



\$WKHURVFOHURVLV 2SHQ \$FFHVV

5HVHDFK \$UWLFQ

20, &6 ,QWH

" \$POTFDVUJWF 4FSJFT PG BMM 4VCUZQFT PG 1BUJFOU "ENJUUF UP BO "DBEFNJD \$SPPOBSZ

+RRUZHJ \$- *UXQGHNHQ 0-' 9DQ GH +RHI 73 +HQULTXHV -36 3HWHUV 5-* 3LHN -- GH :LQWHU 5- %DDQ
 \$0& +HDUWFHQWHU \$FDGHLF 0HGLFDO &HQWHU 8QLYHUVLW\ RI \$PVWHUGDP 7KH 1HWKHUODQGV
 &RUHVSRQGLQDD&WKROU 9LV \$0& +HDUWFHQWHU \$FDGHLF 0HGLFDO &HQWHU 8QLYHUVLW\ RI \$PVWHU
 1HWKHUODQGV 7HO)D[(PDLO P P YLV#DPF XYD QO
 5HFHLYHG6&SWHPEHU \$FFHSHWHG6&SWHPEHU 3XEOLVKHG&DREHU
 &RSULJKW +RRUZHJ \$- HW DO 7KLV LV DQ RSHQ DFFHVV DUWLFQ GLVWULEXWHG XQGHU WKH WHU
 XQUHVWULFWHG XVH GLVWULEXWLRQ DQG UHSURGXFWLRQ LQ DQ\ PHGLXP SURYLGHG WKH RULJLQDO D

\$EVWUDFW

2EMHFLLWV\OH LV NQRZQ RI WKH LQ KRVSLLWDO PDQDJHPHQW DQG RXWFRPHV RI
 \$&6 SDWLHQWV DGPLWWHG WR DQ DFDGHLF FRURQDU\ FDUH XQLW && :H WK
 KRVSLLWDO PDQDJHPHQW DQG FRPSOLFDFWLRQV LQ DQ XQVHOHFWHG \$&6 FRKRUV

0HWKRGV DQG, QHWKOWUHWURVSHFWLYH REVHUYDWLRQDO FRKRUV VWXG\ ZH
 SDWLHQWV GLYLGHG LQ VXEJURXS RI 67VHJPHQW HOHYDWLRQ P\RFDUGLDO
 167(0, Q DQG XQVWDEOH DQJLQD 8\$ Q DGPLWWHG WR RXU && \$Q LC
 RI \$&6 SDWLHQWV 67(0, 167(0, 8\$ S 167(0, SDWLHQWV Z
 VFRUH ! FRPSDUHG WR " ZHUH OHVV IUHTXHQW\ WUHDWHG ZLWK SHUFWDQHI
 S DQG PRUH IUHTXHQW\ ZLWK FRURQDU\ DUWHU\ EISDV JUDIWLQJ &
 2YHUODO LQ KRVSLLWDO PRUWDOLW\ ZDV DW GLVFKDUJH IURP WKH &&
 DQG UHVSHFWLYHO\ ,Q KRVSLLWDO UH LQIDUFWLRQV RFFXUUHG LQ VW
 RI SDWLHQWV 0DMRU DGYHUVH FDUGLDF DQG FHUHEURYDVFXODU HYHQWV 0\$&&(H
 HYHQWV 1\$&(LQ \$JH IHPDOH JHQGHU SUHYLRXV VWURNH DQG FKURQLF NL
 ZLWK KLJKHU RQH \HDU PRUWDOLW\

&RQFOXVLRQFRQVHFHWLYH DQG XQVHOHFWHG \$&6 FRKRUV FRPSULVHG 67(0,
 8\$ SDWLHQWV ,QGHSHQGHQW RI \$&6 VXEW\SH DQG *5\$&(ULVN VFRUH DERXW RI
 VWUDWHJ\ \$JH IHPDOH JHQGHU SUHYLRXV VWURNH DQG &.' ZHUH DVVRFDFWLYH

.H\ZRUGVFXWH FRURQDU\ \IQQGURPH \$FXWHVWUHWURVSHFWLYH LQ DQ XQVHOHFWHG \$&6 FRKRUV
 &RURQDU\ FDUH XQLW *5\$&(ULVN VFRUH DERXW RI \$&6 VXEW\SH DQG *5\$&(ULVN VFRUH DERXW RI
 SUHYHQWLRQ ,Q KRVSLLWDO PDQDJHPHQWV LQ DQ XQVHOHFWHG \$&6 FRKRUV
 FDUGLDF ELRPDUNHUV \$&6 KDV EHHQ F
 HOHYDWLRQ P\RFDUGLDO LQIDUFWLRQ 67
 0HGLFDO &HQWHU %0, %RG\ 0DVV ,QGH
 P\RFDUGLDO &RURQDU\ \$UWHU\ 167(0, DQG XQV
 %\SDV\MDVLQ&S* &RURQDU\ \$QJLRJUDSKV O&D&K QDENQRZQ RI WKH LQ KRVSLLW
 &DWKHHWHULJDWLRQ /DERUDWU\ && &RURQDU\ DQJLQDQV\1 Z&RQVODVW KUH
 ,QGXFHG 1HSKURSDWK\ &.' &KURQLF DQJLQDQV\1 Z&RQVODVW KUH
 3DLQ 8QLW &9' &DUGLRYDVFXODU 'LVHIDUJHFW \$JLQDQV\1 Z&RQVODVW KUH
 HUDS\&* (OHFWURFDUGLRJUDP (' (RUVHOHFWLYH \$&6 P\FRURUV 2XU REVHU
 H*)5 HVWLDPDWHG *ORPHUXODU)LOWUDWLRQV \$UWHU\ 5\$ULH OREDSOHLQWU\ ZLWK
 RI \$FXWH &RURQDU\ (YHQWV KV7URS7 DQJLQDQV\1 Z&RQVODVW KUH
 ,QWHUTXDULWLOHVSODQHULRS 'HVFHQGLQJ Q&W\LDWU\WKH URXWH RI \$&6 SDWL
 \$GYHUVH &DUGLDF \$QG &HUHEURYDVFXODU Q&D&KDUWHU\ 6NHLRQSDWLQDQV\1 Z&RQVODVW KUH
 &OLQLFDO (YHQWV 167(\$&6 1RQ 67 6HJPHQW (OHYDWLRQ
 &RURQDU\ 6IQQGURPH 167(0, 1RQ 67 6HJPHQW (OHYDWLRQ
 0\RFDUGLDO ,QIDUFWLRQ 3&, 3HUFWDQHRXV &RURQDU\ ,QWHUYHQWLRQ 6'
 6WDQGDUG 'HYLDWLRQ 67(0, 67 VHJPHQW (OHYDWLRQ 0\RFDUGLDO
 ,QIDUFWLRQ 7,\$ 7UDQVLHQW ,VFKHLPLF \$WWDFN 8\$ 8QVWDEOH \$QJLQD
 6WXG\ SRSXODWLRQ

,QWURGXFWRQ ,Q WKLV UHWURVSHFWLYH REVHUYDWLRQ
 RQVHFHWLYH \$&6 SDWLHQWV DGPLWWHG
 H DFXWH FRURQDU\ \IQQGURPH \$&6 LV D FDUGLDFDVFXODU VSHFWLYH
 LVFKHLPLF GLVHDVHV ZLWK SRWHQWLDOO DQG VHYDPERUJHWHQW GLYEQDGLJH
 GHDWK \$OWKRJK FOLQLFDO SUHVHQWUHWURVSHFWLYH WKH GLYEQDGLJH
 UHFRUG RI WKH SDWLHQWV ZLWK \$&6 GDUJH

3DJH RI

VHJPHQW HOHYDWLRQ DFXWH FRURQDU BUWDQGWR GHdWD1Z7U\$ & BROZHFVHG DW
FODVWKH GSDWLHQW EDVHG RQ WKH DYRPOWKEKH(X&VLEDC 3MURSRDQDQSHFRUGV
3DWLZHLQW\ HOKYDMHGOVWWBSR QKORSIURP 6HFRQGDUI\ HQGSRLQWV LQFOXGHG WKH I
RWKHU FRQGLWLRQV ZHUH H[FOXGHG

% DV FOKLQD FVZ HURHAWWDLBONHGO FLO LULFFDJSU GY H URXWH RI \$&6 SDWLHQWV WR RXU
GHWDLOHG OLVW RI WGH\EDLWHORLGH H FRKXDG FLVQH ULV WLFV GHYVWLQDPHLB 8 OGGPLVLRQ ZHUH UHJLVWHU
2QOLQH \$SSHQGL[\$ RI VWLWRQ WKH &&8 ,Q KRVSLWDO HYHQV
PHGLFDO UHFRUGV DQG LQFOXGHG PRUWD

6HWWLQJ

LVVWXG\ ZDV SHUIRUPHG DW DQ DFD &HP LRQ &XU \$FDG HP VFKH HJGLFD RXU LQVWLW
&HQW\$OU 8QLYHIS \$PWWHUED DAWKHU,WDQG QZDLWLQJ IRU 3&, RU &\$%* LH LI D FRPS
OD WIHU WHD WLVHER VS KI UFXWERURRXY WHUYH (KWSLWDBH) QKRVSLWDO WUDQVIHU WR D UI
3&, DROG VIE WUHGVLDFJ HJALOS \$WLKAWL FRHWKH QR ORQJHU FRQVLGHUHG DQ LQ KRVSLWDO
UHJLVVW EDMLORERO R ODJUWHSJDUV D V \$S %*)RU FRPSRVLWH HQG SRU QWZ HU BXNRHGO ROZ
ZLWKRXY YDOYH YR DQ EN DZD Z &a YROX E UHTDLEJ QRW UHG BYOHGFRR GLSQ* WZD WK
RI ZKLFK a SULPDU\ 3& , WKH +25, =216 \$0, +DUPRQLJLQJ 2XV
\$HYDVFODUL]DWLRQ DQG 6WHQWV LQ \$FX

: H DWPEHGQGH Q SUH (KRWLWDBY ZRWKH \$&7 < \$FXWH &DWKHWHUL]DWLRQ DQG
GLDJQRVLV LNE DORHQ K * DQSKVIFRPS OD \$&7 < \$FXWH &DWKHWHUL]DWLRQ DQG
WKH SDWLHQW LV SUH WUHDWHG LQ DPEWDDWH\ZLW@ LVWLDQYHQXYV WKHS DUE KR
,8 DQG DQWLS WKW HOSB DQ GURX JWKH FOHHGLQJ DFFHVV VLWH KHPRUUKDJH UH
FDWKHWHUL]DWLRQ ODERUDWRU\ FDWKH WUHEWEGHOFWKHPWRPRQ DAVJYKH VXF V X
\$VHWLP DUX QFRPS GIZFDSHGH DUHUV DQ WRUG HBS RI a PPRO O JGO ZLWK DQ RYH
UHIHUULQD KIRX SUKRXUV REVHUYDWLRQ GURSRXU a && PPRO WDEHG GO ZLWKRXY DQ
67(0, SDWLHQWV KDYH ORQJHU REVHUY DSWLRORQRXIB & FOHHGLQJ RU WKH XVH
ZLWK WKH H[FOXVLRQ RI &\$%* UHODWHG E

3DWLZHLQW SHIBW H \$DUIH WWRQV KKH HSDW QSO, LQYHVWLJDWRUV ZH DOVR UHSRUWHG
XQLW &38 'XWFK c(HUVVH +DUW +XOSd \$ %* LPHGHG EOHHGLQJ ORBLW DQYHU
HYDOXDWHB \$D KWD\GLW KUVHEH WZBHQ 1FY HQWV 0\$&(& FRPSULVH LQ KRVSLW
DQES > @ \$ UHS KURRS ODORHUV BISS E URUW UH LQIDUFWLRQ DQG VWURNH ZLWKRXY
QRUPDO WJ QRQLW QIR WHEGH OHYDMFH XCOVY \$(& ZGHHQBQ WKH FRPSRVLWH RI LQ KR
EHWZHHQDQG WJ OODW FWHUWH VS RWXSHY LBX YMRU EOHHGLQJ QRW UHODWHG WR &\$%*
QRQKRV S7R ZHLRUGH WHEZVU BDCWVRDQ S7KHUH
KRXODS HURVH B D LFRQLV VBUHGHYDQGH SVHWUUDWLEF DRQLR QHDU PRG WODIDVGRZH
PDN WVGLDJQR B V (LOLNH HX D HYDOXH WJ O DZLFDK ZHUH DVRFLDWHG ZLWK KLJKHU RG
DEVROXWRV (HDU VXUYLYDO *HQGHU ZDV UHODWHG W
RQH \HDU PRUWDOLW\ DQG VXUYLYDO LQ D

3DWLZHLQW HL DJ ZLW H 67 (\$86UM-X EPLW W W KHG
& &8DQV UH D W H G 7DQG QWLFRDD R FDUMARCOH DWDDQDO\VLV
JXLGH Q LG H YDULLV NRVVV WDQGF XUPRIQWU G LDO
LQIDUEV D QXOXDW KH S \$(*OR B EOLRMS \$ FXWH &RQLQRRXV YDULDEOHV ZHUH FRPSDUH
&RURQD H QWLWFRJ H W B EOH HGLQV LW KH YDULDQFH \$129\$ DQG WKH LQGHSHQGH
&586 \$(& D QD SUGV W UDW B B O W D R Q S H L H Q W W W U L E X W L R Q RU WKH .UXVND0 :DOOLV
6XSSUSHY MURRWFRZLHW DUOPSOHPHQRWDMHVRQHZHG GLVWULEXWLRQ &DWHJRULFDO I
\$& \$+\$ JXLGHOLQHV EOHHGLQJ ULVN VFRWKH @ KL VTXDUH WHVW 2QH \HDU PR
DSODQ OHLHU PHWKRG \$00 WHVWVQZHFOD
HFKRWBSHUIRQV KHLPRQD LQDIS SVHDFK LIS @ CE 6WDWLVLWLFDO DQDO\VLV
XUJFRWR ODU LRJUSSK\ KRXH DUCS* LI S @ CE 6WDWLVLWLFDO DQDO\VLV
KRXUV RU &\$* KRXUV ZLWK RU ZLWKRXY %0 DG KRF 3&, a LQ 167(\$&6
SDWLZHLQW QMLKF URHWHORVW HSKGLVQEIDDV B KW
JXLGHOLQHV > @ 5HVXOWV

(QGSRLQWV

%DVHOLQH FKDUDFWHULVWLVV

UH SULP D QGS Z H O W V S H F A U H G W P H D W H \$ \ W R W D O R I S D W L H Q W V Z H U H D G P L W
GXULQJ WKH FXUUHQW KRVSLWDO DGPLVLRQ RQ ZLW R \$ &6 E H G Z H R Q W D O L W \ D Q G
RQH \H D U W C H W W H D W P H Q W F Q D V L Q P H R G L F 67 (0 , 167(0, DQG H B B D Q W
WUHDWPHQW RQO\ RU DQ LQYDVLVH VUDJHV V \$ L Q D U M Y Z L W W U D W H R I Z O K H I S D W
VSHFLRQSRQO & & \$ % D Q G \$ H Y D V F X O D L J D W L R Q , S D W L H Q W V Z H U H \ R Q J H U X V H O G S H R U
D Q G R U 3 \$ % D W P H Q W V W U D W H J L H V Z H U H F R E S B Y H G F E A W Z H H O H Q W K F U R S D U H G W R
*5\$& (ULVN VFRUH RQ DGPLVLRQ IRU E C H R W S I Q W D B Q G N B R Z H G W H Q G L O K Z H V W S U
WR LQWHUPH * S B W F R O M N 167(\$ S D W L H Q W G L D E H W H V P H O O L W X V L Q W K H \$ 8 J U R

&LWDWLRQZUZHJ \$- *UXQGHNHQ 0-' 9DQ GH +RHI 73 +HQULTXHV -36 3HWHUV 5-* HW DO
 \$FXWH &RURQDU\ 6\QGURPH 3DWLHQW \$GPLWWHG WR DQ \$FDGHPLF &RURQDU\ &DUH 8

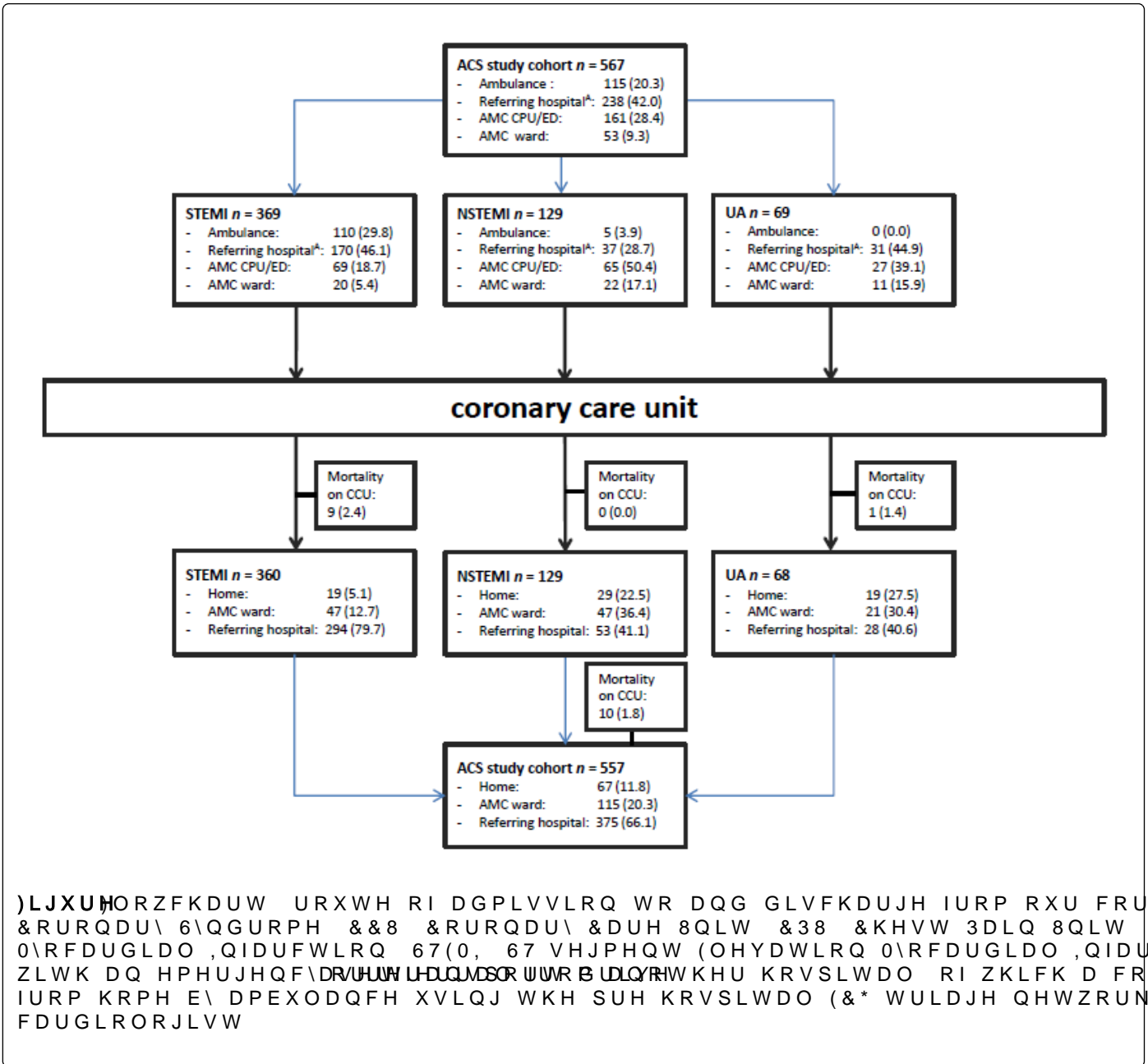
3DJH RI

	\$&6 VWXG\ FRKRUV	67(0,	167(0,	8\$	3 YDOXH
	Q	Q	Q	Q	
3DWLHQW FKDUDFWHULVWLFV					
\$JH \HDUV ± PHDQ " 6'	"	"	"	"	
ODOH JHQGHU ± Q					
&DUGLRYDVFXODU PHGLFDO KLVWRU\					
&DUGLDF\$SDWLHQW					
0\RFDUGLDO LQIDUFWLRQ ± Q					
3&, ± Q					
&\$%* ± Q					
\$WULDO ILEULOODWLRQ ± Q					
3HULSKHUDO YDVFXODU GLVHVV ± Q					
6WURNH 7,\$ ± Q					
&DUGLRYDVFXODU ULVN IDFWRUV					
3DVW DQG FXU\HQRV VPRNHUV					
'LDEHWHV PHOOLWXV ± Q					
+ \SHUWHQVLRQ ± Q					
)DPLO\ KLVWRU\ IRU &9' ± Q					
+ \SHUFKROHVWHUROHPLD ± Q					
%0± PHDQ " 6'	"	"	"	"	
&KURQLF NLGQH\ GLVHVV					
H*)5 PO PLQ ± Q P					

7DEOH% DVHOLQH FKDUDFWHULVWLFV \$&6 \$FXWH &RURQDU\ 6\QGURPHDVLQ' %RG
 &DUGLRYDVFXODU 'LVHVV H*)5 HVWLDPWHG *ORPHUXODU)LOWUDWLRQ 5DW
 3HUFXWDQHRXV &RURQDU\ ,QWHUYHQWLRQ 6' 6WDQGDUG 'HYLDWLRQ 67(0, 67
 \$WWDFN 8\$ 8QVWDEOH \$QJLQD \$ &DUGLDF SDWLHQW D SDWLHQW ZLWK RQH R
 Q 67(0, Q 167(0, RU Q 8\$ & 0LVVLQJ IRU Q \$&6 Q 67(0, Q
 GLVHVV FKURQLF NLGQH\ GLVHVV PHQWLRQH G LQ W KH PHGLFDO RQ VORU G D Q
 FXUHQW DGPLVLRQ PRSDUFDUFDUHG ZLWK DQ GLVHVV HTXDWLRQ

5RXWLQJ RI SDWLHQW WKH DPEXODQFH SHUVRQQHO DQ 3 KRHUH
 HPHUJHQF\ GHSDUWPHQW VKRFN URRP ZI
 IRU RI \$&6 SDWLHQWV DQG DQRWKHU
 \$&6 SDWLHQW
 PRUH LQWHQVLYH KRVSLOWO PDQDJHPHQW IRU \$&6 SDWLHQWV LQ RXU UHJLRQ
)LJXUH }VKQH RI \$&6 SDWLHQWV FDPH GLUHFVO\ IURP KRPH
 E\ DPEXODQFH ORVW \$&6 SDWLHQWV +HPRZHQDUFUDQVSRUWHG1WR \$&6USDWLH
 &&8 E\ DPEXODQFH ZLWK DQ HPHUJHQFH PRDUEHUORVSRUWHGDFIXODUJDWLRQ LQG
 IURP DQRWKHU KRVSLOWO RI ZKLFK S UFRCHQDUFUDQ 3DURV RUWSRQ SDWLHQWV
 SDWLHQWV ZDV DFWXDOO\ WUDQVIRUURG PGEU DUFUDQ RPH ZEDLWREXJODUFW
 XVLQJ WKH SUH KRVSLOWO (& WULDJHZHUW DGPLWZLWK EHRQDXXCHRWLRQHEHVKZHH

\$WKHURVFOHU 2SHQ \$FFHVV DQ RSHQ DFFHVV MRXUQDO 9ROXP k ,VVXH k



)LJXUH\HORZFKDUW URXWH RI DGPLVLRQ WR DQG GLVFKDUJH IURP RXU FRURQDU
 &RURQDU\ 6\QGURPH &&8 &RURQDU\ &DUH 8QLW &38 &KHVW 3DLQ 8QLW (' (P
 0\RFDUGLDO ,QIDUFWLRQ 67(0, 67 VHJPHQW (OHYDWLRQ 0\RFDUGLDO ,QIDUFWLR
 ZLWK DQ HPHUJHQF\DRUHUW L\DUVSRUWR B\DUVWKHU KRVS LWDO RI ZKLFK D FRQVLG
 IURP KRPH E\ DPEXODQFH XVLQJ WKH SUH KRVS LWDO (&* WULDJH QHWZRUN ZLW
 FDUGLRORJLVW

7UHDWPHQW RI SDWLHQWV

(OHFWLYH 3&, FRPSOLFDWHG E\ \$&6 DFFRXLQW\IRXUHQW DGPLVLRQ LQ
 SDWLHQWV 2QO\ SDWLHQWV 67(0, FRPSDUW\SRZQ IURP 167(0, DQG
 LQWHQVLYH FDUH XQLW WR RXU &&8 S 7DEOH 167(0, DQG 8\$ SD
 OHVV IUHTXHQWO\ UHYDVFXODULJHG 3&, D SDWLHQWV ZDV S KRXUV \$ KLJKHU SURSRU
 LQWHUTXDUWLOH UDQJH ,45JL}FRURQDUV ZLW SDWLHQWV ZHUH UHYDVFXODULJ
 DGPLVLRQ IRU 67(0, SDWLHQWV PHGLDQ 67(0, SRXUWV 45 S KRXUV*5\$(& ULVN
 S PRVWO\ DZDLWLQJ IRU WUDQVIRU WR DRWKHU KRVS LWDO &RURQDUV &RURQDUV
 UHKDELOLWDWLRQV LQ 67(0, DQG 167(\$& 167(0, DQG 8\$ SDWLHQWV PDQDJ
 8\$ S 7DEOH DQG)LJXUH LQYDVLYH VWUDWHJ\ +LJK ULVN *5\$(& VFRUH ! 167(0, S
 FRPSDUHG WR ORZ WR LQWHQVLYH

&LWDWLRQ UZJHJ \$- *UXQGHNHQ 0-' 9DQ GH +RHI 73 +HQULTXHV -36 3HWHUV 5-* HW DO
 \$FXWH &RURQDU\ 6\QQGURPH 3DWLHQW \$GPLWWHG WR DQ \$FDGHPLF &RURQDU\ &DUH 8

3DJH RI

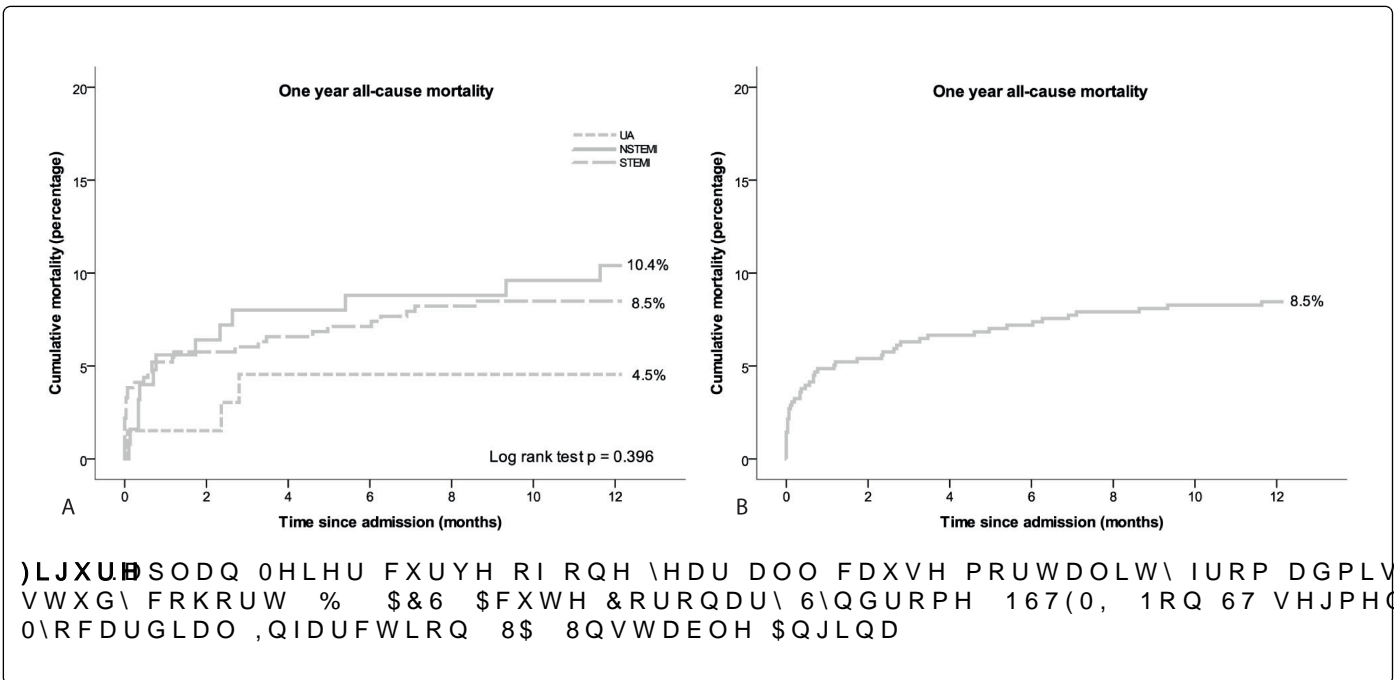
SDWLHQWV ZHUH OHVV IUHTXHQWO\ YUHDWHG ZLWK 8\$, SDWLHQWV ZLWK
 S DQG PRUH IUHTXHQWO\ ZLWK 8\$ WR © PDQDJHPHQW VWUDWHJ
 S +LJK ULVN SDWLHQWV HOSGRG 8\$% KDYH PRUH

	\$& VWXG\ FRKRUW	167(0,	8\$	3 YDOXH
	Q	Q	Q	
'XUDWLRQ RI VWD\ RQ &&8 KRXUV ±	PHGLDQ ,45			
7UHDWPHQW VWUDWHJ\				
OHGLFDO WUHDWPHQW RQO\ ± Q				
,QYDVLYH VWUDWHJ\ ± Q				
&\$* RQO\ ± Q				
3&, ± Q				
&\$%* ± Q				
5HYDVFXODULJDWLRQ ± Q				

7DEOH KRVSLWDO WUHDWPHQW \$& \$FXWH &RURQDU\ 6\QQGURPH RWRQ\$% \$QRURQDU\
 &RURQDU\ &DUH 8QLW ,45 ,QWHUTXDUWLOH 5DQJH 167(0, 1RQ 67 VHJPHQW (O
 ,QWHUYHQWLRQ 67(0, 67 VHJPHQW (OHYDWLRQ 0\RFDUGLDO ,QIDUFWLRQ 8\$ 8QV

&OLQLFDO RXWFRPHV

ORUWDOLW\ DW GLVFKDUJH IURP WKH +RFRZDKDJLF DQGU DNH KRZSLWKHO FDXVH
 GLVFKDUJH LW ZDV 7DEOH DQG YLHXBHQDW&RVRM RUHLQWFRMSW WLOO WKH
 GHDWK ZHUH FDUGLDF IDLOXUH LQ SDWERYHU 167(0,RWK 67(0,SDW 8\$ QWV 67(0,
 FDUGLDF IDLOXUH FRPELQHG ZLWK D FRPHU PRDULDFOLWR FZVLQ SDWUHQW LQJ
 67(0, DQG FDUGLDF IDLOXUH FRPELQHG ZLWK DFRWVW LQ 67(0,SDWLHQWV ZDV
 167(0, DQG LQ 8\$ SDWLHQWV S



)LJXUB SODQ 0HLHU FXUYH RI RQH \HDU DOO FDXVH PRUWDOLW\ IURP DGPLVVLRQ
 VWXG\ FRKRUW % \$& \$FXWH &RURQDU\ 6\QQGURPH 167(0, 1RQ 67 VHJPHQW (O
 0\RFDUGLDO ,QIDUFWLRQ 8\$ 8QVWDEOH \$QJLQD

H LQ KRVSLWDO UH LQIDUFWLRQ UDVLQIDUFWLRQ QG @UHDVQ MKRFZOLRQV 7DEOH
 FODVVLFRUGLQJ WR WKH}WKUHQFRGDFRQDO 167(0, DQG 8\$ SDWLHQW
 KRVSLWDO DGPLVVLRQ S %OHHGLQ

\$WKHURVFOHU 2SHQ \$FFHVV DQ RSHQ DFFHVV MRXUQDO 9ROXP k ,VVXH k

&LWDWLRQ UZHZJ \$- *UXQGHNNHQ 0-' 9DQ GH +RHI 73 +HQULTXHV -36 3HWHUV 5-* HW DO
 \$FXWH &RURQDU\ 6\QGURPH 3DWLHQW \$GPLWWHG WR DQ \$FDGHPLF &RURQDU\ &DUH 8

3DJH RI

RI SDWLHQWV ZLWK DFFHVV VLWH EOHHS DWLHQWV UHVSROK KRVSLWDO PRYD
 RI WKHP ODMRU EOHHGLQJV QRW UHQDWHG WR R\$ \$ & R FDXVH QW LQWJF
 RI SDWLHQWV &\$%* UHODWHG QLFROUDLWHUHQFH WKH VXEJURXSV
 FRPPRQ LQ 167(0, FRPSDUHG WR 67(0, DQG 8\$

	\$&6 VWXG\ FRKRW	167(0,	8\$	3 YDOXH
	Q	Q	Q	
,Q KRVSLWDO RXWFRPHV				
2Q &&8 DOO FDXVH PRUWDOLW\ ± Q				
,Q \$0& DOO FDXVH PRUWDOLW\ ± Q				
5H LQIDUFWLRQ ± Q				
6SRQWDQHRXV W\SH ± Q				
6HFRQGDU\ WR LVFKHPLF LPEDODQFH W\SH ± Q				
3&, UHODWHG W\SH D ± Q				
,Q VWHQW WKURPERVLV W\SH E ± Q				
&\$%* UHODWHG W\SH ± Q				
6WURNH 7,\$ ± Q				
%OHHGLQJ ± Q				
&DXVH				
\$FFHVV VLWH ± Q				
)HPRUDO KHPDWRPD • FP ± Q				
)HPRUDO FP RU EUDFKLDO UDGLDO ± Q				
&\$%* UHODWHG ± Q				
*DVWUR LQWHVWLQDO ± Q				
1RQ JQDVWUR LQWHVWLQDO ± Q				
6HYHULW\				
:LWK • PPRO O +E GURS ± Q				
:LWK EORRG WUDQVIXVLRQ ± Q				
ODMRU EOHHGLQJ QRQ &\$%* UHODWHG ± Q				
ODMRU EOHHGLQJ LQFOXGLQJ &\$%* UHODWHG ± Q				
0\$&&(± Q				
1\$&(± Q				
GD\ RXWFRPH				
\$OO FDXVH\$ PRUWDOLW\				
2QH \HDU RXWFRPH				
\$OO FDXVH\$ PRUWDOLW\				

7DEOH OLQLFDO RXWFRPHV \$&6 \$FXWH &RURQDU\ 6UDQVIXVH &\$%* UHODWHG RQDHI\ 8\$
 ODMRU \$GYHUVH &DUGLDF DQG &HUHEURYDVFXODU (YHQWV 1\$&(1HW \$GYHUVH
 ,QIDUFWLRQ 3&, 3HUFXWDQHRXV &RURQDU\ ,QWHUYHQWLRQ 67(0, 67 VHJPHQW
 8QVWDEOH \$QJLQD \$ 0LVVLQJ IRU Q \$&6 Q 67(0, Q 167(0, RU Q 8\$

\$WKHURVFOHU 2SHQ \$FFHVV DQ RSHQ DFFHVV MRXUQDO 9ROXP k ,VVXH k

Stratification E\ RQH \H DU PRUWDOLW\ LQFRUSRUDWHG LQ WKH *5\$&(VFRUH LQ F
\$&6 SDWLHQWV GHFHDVHG DW RQH ZLWK KLJK RYHUDO UDWHV RI 3&, DQG &\$
VLJQL}FRDQ\ ZLWK VWDQGDUG GHYLDWLRQ SDWLHQWV DZLWKVD *5\$&(VFRUH
ZLWK 6' \H DU SRVHG HPRUH YRXU SRSXODWLRQ ZHUH OHVV IUHTXHQW
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,Q WKH FRPSOHWH \$&6 VWXG\ FRKRUW \$OWHUQDWLYH FRPSDUHG WR PDH
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H FXUUHQW XQVHOHFWHG \$&6 SRSXODWLRQ DGPLWWHG WR RXU DFDGHPLF
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167(0, DQG 8\$ SDWLHQWV 1 R W P D O P \$ & 6 S D W L H Q W V D O H J H Q G H U Z D V
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&38 ZLWK D PD[LXP REVHUYDWLRQ W D P H R U V K R X U Z H U P H D P L W K H E D W H G
WR D ZDUG 2Q WKH RWKHU HQG 67(0, SDWLHQWV ZLWK DOLWLYH W K R R P H P R A U K W Z O G H
RU WKRVH FRPLQJ LQWXEDWLRQV L Q X U L F K M U S L Q R X Q G R I J R W J H Y D V F X O D U L J D W L R Q C
LPPHGLDWHO\ WR WKH LQWHQVLYH FDUSULRUWUHQGHFRHDVH @DUHYHSHU DQ DGRUW
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H PDLQLRU WKL V REVHUYDWLRQDO V R X Q K L V G L D W R Q V G F S D Q D H W R P V L Q I H F
\$&6 VXEWISH DQG *5\$&(ULVN VFRUH K E K K W R Q H R H B B W P R H W D O Z W U J D W H V L Q
WUHDWHG ZLWK DQ LQYDVLVH VWUDWH FRPR \$ L G W L H V D Q G Q B Z H U & 5 D W H V R I U I
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VWXG\ FRKRUW

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67(0, SDWLHQWV VKRZH G D KLJKHU LQ K R X U S W O S D P R I U H Q D O L V L D Q G . 1 6 7 (0 , D Q L Q P
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DERXW ZHUH VLPLODU I H O P R K U W D O L Z R X W X E R N K S V D Q G D Q L Q G H S H Q G H Q W S U H G L
DUH FRPSDUDEOH ZLWK WKH OLWHUDWPRUWDOLW@ L O S W K S D J K L H Q W R X Y F R @ R L S W U
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*5\$&(ULVN VFRUH
FRQVHTXHQF H RI WKSURJ D Q V R L X N D E F D G H P L Q H O F O H & R Q V H T X H Q W O \ S D W L H Q W V
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PHGLDQ *5\$&(VFRUH EXW DOVR PRUH Q G L D P Y D R Q J H R X U L Q L X N D E F D G H P L Q H O F O H S O D F
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QRQ &&8 SRSXODWLRQV > @ K I S R S H U I X V L R Q D V D F R Q V H T X H Q F H R I P \

H *5\$&(ULVN VFRUH H G L H G M A R Z W H H Q 1 6 7 (0 , D Q 6 7 (0 , S D W L H Q W L Q Z K R P U H Q D O I X
SDWLHQWV WUHDWHG ZLWK D Q P L J K K R X E W D O Y D V L Y H V W U D W H J \ S U I P D F X W 3 &
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&LWDWLRU RUZHUJ \$- *UXQGHNHQ 0-' 9DQ GH +RHI 73 +HQULTXHV -36 3HWHUV 5-* HW DO
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+YHOS \$XDQD WLDX DG VHQ 0 5DVPXVVHQ -1 5DQPHYD WDRQ DFXWH FRURQDU\ V\QQGURPH UH
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+RHQL5'RXV-\$SURQ&H 6FRWW , \$ (DUO\ LERQ WLYCHV WHLQGXV FHG QH SKURSDWK\ LQ 67(0
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&' +H\G*6 .RFK .7 GH'ELMOW H D D H H V HW DO
\$OIUHGV&QD\DRQDQ)R[)\$HGULN VWRQO 5DQGRPLJHG WULDO FRPSDULQJ VDPH GD\ GU
,PSDFW RI DQ LQYDVLVH VWUDWHJ\ RQ \H D W D V R S H V F R P W D Q H F X H Q F R Q G Z R P H I Q Q W H U Y H Q W
ZLWK QRQ 67 VHJPHQW HOHYDWLRQ DFXWH ERQ R Q M S D W L V Q G W F P M X G \ \$ P 3 2 6 H D L W U F X O D W L R Q
.RFK 37LN GH :LQWHU 5- 'DYLQ * . 0XOGHU
6MDXZ 6WHJHQJD 1. (QJVWU,P \$(YDQ GHU W F K L P D I 5 K R 9 L V V O D R E H W O H D P O M M L H R Q F R U R Q D U \ D Q
HLQ~XHQFHHQGHU RQ VKRUW DQGHURQ & D W G H L R P O R X W F R P H
SULPDU\ 3&, DQG GHOLYHUHG PHGLFDO FQVW «YR\ / 65 V H D O H Q R Q R 6 H Q V R W L 5 R 9 E J T X H J - 0
P\RFDUGLDO LQIDUFWLRQ (XUR,QWHUYHQWLRQ DOJDGR)HUQEQQHJ - HW DO 6DIH
+XDQJ \$ODP+DP]H, KLUDGHLVZ\$ OHW DO 3SDWHLQV W V H D U O \ W R W K H W U U B R V U H Q D I R U Q S
ZLWK VHYHUH FKUREHLGHNURQHDGO V H D V H V F X H D E X V D V O L F R K V F R U R Q D U \ L Q W H U Y H Q W L R Q
DVHDFXWH FRURQDU\ V\QQGURPH ,QW - &DUGLRO
*ROGHQ E X E L U , P Q R D N R 9 L C O D R V X D H W D O 5 H O D W L R Q
EHWZHHQ UHQDO IXQFWLRQ DQG RXWFRPHV LQ SDWLHQWV ZLWK QRQ 67 VHJPHQW