

\$SSUDLVDO RI \$QDO\WHV LQ WKH /DERUDWRU\  
1HHG \$VSDUWDWH \$PLQRWUDQVIHUDVH DQG 'L  
+HDG \$67 DQG 'LUHFW %LOLUXELQ LQ /DE 3DC

\*XUPXNK 6LQJK

'HSDUWPHQW RI 3DWKRORJ\ 8QLYHUVLW\ RI 0LVVRXUL .DQVDV &LW\ 6FKRRO RI 0HGLFLQH 7UXPDQ 0HGL

%RWK \$67 DQG \$/7 DUH OLYHU HQJ\PHV DQG DUH HOHYDWHG LQ FLUFXPVWDQFHV RI KHSDWRF\WH LQMXU\ \$/7 LV SUHVVHQW SUHGRPLQDQWO\ LQ WKH F\WRSODVP ZKHUHDV \$67 LV SUHVVHQW LQ F\WRSODVP DQG KHSDWRF\WH PLWRFKRQGULD DV ZHOO \$/7 LV SUHVVHQW PDLQO\ LQ OLYHU DQG NLGQH\ ZKHUHDV \$67 LV SUHVVHQW LQ PDQ\ RWKHU WLVVXHV LQFOXGLQJ KHUW VNHQHV PXVFOH NLGQH\ SDQFUHDV VSOHHQ OXQJV DQG UHG EORRG FHOOV \$67 FRQWHQW RI KHUW LV KLJKHU WKDQ WKDW RI OLYHU 7KH UHODWLYH FRQFHQWU RI \$67 DQG \$/7 LQ YDULRXV WLVVXHV LV SUHVVHQWHG LQ 7DEOH > @ \$/7 LV SUHVVHQW LQ KLJKHVW FRQFHQWUDWLRQ LQ WKH OLYHU IROORZHG E\ GHFUHDV\ DPRXQWV LQ NLGQH\ KHUW VNHQHWDO PXVFOH SDQFUHDV VSOHHQ OXQJV DQ UHG EORRG FHOOV 7KH \$/7 FRQWHQW LV PRUH WKDQ WZLFH DV KLJK LQ WKH OLY DV LQ WKH NLGQH\ ZKLFK WKH VFRQG ULFKHVW RUJDQ LQ \$/7 7KH KDOI OLIH RI \$/7 LQ VHUXP LV DERXW KRXUV DQG WKDW RI \$67 LV PXFK VKRUWHU KRXUV KRZHYHU PLWRFKRQGULD \$67 KDV D PXFK ORQJHU KDOI OLIH RI KRXUV 7KHU LV JUHDWHU FLUFDGLDQ YDULDELWLW\ LQ \$/7 OHYHOV WKDQ IRU \$67 \$67 OHYHOV LQFUHDVH PRGHWO\ ZLWK DJH ZKHUHDV \$/7 LV QRW DIIHFWHG E\ DJLQJ \$/7 OHYHOV DUH KLJKHU LQ PHQ WKDQ LQ ZRPHQ DQG PD\ EH IXUWKHU GHSUHVVHG E\ IHPDOH VH\ KRUPRQH V LQFOXGLQJ ELUWK FRQWURO SLOOV > @ 7KH XVXDO UHIHUHQFH UDQJHV IRU \$/7 DUH DQG LQ ZRPHQ DQG PHQ UHVSHFWLYHO\ DQG FRUHVSRQGLQJ YDOXHV IRU \$67 DUH DQG KRZHYHU LQIRUPDOO\ XQLWV LV XVHG DV WKH XSSHU OLPLW IRU ERWK DQDO\WHV > @

7LVVXH	\$67	\$/7
+H DUW		
/LYHU		
6NHQHWDO PXVFOH		
.LGQH\		
3DQFUHDV		
6SOHHQ		
/XQJV		
5HG %ORRG &HOOV		

**7DEOH** 5HODWLYH \$67 DQG \$/7 FRQWHQW RI YDULRXV WLVVXHV 7KH HQJ\PH FRQFHQWUDWLRQ RI VHUXP LV WDNHQ WR EH XQLW\ RU RQH > @ 5HODWLYH WLW FRQWHQW RI \$67 DQG \$/7 ZLWK VHUXP FRQFHQWUDWLRQ WDNHQ DV RQH

7KH XSSHU OLPLW RI QRUPDO IRU WRWDO ELOLUXELQ LQ DGXOWV LV JHQHUDO DFFHSWHG WR EH PJ G/ WKRXJK VRPH VRXUFHV OLVW WKH XSSHU OLPLW WR EH DV KLJK DV PJ G/ > @ 7KH QRUPDO OHYHOV RI GLUHFV ELOLUXELQ DUH FRQVLGHUHG WR EH > @ 7KHVH YDOXHV UHIHU WR PHWKRGV XVLQJ WKH GLDJR UHJDJHQWV WKDW PHDVXUH GLUHFV DQG LQGLUHFV ELOLUXELQ QRW FRQMXJDWHG DQG XQFRQMXJDWHG ELOLUXELQ VSHFLILFDOO\ > @ ,I FRQMXJDWHG ELOLUXELQ LV PHDVXUH VSHFLILFDOO\ PRVW KHDOWK\ LQGLYLGX KDYH YLUWXDOO\ XQGHWHFVDEOH OHYHOV RI FRQMXJDWHG ELOLUXELQ > @

5HVXOWV IRU WRWDO DQG GLUHFV ELOLUXELQ WHVWLQJ GRQH RYHU VL[ PRQW  
 ZHUH DOVR H[WUDFWHG 7KH UHVXOWV IRU GLUHFV ELOLUXELQ IRU LQVWDQFH  
 ZKLFK WRWDO ELOLUXELQ UDQJHG IURP WR PJ G/ PJ G/  
 PJ G/ PJ G/ DQG JUHDWHU WKDQ PJ G/ ZHUH VWUDWLILHG 7KH  
 QXPEHU RI GLUHFV ELOLUXELQ YDOXH DW PJ G/ PJ G/ PJ G/  
 DQG ! PJ G/ ZHUH LGHQWLILHG IRU HDFK RI WKH VXEJURXS RI WRWDO  
 ELOLUXELQ UHVXOWV

<U	1XPEHU RI 0HHWLQJ FULWHULD	1XPEHU RI HSLVRGHV PHHWLQJ IRU FKDUW	3DWLHQW FULWHULD UHVLHZ	8QLTXH PRQWK
\$SULO				

0D\

-XQH

-XO\

\$XJXVW

6HSWHPEHU

7RWDO

0HHWLQJ

FULWHULD

8QLTXH 3DWLHQW  
LQ GDWD VHW



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\$OFRKRO QRW WKH SULPDU\ FDXVH RI \$67 DQG \$/7 DQRPDO\

7RWDO 0&9 GDWD DYDLODEOH/ LQ  
LQ

+'/ GDWD DYDLODEOH/ G/ LQ  
LQ

RI WKH FDVHV KDG KLVWRU\ RI DOFRKRO LQWDNH HYHQ WKRXJK DOFRKRO ZDV MXGJHG  
WR EH QRW WKH SULPDU\ FDXVH RI \$67 \$/7 DQRPDOLHV \$OO IRXU FDVHV KDG KLVWRU\  
RI DOFRKRO LQWDNH HYHQ WKRXJK DOFRKRO ZDV MXGJHG WR EH QRW WKH SULPDU\ FDXVH  
\$67 \$/7 DQRPDOLHV

'LVFXVVLQR

\$V VWDWHG LQ WKH LQWURGXFWLRQ UXOHV IURP WKH &HQWHUV IRU OHGLFDU  
DQG OHGLFDLG 6HUYLFHV KDYH OHG WKH ODERUDWRULHV LQ WKH 86 WR WHVW I  
VHYHQ DQDO\WHV LQ WKH &06 DSSURYHG OLYHU SDQHO HYHQ LI UHVXOWV RI D  
WKH DQDO\WHV DUH QRW FOLQLFDOO\ QHHGHG > @ 7KH LQFOXVLRQ RI \$67 LQ W  
DQG FRPSUHKKHQVLYH PHWDEROLF SDQHO LV EHLQJ TXHVWLRQHG DV WKH HQJ\PH  
LV QRW OLYHU VSHFLILF > @ 2QH RVWHQVLEOH UHVRQ IRU LQFOXGLQJ \$67 LQ  
WKHVH SDQHOV LV WR DOORZ GHWHFWLRQ RI KHSDWRF\WH LQMXU\ GXH WR DOF

RI URXWLQH \$67 DQG GLUHFW ELOLUXELQ WHVWLQJ DV SURSRVHG WKLV KDV W