Molecular Epidemiological Analysis of Methicillin-Resistant Staphylococcus aureus Isolates From a Medical Intensive Care Unit: A Comparison of Nasal and Clinical Isolates

Limei Luo, MM, Yi Xie, PhD, Chao He, MD, Fu Qiao, MM, Hongdi Zhuang, MM, Liang Guo, MM, Weijia Yin, MM, Mei Kang, MD and Lanlan Wang, MD, PhD

Abstract: Background: The control of nosocomial transmission of methicillin-resistant Staphylococcus aureus (MRSA) represents a significant challenge to infection control professionals. Nasal carriage colonization by MRSA plays a crucial role in the epidemiology and pathogenesis of this infection. Methods: Patients in the medical intensive care unit (ICU) between November 2010 and March 2011 were swabbed when hospitalized, reswabbed 1 week later and for a third time, when they were discharged from the ICU. All swabs were examined within 2 hours of collection using ChromID MRSA-Select agar plates to detect MRSA. Positive specimens were determined to have the mecA and femB gene through amplification with duplex polymerase chain reaction. Repetitive element sequence-based polymerase chain reaction was used to investigate the epidemiological types of MRSA isolates in the third screening and clinical isolates obtained from 2007 to 2010 in West China Hospital. A comparison of molecular types was performed to investigate the genetic relationship between nasal and clinical isolates. Results: After the third screening, 16 nasal MRSA isolates were identified. Epidemiological analysis revealed that 16 nasal MRSA isolates and 37 clinical MRSA isolates differentiated into 2 clusters, comprising 9 subclusters. Of the 16 nasal strains, 11 (68.8%) belonged to subcluster I of cluster I; 3 of 9 subclusters consisted of both nasal and clinical isolates, while 4 of 9 subclusters consisted of clinical isolates and only 2 of 9 consisted of nasal isolates. Conclusions: Our study indicated a high degree of genetic relatedness between nasal and clinical MRSA isolates. The molecular typing of MRSA is critical for controlling the nosocomial transmission of this pathogen in ICU setting and defining a nosocomial infection control policy.

Key Indexing Terms: Methicillin-resistant *Staphylococcus aureus*; MRSA-select agar; Rep-PCR; Infection control. [Am J Med Sci 2013;345(5):361–365.]

INTRODUCTION

ethicillin-resistant *Staphylococcus aureus* (MRSA) is one of the most common nosocomial pathogens and is associated with significant morbidity and mortality among hospitalized patients in intensive care units (ICUs). Several characteristics of MRSA contribute to its propensity for epidemic spread, including multidrug resistance, long-term survival in medical environments and high virulence. For the control of

From the Department of Laboratory Medicine (LL, YX, CH, LG, MK, LW); and Infection Control (FQ, HZ, WY), West China Hospital, Sichuan University, Chengdu, Sichuan, China.

Submitted December 26, 2011; accepted in revised form April 19, 2012. Supported by grants from the National Natural Science Foundation of China (NSFC- 81000712).

The authors have no financial or other conflicts of interest to disclose. L. Luo and Y. Xie contributed equally to this work.

Correspondence: Lanlan Wang, MD, PhD, Department of Laboratory Medicine, West China Hospital of Sichuan University, No. 37 Guoxue Xiang, Wuhou District, Chengdu, Sichuan 610041, China (E-mail: wanglanlanlab@126.com).

MRSA infection, strict compliance with infection control measures is required, such as hand hygiene, environmental cleaning and contact isolation. Active surveillance has been implemented to screen and identify patients who are carriers of MRSA.² Furthermore, the analysis of MRSA molecular typing may be useful for controlling the nosocomial transmission of this pathogen in ICU settings.³

Nasal colonization by MRSA plays a crucial role in the epidemiology and pathogenesis of infection. The rapid screening and early identification of isolates among high-risk patients is critical for reducing the spread of MRSA. According to a study conducted mainly in southern and eastern Europe, South America and the United States in 2002, it was found that pandemic clones of MRSA belong to several genetic lineages. Nosocomial MRSA infection rates were dependent on the medical practice of local hospitals and microbial resistance patterns, which vary from 1% to 80% between different hospitals. Detailed information regarding MRSA genetic relatedness and nosocomial transmission among patients is required for the effective control of the infection.

Active surveillance for MRSA involves genetic analysis of pathogens cultured from nasal samples of patients obtained at the time of admission or during hospitalization. The DiversiLab system is a molecular strain typing system that uses the repetitive element sequence-based polymerase chain reaction (rep-PCR) method to determine the similarity of bacterial strains at the genomic level.8 The most important advantage of using the rep-PCR microbial genotyping system is the potential to trace the sources of nosocomial outbreaks in the hospital setting, and meaningful results will be obtained across consecutive studies over many years. In the present study, the molecular types of nasal MRSA collected after the patient was admitted in the ICU were compared with the strains of MRSA isolated from clinical samples over 4 consecutive years to investigate any potential relationship, or differences, between nasal colonization and clinically significant MRSA.

METHODS

This prospective study was carried out from November 2010 to March 2011 in the 50-bed medical ICU of West China Hospital. A total of 670 nasal swabs from 336 newly admitted or already hospitalized ICU patients were included in this study. All patients were swabbed when hospitalized, reswabbed 1 week later and for a third time, when they were discharged from the ICU. All swabs were examined within 2 hours of collection.

Nasal swabs were collected by nursing personnel who were trained by microbiology and infection control experts. Specimens were transported in COPAN medium (bioMerieux, Inc; Marcy l'Etoile, France), and cultures were processed within 2 hours of collection in the following manner: all swabs were streaked on ChromID MRSA-Select agar plates (bioMerieux, Inc) for the detection of MRSA. MRSA-select agar plates that

Note Company Continue Con	TABLE 1. Epidemiological features of MRSA in this study						
1002 31-7-2007 INF WS ERY, TET VAN, SXT, RIF, CIP, GM 1003 18-5-2007 INF WS ERY, CIP VAN, SXT, RIF, CIP, GM TO		Culture date	Infection or		Antimicrobial resistance pattern		
1905	Strain ID	(day/mo/yr)	colonization	Isolated source	R	S	
1004 12-7-2007 COL SP	71002	31-7-2007	INF	WS	ERY, TET	VAN, SXT, RIF, CIP, GM	
	71003	18-5-2007	INF		ERY, CIP		
1108 18-7-2007 COL SP ERY, TET, CIP VAN, SXT, RIF, GM TET 1111 20-9-2007 COL SP ERY, CIP VAN, SXT, RIF, GM, TET 1111 20-9-2007 COL SP ERY, TET VAN, SXT, RIF, CIP, GM, TET 1112 20-9-2007 COL SP ERY, TET, CIP, GM, RIF VAN, SXT, RIF, CIP, GM TET 1113 20-9-2007 COL SP ERY, TET, CIP, GM, RIF VAN, SXT	71004	12-7-2007	COL		ERY	VAN, SXT, RIF, CIP, GM, TET	
1109	71107	3-7-2007	COL	SP	ERY, TET, CIP, GM	VAN, SXT, RIF	
1111	71108	18-7-2007	COL	SP	ERY, TET, CIP	VAN, SXT, RIF, GM	
	71109	1-9-2007	COL	SP	ERY, CIP	VAN, SXT, RIF, GM, TET	
1113 20-9-2007	71111	25-9-2007	INF	BC	ERY	VAN, SXT, RIF, CIP, GM, TET	
1105	71112	20-9-2007	COL	SP	ERY, TET	VAN, SXT, RIF, CIP, GM	
11006	71113	20-9-2007	INF	WS	ERY, TET, CIP, GM, RIF	VAN, SXT	
11007 19-5-2008	81005	16-5-2008	INF	BC	ERY, TET, CIP, GM, RIF	VAN, SXT	
Section Sect	81006	8-6-2008	INF	WS	ERY, TET, CIP, GM, RIF	VAN, SXT	
STOOP 22-7-2008	81007	19-5-2008	INF	WS		VAN, SXT	
Side George Side Side	81008	16-8-2008	COL	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
Section Sect	81009	22-7-2008	INF	WS	ERY, TET, CIP, GM	VAN, SXT, RIF	
1810 15-5-2008	81010	6-6-2008	INF	WS	ERY, TET, CIP, GM, SXT	VAN, RIF	
STOCK SP	81012	25-5-2008	COL	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
102 19-5-2008 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 103 18-6-2008 INF BC ERY, TET, CIP, GM, RIF VAN, SXT 104 19-5-2008 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 105 29-1-2009 INF BC ERY, TET, CIP, GM, RIF VAN, SXT 105 29-1-2009 INF BC ERY, TET, CIP, GM, RIF VAN, RIF 105 29-1-2009 INF BC ERY, TET, CIP, GM, RIF, SXT VAN 105 1-3-2009 INF BC ERY, TET, CIP, GM, RIF VAN, SXT 105 VAN, SXT VAN 105 VAN VAN VAN VAN VAN 105 VAN VAN VAN VAN VAN VAN 105 VAN VAN VAN VAN VAN VAN VAN 105 VAN VAN	81013	15-5-2008	INF	WS	ERY, TET, CIP, GM, RIF	VAN, SXT	
18103 18-6-2008 INF BC ERY, TET, CIP, GM, RIF VAN, SXT	81101	15-5-2008	COL	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
1110	81102	19-5-2008	INF	WS	ERY, TET, CIP, GM, RIF	VAN, SXT	
14802 24-1-2009 INF	81103	18-6-2008	INF	BC	ERY, TET, CIP, GM, RIF	VAN, SXT	
14510 29-1-2009 INF	81110	19-5-2008	INF	WS		VAN, SXT	
1-3-2009	94802	24-1-2009	INF	BC	ERY, TET, CIP, GM, SXT	VAN, RIF	
A4404 24-2-2009 COL SP	94510	29-1-2009	INF	WS	ERY, TET, CIP, GM, RIF, SXT	VAN	
Section Sect	94505	1-3-2009	INF	BC	ERY, TET, CIP, GM, SXT	VAN, RIF	
27-11-2009 COL SP ERY, TET, CIP, GM, RIF VAN, SXT 25-12-2009 COL SP ERY, TET, CIP, GM, RIF VAN, SXT 24-103 30-3-2009 COL SP ERY, TET, CIP, GM, RIF VAN, SXT 24-104 2-8-2009 INF SP ERY, TET, CIP, GM, RIF VAN, SXT 24-104 2-8-2009 INF WS ERY, TET, CIP, GM RIF VAN, SXT 24-104 COL SP ERY, TET, CIP, GM VAN, SXT, RIF 24-104 COL SP ERY, TET, CIP, GM, RIF VAN, SXT 24-11 12-4-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 24-11 12-4-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 24-11 12-4-2010 INF SP ERY, TET, CIP, GM, RIF VAN, SXT 24-12 16-4-2010 COL SP ERY, TET, CIP, GM, RIF VAN, SXT 25-10 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 25-10 VAN, SXT VAN, SXT 25-10 VAN, SXT, RIF 25-10 VAN, SXT, RIF, CIP, GM 25-10 VAN, SXT, RIF, CIP, G	94404	24-2-2009	COL	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
S212 25-2-2009 COL SP	95211	26-5-2009	COL	SP	ERY, TET, CIP, GM, RIF, SXT	VAN	
A4403 30-3-2009 COL SP ERY, TET, CIP, GM, RIF VAN, SXT A4401 2-8-2009 INF SP ERY, TET, CIP, GM, RIF VAN, SXT A4401 2-8-2009 INF SP ERY, TET, CIP, GM, RIF VAN, SXT A4401 2-8-2010 INF WS ERY, TET, CIP, GM VAN, SXT, RIF A4402 20-3-2010 COL SP ERY, TET, CIP, GM, RIF VAN, SXT A4411 12-4-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT A4412 16-4-2010 COL SP ERY, TET, CIP, GM, RIF VAN, SXT A4412 16-4-2010 INF SP ERY, TET, CIP, GM, RIF VAN, SXT A4403 19-6-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT A4404 VAN, SXT VAN, SXT A4405 VAN, SXT VAN, SXT A4406 VAN, SXT VAN, SXT A4407 VAN, SXT A4408 VAN, SXT VAN, SXT	94405	27-11-2009	COL	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
1	95212	25-2-2009	COL	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
04508 20-2-2010 INF WS ERY, TET, CIP, GM VAN, SXT, RIF 04402 20-3-2010 COL SP ERY, TET, CIP, GM, RIF VAN, SXT 04411 12-4-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 04412 16-4-2010 COL SP ERY, TET, CIP, RIF VAN, SXT, GM 05210 7-5-2010 INF SP ERY, TET, CIP, GM, RIF VAN, SXT 04803 19-6-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 044509 27-8-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 044509 27-8-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 8044808* 29-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 804811* 8-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT 804812* 23-12-2010 INF NS ERY, TET, CIP, GM VAN, SXT, RIF 8045201* 29-12-2010 COL NS	94403	30-3-2009	COL	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
04402 20-3-2010 COL SP ERY, TET, CIP, GM, RIF VAN, SXT 04411 12-4-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 04412 16-4-2010 COL SP ERY, TET, CIP, RIF VAN, SXT, GM 05210 7-5-2010 INF SP ERY, TET, CIP, GM, RIF VAN, SXT 04803 19-6-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 04509 27-8-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 304808* 29-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 304811* 8-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 304812* 23-12-2010 INF NS ERY, TET, CIP, GM VAN, SXT 3048201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 3045204* 29-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 3045206* 26-12-2010 COL NS </td <td>94401</td> <td>2-8-2009</td> <td>INF</td> <td>SP</td> <td>ERY, TET, CIP, GM, RIF</td> <td>VAN, SXT</td>	94401	2-8-2009	INF	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
04411 12-4-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 04412 16-4-2010 COL SP ERY, TET, CIP, RIF VAN, SXT, GM 05210 7-5-2010 INF SP ERY, TET, CIP, GM, RIF VAN, SXT 04803 19-6-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 04509 27-8-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 8M4808* 29-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4811* 8-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4812* 23-12-2010 INF NS ERY, TET, CIP, GM VAN, SXT 8M5201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M5203* 17-2-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT, RIF, CIP, GM 8M5205* 24-12-2010 COL NS ERY, TET, GIP, GM, RIF VAN, SXT, RIF, CIP, GM 8M5206* 26-12-2010 <t< td=""><td>104508</td><td>20-2-2010</td><td>INF</td><td>WS</td><td>ERY, TET, CIP, GM</td><td>VAN, SXT, RIF</td></t<>	104508	20-2-2010	INF	WS	ERY, TET, CIP, GM	VAN, SXT, RIF	
04412 16-4-2010 COL SP ERY, TET, CIP, RIF VAN, SXT, GM 05210 7-5-2010 INF SP ERY, TET, CIP, GM, RIF VAN, SXT 04803 19-6-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 04509 27-8-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 8M4808* 29-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4811* 8-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4812* 23-12-2010 INF NS ERY, TET, CIP, GM VAN, SXT 8M4813* 28-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M5201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT 8M5203* 17-2-2011 COL NS ERY, TET VAN, SXT 8M5204* 20-2-2011 INF NS ERY, TET, GM VAN, SXT, RIF, CIP, GM 8M5206* 26-12-2010 COL NS <t< td=""><td>104402</td><td>20-3-2010</td><td>COL</td><td>SP</td><td>ERY, TET, CIP, GM, RIF</td><td>VAN, SXT</td></t<>	104402	20-3-2010	COL	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
05210 7-5-2010 INF SP ERY, TET, CIP, GM, RIF VAN, SXT 04803 19-6-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 04509 27-8-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 8M4808* 29-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4811* 8-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4812* 23-12-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT 8M4813* 28-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M5201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT 8M5203* 17-2-2011 COL NS ERY, TET UAN, SXT 8M5204* 20-2-2011 INF NS ERY, TET VAN, SXT, RIF, CIP, GM 8M5206* 24-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 8M5207* 23-3-2010 COL NS	104411	12-4-2010	INF	WS	ERY, TET, CIP, GM, RIF	VAN, SXT	
04803 19-6-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 04509 27-8-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 3M4808* 29-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 3M4811* 8-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 3M4812* 23-12-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT 3M4813* 28-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 3M5201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 3M5203* 17-2-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT, RIF, CIP, GM 3M5204* 20-2-2011 INF NS ERY, TET, GM VAN, SXT, RIF, CIP, GM 3M5206* 24-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 3M5208* 13-11-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT 3M4810* 20-11-2010	104412	16-4-2010	COL	SP	ERY, TET, CIP, RIF	VAN, SXT, GM	
0.04509 27-8-2010 INF WS ERY, TET, CIP, GM, RIF VAN, SXT 3.04808* 29-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 3.04811* 8-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 3.04812* 23-12-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT 3.04813* 28-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 3.045201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 3.045203* 17-2-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT, RIF, CIP, GM 3.045204* 20-2-2011 INF NS ERY, TET, GM VAN, SXT, RIF, CIP, GM 3.045205* 24-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 3.045206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 3.04810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF, CIP, GM 3.04820*	105210	7-5-2010	INF	SP	ERY, TET, CIP, GM, RIF	VAN, SXT	
8M4808* 29-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4811* 8-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4812* 23-12-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT 8M4813* 28-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M5201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M5203* 17-2-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 8M5204* 20-2-2011 INF NS ERY, TET, GM VAN, SXT, RIF, CIP, GM 8M5205* 24-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 8M5206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 8M5208* 13-11-2010 INF NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4810* 20-11-2010 COL NS ERY, TET VAN, SXT, RIF, CIP, GM 8M5207* 23-3-2011 COL	104803	19-6-2010	INF	WS		VAN, SXT	
8M4811* 8-1-2011 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4812* 23-12-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT 8M4813* 28-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M5201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF 8M5203* 17-2-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 8M5204* 20-2-2011 INF NS ERY, TET, GM VAN, SXT, RIF, CIP, GM 8M5205* 24-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 8M5206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT 8M5208* 13-11-2010 INF NS ERY, TET, CIP, GM VAN, SXT, RIF 8M4810* 20-11-2010 COL NS ERY, TET VAN, SXT, RIF, CIP, GM 8M5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	104509	27-8-2010	INF	WS	ERY, TET, CIP, GM, RIF	VAN, SXT	
SM4812* 23-12-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT SM4813* 28-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM5201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM5203* 17-2-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5204* 20-2-2011 INF NS ERY, TET VAN, SXT, RIF, CIP, GM SM5205* 24-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5208* 13-11-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT SM4810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM4808*	29-1-2011	COL	NS		VAN, SXT, RIF	
SM4813* 28-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM5201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM5203* 17-2-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5204* 20-2-2011 INF NS ERY, TET VAN, SXT, RIF, CIP, GM SM5205* 24-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT, RIF, CIP SM5206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5208* 13-11-2010 INF NS ERY, TET, CIP, GM VAN, SXT SM4810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF, CIP, GM SM4804* 6-1-2011 COL NS ERY, TET VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM4811*	8-1-2011	COL	NS	ERY, TET, CIP, GM	VAN, SXT, RIF	
SM5201* 29-12-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM5203* 17-2-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5204* 20-2-2011 INF NS ERY, TET VAN, SXT, RIF, CIP, GM SM5205* 24-12-2010 COL NS ERY, TET, GM VAN, SXT, RIF, CIP SM5206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5208* 13-11-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT SM4810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF, CIP, GM SM4804* 6-1-2011 COL NS ERY, TET VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM4812*	23-12-2010	INF	NS	ERY, TET, CIP, GM, RIF	VAN, SXT	
SM5203* 17-2-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5204* 20-2-2011 INF NS ERY, TET VAN, SXT, RIF, CIP, GM SM5205* 24-12-2010 COL NS ERY, TET, GM VAN, SXT, RIF, CIP SM5206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5208* 13-11-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT SM4810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF, CIP, GM SM4804* 6-1-2011 COL NS ERY, TET VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM4813*	28-12-2010	COL	NS	ERY, TET, CIP, GM	VAN, SXT, RIF	
SM5204* 20-2-2011 INF NS ERY, TET VAN, SXT, RIF, CIP, GM SM5205* 24-12-2010 COL NS ERY, TET, GM VAN, SXT, RIF, CIP SM5206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5208* 13-11-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT SM4810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM4804* 6-1-2011 COL NS ERY, TET VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM5201*	29-12-2010	COL	NS	ERY, TET, CIP, GM	VAN, SXT, RIF	
SM5205* 24-12-2010 COL NS ERY, TET, GM VAN, SXT, RIF, CIP SM5206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5208* 13-11-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT SM4810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM4804* 6-1-2011 COL NS ERY, TET VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM5203*	17-2-2011	COL	NS	ERY, TET, CIP, GM, RIF	VAN, SXT	
SM5206* 26-12-2010 COL NS ERY, TET, CIP, GM, RIF VAN, SXT SM5208* 13-11-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT SM4810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM4804* 6-1-2011 COL NS ERY, TET VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM5204*	20-2-2011	INF	NS	ERY, TET	VAN, SXT, RIF, CIP, GM	
SM5208* 13-11-2010 INF NS ERY, TET, CIP, GM, RIF VAN, SXT SM4810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM4804* 6-1-2011 COL NS ERY, TET VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM5205*	24-12-2010	COL	NS	ERY, TET, GM	VAN, SXT, RIF, CIP	
SM4810* 20-11-2010 COL NS ERY, TET, CIP, GM VAN, SXT, RIF SM4804* 6-1-2011 COL NS ERY, TET VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM5206*	26-12-2010	COL	NS	ERY, TET, CIP, GM, RIF	VAN, SXT	
SM4804* 6-1-2011 COL NS ERY, TET VAN, SXT, RIF, CIP, GM SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM5208*	13-11-2010	INF	NS	ERY, TET, CIP, GM, RIF	VAN, SXT	
SM5207* 23-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM4810*	20-11-2010	COL	NS	ERY, TET, CIP, GM	VAN, SXT, RIF	
	SM4804*	6-1-2011	COL	NS	ERY, TET	VAN, SXT, RIF, CIP, GM	
SM4409* 30-3-2011 COL NS ERY, TET, CIP, GM, RIF VAN, SXT	SM5207*	23-3-2011	COL	NS	ERY, TET, CIP, GM, RIF	VAN, SXT	
	SM4409*	30-3-2011	COL	NS	ERY, TET, CIP, GM, RIF	VAN, SXT	

Download English Version:

https://daneshyari.com/en/article/2863889

Download Persian Version:

https://daneshyari.com/article/2863889

<u>Daneshyari.com</u>