to the prison despite an elevated white blood cell count of over 17,000. Two days later he became hypotensive and was returned to the hospital where he died of sepsis from spontaneous bacterial peritonitis. The ED physician was thought to have missed the earlier opportunity to treat peritonitis.

In most (6) of these cases, severe iatrogenic injury followed an invasive diagnostic procedure or surgery. One case resulted from a delayed diagnosis of a potentially treatable cancer, one from failure to report an abnormal (and critical) lab result for two days, one from premature discharge following a cardiac catheterization, one from an incomplete evaluation by a specialist consultant, and one from incomplete evaluation and inappropriate discharge by an ED physician.

### ***G. Primary Care – 2011***

In 2009, primary care teams were installed in all California prisons in order to improve accountability for patient outcomes. Before the creation of the Receivership in 2006, prison care tended to be delivered episodically rather than systematically, was reactive rather than proactive, and idiosyncratic rather than guideline driven. Now each inmate is assigned to a specific primary care team. These teams are held to a high standard of practice – responsible for timely access, efficient and appropriate care, and for using evidence based

guidelines in the management of chronic diseases such as asthma, diabetes and hepatitis, pain management and provision of hospice care for patients with terminal illnesses.

Table 7. Presence of Primary Care in California inmate death cases, 2009 – 2011.

	2011		2010		2009	
	Cases with an identified Primary Care Physician	% of total cases	Cases with an identified Primary Care Physician	% of total cases	Cases with an identified Primary Care Physician	% of total cases
Likely Preventable deaths	2 of 2	100%	3 of 5	60%	1 of 3	33%
Possibly Preventable deaths	24 of 41	52.9%	23 of 47	49%	13 of 43	30%
Non Preventable deaths	183 of 345	53.7%	191 of 363	52.6%	127 of 248	37%
<b>TOTAL DEATHS</b>	<b>209 of 388</b>	<b>53.4%</b>	<b>217 of 415</b>	<b>52.3%</b>	<b>141 of 393</b>	<b>35.5%</b>

The total penetration of primary care as measured by the percentage of patients with identifiable primary care physicians has remained steady for the past few years at a little over 50%.

## VII. Discussion

### A. Trends in California Prison Death rates 2006-2011

Table 8. Annual death Rates among California inmates, 2006- 2011.

Year	NUMBER OF DEATHS	NUMBER OF INMATES (on Jan. 31)	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

Indexed to population, the all cause death rate among California inmates has remained stable over the past six years of analysis, averaging 238 deaths/100,000 inmates, with a range of 232-255/100,000.

**B. Trends in Preventable Deaths, 2006-2011**

Figure 1. Numbers of California Prison System Deaths by Preventability, 2006-2011

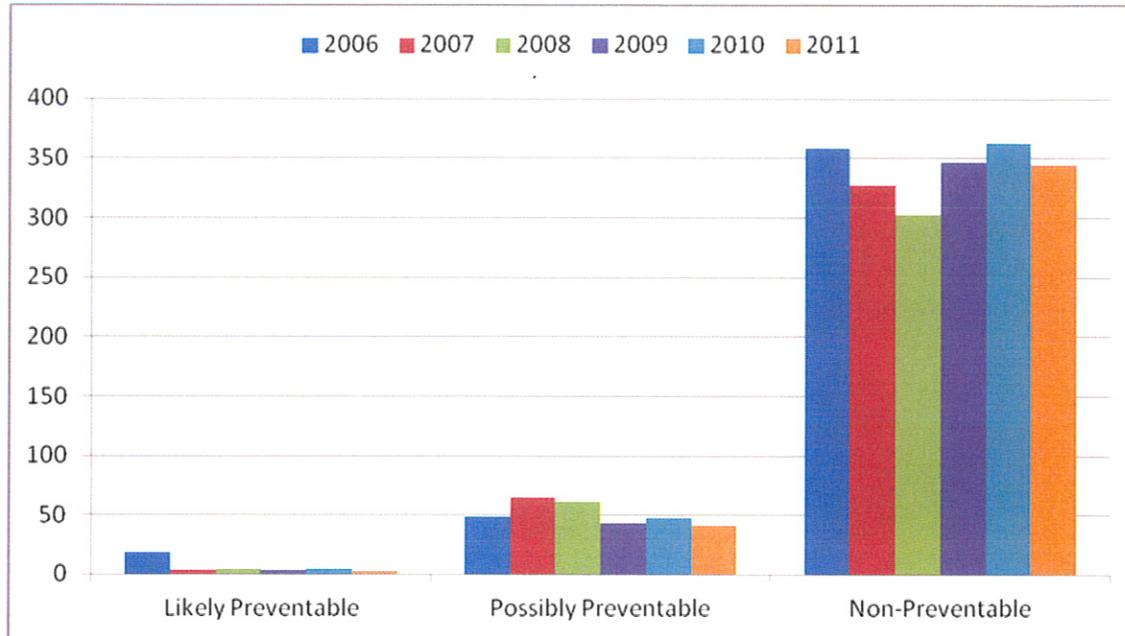


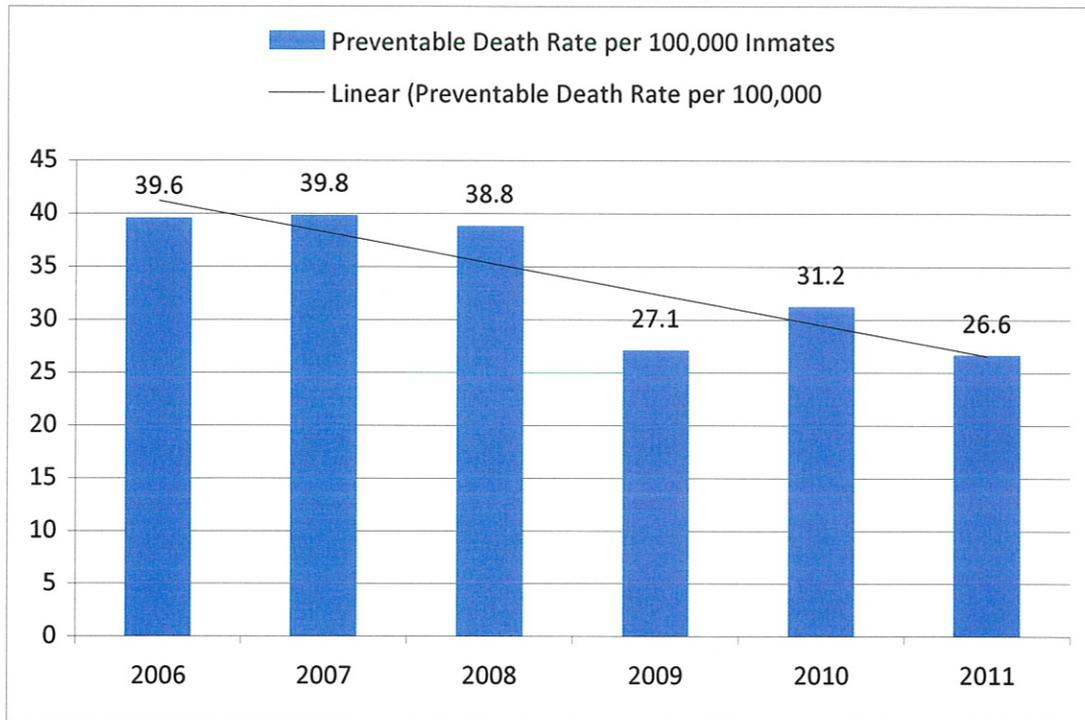
Table 9. Rates of preventable deaths among California inmates, 2006-2011.

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

Figure 2 and Table 9 show that in 2011, there were 43 total preventable deaths (2 likely and 41 possibly preventable). This represents a reduction in the rate of all preventable

deaths / 100,000 inmates, which continues a trend that began in 2009 (six year average = 33.9/ year, range 26 - 40).

Figure 2. Trend in Preventable Death Rates in the California Prison System, 2006-2011.



There has also been a decrease in the number of definitely preventable deaths in 2011, continuing the favorable trend that began in 2007. (six year average = 6/year, range 2-18).

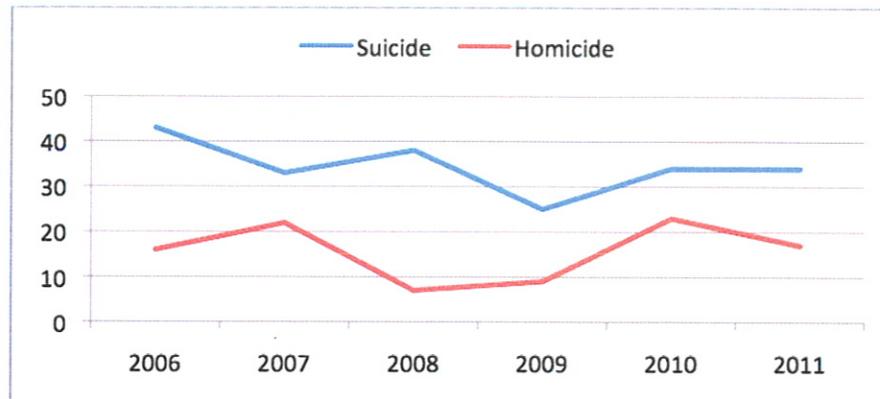
### C. Trends in causes of mortality

1. SUICIDES AND HOMICIDES – There were 34 suicides and 17 homicides in 2011. Table 11 and Figure 3 show that the number of suicides and homicides has remained stable over the six years of the Receivership. The average number of suicides is 35/year, ranging from 25 to 43. The average number of homicides is 16 / year, ranging from 7 to 22.

Table 10. Numbers of Suicide- and Homicide- related deaths in the California Prison System, 2006-2011.

	2006	2007	2008	2009	2010	2011
Suicide	43	33	38	25	34	34
Homicide	16	22	7	9	23	17

Figure 3. Numbers of Suicide- and Homicide-related deaths in the California Prison System, 2006-2011.



2. DRUG OVERDOSES – Drug overdoses have been a significant cause of death in the younger inmate population. In 2010, the Quality Improvement department reinforced adherence to the CCHCS pain management and medication management guidelines in an effort to control opiate diversion and the opportunity for drug overdose. There were 12 drug overdose deaths in 2011. This represents a reduction of 48% from 2010, hopefully the onset of a favorable trend.

Table 11. Numbers of Drug Overdose-related deaths in the California Prison System, 2006-2011.

	2006	2007	2008	2009	2010	2011
Drug Overdose	17	9	19	14	23	12

The average number of drug overdose deaths from 2006-2011 was 16, ranging from 9 – 23 per year.

3. COCCIDIOIDOMYCOSIS– Coccidioidomycosis (cocci) is a fungal disease endemic in the California Central Valley, where eight of the 33 state prisons are located. In the past few years, there has been a significant effort related to controlling coccidioidomycosis in the California prison population, including educational presentations to clinicians and a policy to restrict or remove high risk immune suppressed patients from the eight prisons in the endemic area, and ongoing monitoring of cases.

Figure 4. Cocci-related deaths in the California Prison System, 2006-2011.

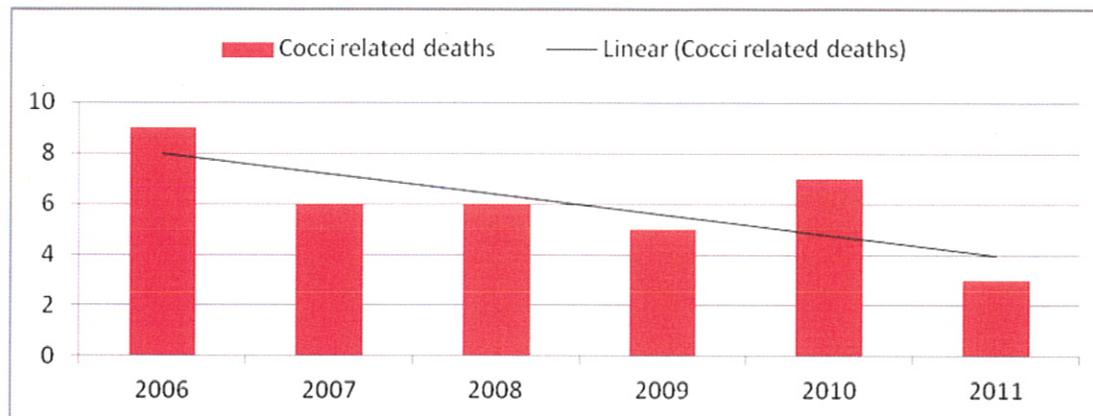


Table 12. Cocci-related deaths in the California Prison System, 2006-2011.

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

From 2006-2011, the average number of coccidioidomycosis deaths was six per year with a range of three to nine. In 2011 there were only three deaths from coccidioidomycosis, representing the possible beginning of another favorable trend.

#### **D. Trends in Lapses in Care – 2011**

Previous annual reports have pointed out 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 when they occur in vulnerable patients with serious underlying medical conditions. It also is true that the number of lapses rises with increasing numbers of encounters. Therefore, the patients at highest risk for encountering lapses in care are those that have the most medical needs. These high risk patients are the chronically ill, the elderly, patients with chronic pain and patients with coexisting serious behavioral illness.

##### **1. Relationships between lapses in care and preventable deaths.**

There is a relationship between the number of lapses occurring in a single case and a cascade of events that may lead to a preventable death.

Table 13 shows that in 2011 the cases of non preventable deaths averaged 0.4 lapses. There were an average of 2.4 lapses in possibly preventable death cases and an average of 3.0 lapses in the two definitely preventable deaths.

Table 13. Number of lapses by preventability among California inmates, 2011.

	Lapses	Number of Deaths	Average Lapses per death
Likely Preventable	6	2	3.0
Possibly Preventable	85	34	2.4
Non-Preventable	252	352	0.4

Figure 5. Average number of lapses per death by preventability among California inmates, 2007-2011.

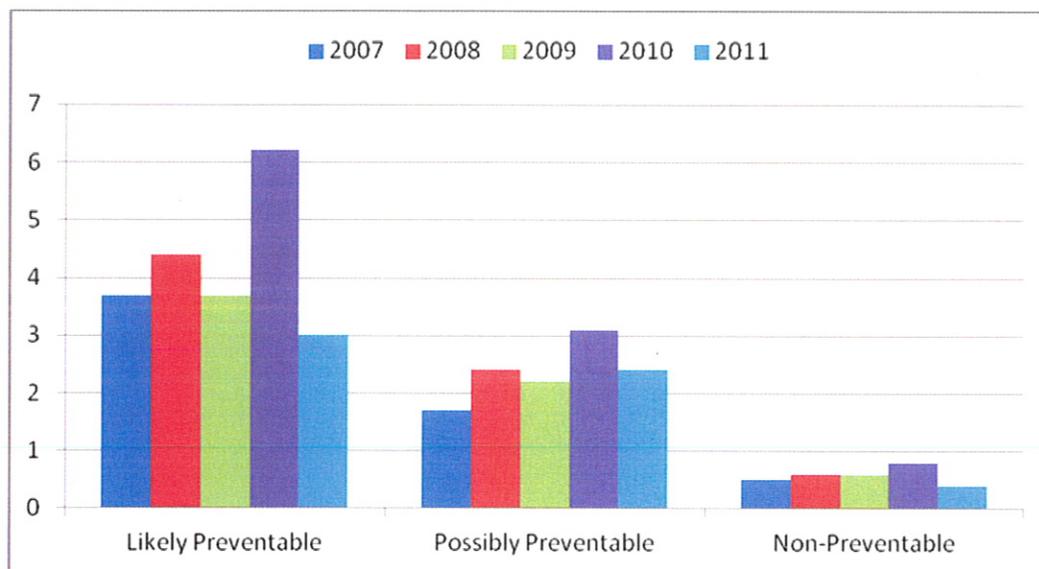


Figure 5 shows that there is a consistent relationship between numbers of lapses and preventability that has held true for six years of analysis.

## 2. Trends in total lapses in care, 2007-2011

Table 14. Number of lapses, by preventability, in California Prison System deaths, 2007-2011.

Year	Likely Preventable	Possibly Preventable	Non-Preventable	Total
2007	11	109	179	299
2008	22	147	193	362
2009	11	90	205	306
2010	31	147	284	462
2011	6	92	154	252

Figure 6. Lapses, by year and death preventability, in the California Prison System, 2007-2011.

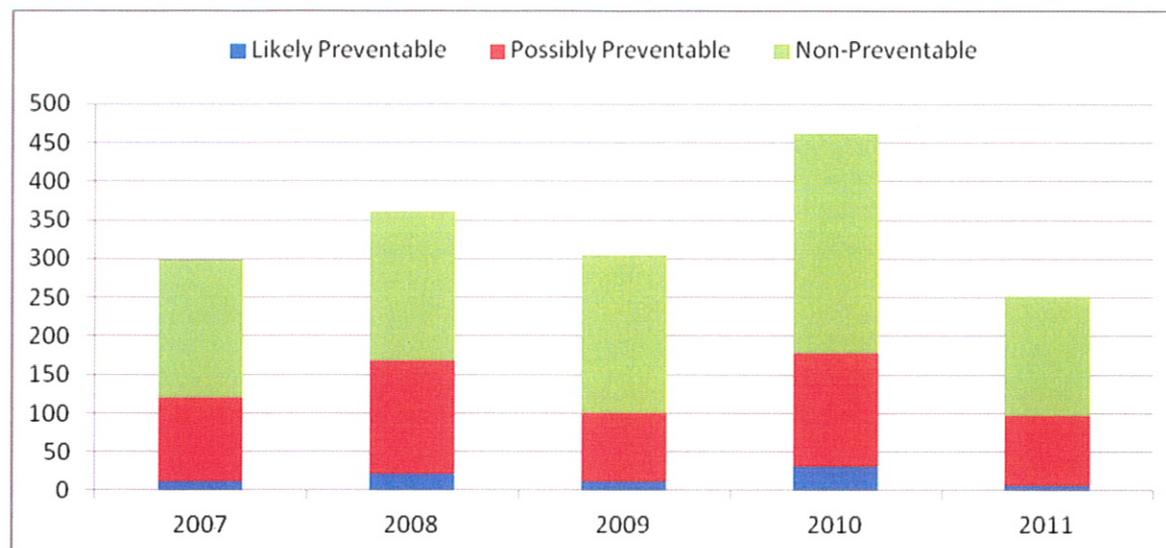


Table 14 and Figure 6 show the trends in total numbers of lapses from 2007-2011. The average number of lapses in the five years of tracking is 335 (range 252 – 462).

In 2011, there were a total of 252 identified serious lapses in care. This represents a very significant reduction from the average of 335 lapses identified from 2007-2010, and may represent the beginning of a favorable trend.

In the author’s opinion, the overall decline in identified lapses is a result of the work done to systematically improve quality in the CCHCS. The 2010 Performance Improvement Plan described a detailed approach to improving quality in four specific areas – the areas representing the top four causes of death and the most common types of lapses noted in the care of these conditions.

Cardiovascular diseases - by focusing on identifying high risk patients and applying guideline directed proactive management such as the prescription of low dose aspirin, and education about recognition and management of acute coronary syndromes.

Drug overdoses - by improving emergency response protocols to “man down” situations and by reinforcing adherence to the CCHCS Pain Management and Medication Management Guidelines in order to mitigate opiate diversion and lessen the opportunity for drug overdose;

Cancer care - by developing performance dashboards and standardizing timeframes for cancer evaluation and treatment, encouraging the use of “holds” on pending transfers of patients between prisons to prevent treatment interruptions; and

Chronic liver disease - by reinforcing focus on existing policies and guidelines for managing chronic liver disease including more timely screening for liver cancer in high risk patients and earlier identification of those patients who might benefit from antiviral treatment.

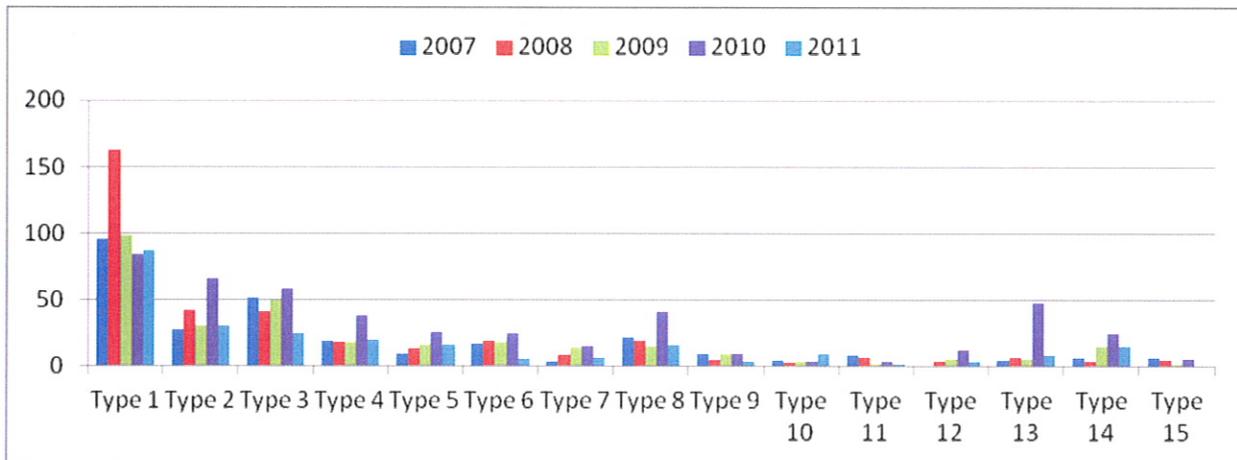
3. Trends in lapses, by type, 2007-2011.

Table 15 and Figure 7 show the number of lapses by type from 2007 – 2011. With the exceptions of lapse types 1 and 10, the number of identified lapses in all other categories has declined.

Table 15. Lapses, by type, in California Prison System deaths, 2007-2011.

Year	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8	Type 9	Type 10	Type 11	Type 12	Type 13	Type 14
2007	96	28	52	19	10	17	4	22	10	5	9	1	5	7
2008	163	42	41	18	13	19	9	19	5	3	7	4	7	4
2009	99	31	50	18	16	18	14	15	10	4	2	6	6	15
2010	84	66	58	38	26	25	15	41	10	4	4	12	48	25
2011	87	31	25	20	16	6	7	16	4	10	2	4	9	15

Figure 7. Number of lapses, by type, in California Prison System deaths, 2007-2011.



4. Type 1 lapses, 2011

There has been no significant decline in type 1 lapses since 2007. The kinds of red flag signs and symptoms that have been cited by the review process are depicted in Figure 8 and Table 16.

Figure 8. Signs and symptoms in Type 1 lapses in California Prison System deaths, 2011.

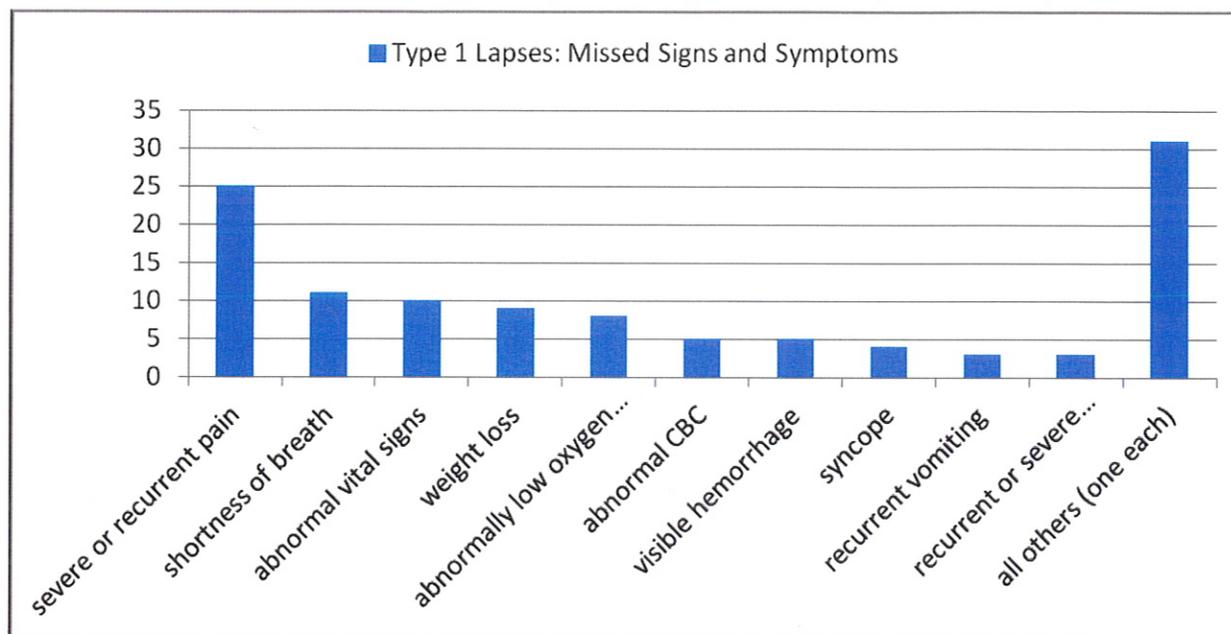


Table 16. Signs and symptoms in Type 1 lapses in California Prison System deaths, 2011.

Sign or Symptom	No. of occurrences
Severe or recurrent pain	25
chest - 9	
abdomen -6	
back - 4	
Shortness of breath	11
Abnormal vital signs	10
hypotension - 4	
Weight loss	9
Abnormally low oxygen saturation (less than 95%)	8
Abnormal CBC	5
Visible hemorrhage	5
epistaxis (nasal bleeding) - 2	
hemoptysis (coughing of blood)- 1	
hematemesis (vomiting of blood) - 1	
hematochezia (rectal bleeding)- 1	
Syncope	4
exertional syncope - 2	
Recurrent vomiting	3
Recurrent or severe dizziness	3
All others (one each)	31

Severe and /or recurrent pain, especially when located in the chest and abdomen, shortness of breath, measurable declines in oxygen saturation to 95% or less, and progressive weight loss are the most frequently mishandled “red flags”, but clinicians should be made aware of the need to be particularly thorough in the evaluation of hemorrhage and loss of consciousness, whether observed or reported.

## **VIII. Opportunities**

In 2011, there have been ongoing improvements with the adoption of clinical information systems that support primary care and continuous quality improvement. A network has been contracted with for the provision of specialty care with requirements for timely consultation and reporting. An extensive program of continuing medical education and training has been offered to providers. Additional quality improvement and population management tools (patient registries and additional clinical guidelines) have been implemented. The Quality Improvement Department has started to track and report important clinical quality performance measures.

In 2012, all of these quality improvement activities are intended to continue in order to support full implementation of the Primary Care Model emphasizing population management.

The Primary Care Teams in every prison will receive further training on the identification and consistent management of high risk patients...older patients, patients with chronic disease and chronic pain syndromes, patients with coexisting behavioral issue, patients who have high utilization of emergency departments, patients who are frequently hospitalized, and patients who are candidates for hospice care. Teams will work to improve communication and coordination of care of their patients especially during care transitions (transfers from prison to prison and to and from specialists and hospitals).

Attention should be paid to the continuing high number of type 1 lapses involving the recognition and careful assessment of certain high risk symptoms and signs....those that most often signal an opportunity to prevent serious morbidity or death.

In 2012, there may also be opportunities to decrease the numbers of deaths involving younger inmates – working with behavioral health to identify and treat serious depression, depression that does not seem to be responding to treatment, and continuing the work to decrease opportunities for drug overdose.

## **IX. Conclusions**

The Federal Receivership for CCHCS has continued to conduct thorough reviews of all patient deaths. Deaths are seen as potential sentinel events, and the reviews focus not just on the events immediately surrounding the death, but at all of the care in the preceding six months or beyond, looking for serious lapses in care, and targeting these identified lapses for directed quality improvement. Although the overall death rate for California inmates has remained stable, this 2011 annual review has shown improvement in many major areas, including meaningful reductions in identified serious lapses in medical care, and reductions in the number of preventable deaths.

This review attributes these improvements to the many positive changes being made in continuous quality improvement as well as the continued evolution of a primary care patient centered model, and predicts that the gains made in 2011 will be further consolidated and sustained in 2012.