+HDOWK 3ROLF\ IRU 0DULMXDQD

1RUPDQ 6 0LOOHU &(2 RI +HDOWK $GYRFDWHV 3//& (DVW /DQVLQJ 0, &OLQLFDO 3URIHVVRU RI 3V\FKLDWU\ 'HSDUWPHQW I
*HRUJLD 86$

'HSDUWPHQW RI 3V\FKLDWU\ &HQWUDO 0LFKLJDQ 8QLYHUVLW\ 86$

&RUUHVSRQGLQJ DXWKRU 1RUPDQ 6 0LOOHU &(2 RI +HDOWK $GYRFDWHV 3//& (DVW /DQVLQJ 0, &OL
&ROOHJH RI *HRUJH $XJXVWD 8QLYHUVLW\ $XJXVWD *HRUJLD 86$ 7HO (PDLO 1RUPDQ 0LO

GHELOLWDWLQJ PDULMXDQD DQG WKH LQFUHDVHG ULVN DQG LPSDLUPHQWV RI PDULMXDQD LQ WKH ZRUNSODFH ,PSRUWDQWO\ UHJXODU PDULMXDQD XVH OHDGV WR SHUVRQDO ORVV ORZHUHG VHOI HVWHHP ORZHU SURGXFWLYLW\ DQG LQFUHDVHG ULVN RI LQMXULHV DQG PD\ EH DVVRFLDWHG ZLWK D VKRUWHQHG OLIHVSDQ > @

8QGHUHPSKDVL]HG LV RWKHU DGGLFWLQJ GUXJ XVH LV FRPPRQ DQG PDULMXDQD E\ LWVHOI RU LQ FRPELQDWLRQ ZLWK RWKHU GUXJV LQFUHDVHV WKH ULVN RI PRWRU YHKLFOH DFFLGHQWV DQG IDWDOLWLHV GXH WR GHFUHDVHG SHUFHSWLRQ FRRUGLQDWLRQ DQG MXGJPHQW DQG XQLQWHQWLRQDO SHGLDWULFLQJHVWLRQ > @

5HODWLRQVKLSV EHWZHHQ SHUFHLYHG ULVN RI PDULMXDQD DQG KDUPIXO HIIHFWV

HUHVHHPV WR EH D FOHDU LQYHUVH UHODWLRQVKLS EHWZHHQ WKH SHUFHSWLRQ RI ULVN DQG PDULMXDQD XVH SDUWLFXODUO\ DPRQJ \RXWK &XUUHQWO\ VWXGLHV LQGLFDWH WKDW WKH SHUFHLYHG ULVN E\ WKH SXEOLF GX PDULMXDQD LV ORZ DQG FHUWDLQO\ DPRQJ XVHUV WKLV P\WK LV SHUSHWXDWHG

FDQQDELV > @

:LWK GLVFRQWLQXDWLRQ RI WKH XVH RU LQ EHWZHHQ GRVHV ZLWKGUDZDO V\PSWRPV RFFXU

6\PSWRPV RI PDULMXDQD ZLWKGUDZDO DUH FRQVLVWHQW RI DQ[LHW\ GHSUHVVLRQ GHFUHDVHG DSSHWLWH KHDGDFKHV LQVRPQLD LUULWDELOLW PXVFOH WHQVLRQ QDXVHD QLJKWPDUHV DQG XQSOHDVDQW YLYLG GUHDPV > @

,V PHGLFDO PDULMXDQD DV PHGLFLQH"

0DULMXDQD IDOOV GHVFULEHG E\ WKH)HGHUDO 'UXJ $GPLQLVWUDWLRQ)'$ LQ WKH 86 DSSURYDO SURFHVV IRU D PHGLFDWLRQ LV HVWDEOLVKHG E\ WKH)RRG DQG 'UXJ $GPLQLVWUDWLRQ E\ WKH IHGHUDO JRYHUQPHQW IROORZLQJ WKH)HGHUDO)RRG DQG 'UXJ &RVPHWLF DQG 2QH RI WKH PRVW LPSRUWDQW UHVSRQVLELOLWLHV RI WKH)'$ LV WR SURYLGH GUXJ DSSURYDO IRU SUHVFULSWL GUXJV VROG LQ WKH PDUNHWSODFH IRU PHGLFDO SXUSRVHV LQ WKH 86 7R GHWHUPLQH ZKHWKHU WKH PDULMXDQD SODQW LQ LWV QDWXUDO IRUP VDIH DQG HIIHFWLYH)'$ VWDQGDUGV WKH GUXJ PXVW XQGHUJR LQYHVWLJDWLRQ E\ WKH)'$ >@

H PRVW LPSRUWDQW IDFWRUV LQ FRQVLGHULQJ DSSURYDO RI D GUXJ DUH GHWHUPLQLQJ WKHLU EHQHILWV DQG ULVNV :KLOH WKH)'$ GRHV VXSSRUW FOLQLFDO LQYHVWLJDWLRQV RI WKH SRWHQWLDO PHGLFDO XVHV RI PDULMXDQD LQ WUHDWLQJ PHGLFDO FRQGLWLRQV WKH)'$ LV \HW WR DSSURYH PDULMXDQD IRU PHGLFDO XVH $OVR PHGLFDO PDULMXDQD LV QRW SUHVFULEHG E\ SK\VLFLDQV LQ VWDQGDUG PHGLFDO SUDFWLFH ,Q PDQ\ VWDWHV LW LV SUHVFULEHG RXWVLGH RI XVXDO GRFWRU SDWLHQW UHODWLRQVKLS DQG D GRF GRHV QRW PRQLWRU WKH UHVSRQVH WR PDULMXDQD IRU WKH PHGLFDO FRQGLWL 7\SLFDOO\ HDFK GUXJ DSSURYHG E\ WKH)'$ LV WKH UHVXOW RI PHGLFDO PDULMXDQD)XUWKHU PHGLFDO PDULMXDQD LV QRW GLVSHQVHG LQ SKDUPDFLHV GRHV QRW XQGHUJR WKH W\SLFDO SUHVFULELQJ URXWH UDWKHU LW LV JURZQ FDUHJLYHUV ZKR DUH QRW XQGHU DQ\ VXSHUYLVLRQ RU UHJXODWLRQ DQG WKH PDULMXDQD LV VROG LQ GLVSHQVDULHV WKDW DUH QRW WHVWHG IRU VDIHW\ DQG GLVWULEXWLRQ LV ORRVHO\ UHJXODWHG E\ ORFDO RUGLQDQFHV D VWDWH ODZ >@

)'$ UHTXLUHV VWDJHV WKDW D GUXJ PXVW SDVV WR UHFHLYH)'$ DSSURYDO 6WDJH LV DQLPDO WHVWLQJ VWDJH LV LQYHVWLJDWLRQDO QHZ G DSSOLFDWLRQ VWDJH LV ,1' UHYLHZ VWDJH LV FOLQLFDO WULDO SKDVH RQ IRFXVHG RQ VDIHW\ VWDJH 0@$LV OLQLFDO VLLDOVKDVH VZH @ÀRFWVHG RQëöŸ

KHURLQHvKHFZKDVH ODZ DQG RUGHU EHHQ [illegible]
FRQWLQXHG GLVFXVVLRQ > @

H LOOLFLW WUDGH RQ WKH RWKHU KDQG GRHV QRW ZDQW OHJDOL]DWLRQ DV
JHQHUDOO\ FXWV LQWR WKHLU YROXPH RI EXVLQHVV $OFRKRO LQWHUHVWV DU
PRVWO\ VLOHQW RQ WKH OHJDOL]DWLRQ GHEDWH EHFDXVH LW LV QRW FOHDU WR
PDULMXDQD KHOSV RU KLQGHUV WKHLU DOFRKRO VDOHV 0DULMXDQD FDQ EH
FRQVLGHUHG D VXEVWLWXWH IRU DOFRKRO RU FRPSOLPHQW WR DOFRKRO RU WUL
WKH XVH RI PRUH DOFRKRO XVH %XUHDXFUDFLHV PD\ VXSSRUW OHJDOL]DWLRQ R
PDULMXDQD DV ORFDO SROLFH SDG WKHLU EXGJHWV WR HQIRUFH PDULMXDQD OD
GR ORFDO DQG QDWLRQDO JRYHUQPHQW DJHQFLHV VXFK DV WKH 'UXJ
(QIRUFHPHQW $JHQF\ '(DQG WKH 8 6 -XVWLFH 'HSDUWPHQW > @

,Q DGGLWLRQ WR [illegible]
ZKDW GULYHV PDULMXDQD [illegible]
fGXPP\g 1LFRWLQH DQG DOFKRO DUH WD[HG KHDYLO\ DQG FRQWULEXWH WR
JRYHUQPHQW IXQGV KRZHYHU WKH GRZQVLGH LV WKH SRRUHU SRSXODWLRQV
ZLOO EH WD[HG DV WKH\ DUH QRZ IRU QLFRWLQH DQG DOFKRO VR WKDW WKH
WD[DWLRQ LV GLVSURSRUWLRQDWHO\ SURKLELWLYH WR FHUWDLQ VHJPHQWV RI
SRSXODWLRQ [illegible] SXEOLF PROYHPHQW WR OHJDOL]H PDULMXDQD FRXOG
EH FKDUDFWHUL]HG DV HPHUJLQJ SXEOLF SROLF\ WKDW LV PDNLQJ fJHWWLQJ
VWRQHGg RQ PDULMXDQD QRW SURQRXQFHG DERYH DOO\ DFFHSWDEOH EXW
&XUUHQWO\ OHJDO PDULMXDQD LV UHJXODWHG E\ WKH VWDWHV DQG WKH UHJX
GDO\ KHDY\ XVH FRQWLQXRXVO\ LV FRQGRQHG E\ VWDWH ODZV WKDW GR OLWWO
PRQLWRU WKH LQGLYLGXDOdV UHVSRQVH WR VXFK D SDWWHUQ RI XVH %H\RQG
[illegible]
PDULMXDQDg D GRFWRU RU PHGLFDO SUDFWLFH LV QRW LQYROYHG LQ WKH
[illegible]
IRU PDULMXDQD XVH > @

6SHFLDO LQWHUHVW JURXSV DQG VHOI VHUYLQJ JURXSV ZLOO EH FRPPRQ
VXFK DV ELJ [illegible] ZKHWKHU ELJ
PDULMXDQD FRPSDQLHV ZLOO OLH WR PDULMXDQD XVHUV DV WKH\ IUDXGXOHQW
FODLPHG QLFRWLQH ZDV QRW DGGLFWLQJ DQG WU\ WR fVHOOg WKHP WKDW
PDULMXDQD LV VDIH [illegible]
JDWHZD\ GUXJ ,W PD\ QRW EH WKH RQO\ JDWHZD\ GUXJ DQG DV RQH
DGGLFWLQJ GUXJ OHDGV WR XVH RI DQRWKHU DGGLFWLQJ GUXJ DQG WKHUH LV
JHQHUDOL]HG YXOQHUDELOLW\ WR LQWHUFKDQJH VXEVWLWXWH DQG FRPSOHPH
DGGLFWLQJ GUXJV

&XUUHQW IHGHUDO DQG VWDWH ODZV

0HGLFDO PDULMXDQD LV D JUD\ PDUNHW TXDVL OHJDO LQ VRPH VWDWHV DV
VWDWH PHGLFDO PDULMXDQD [illegible]
WKH 86 *HQHUDOO\ IHGHUDO ODZ WUXPSV VWDWH ODZ LQ RWKHU OHJDO PDWWH
KRZHYHU LQ WKH FDVH RI PHGLFDO PDULMXDQD IHGHUDO ODZ SDVVLYHO\ JLYH
ZD\ WR VWDWH ODZ E\ QRW HQIRUFLQJ IHGHUDO ODZ ZKHUH fPDULMXDQD LV
FOHDUO\ DQG FRQYLQFLQJO\ FRPSOLDQW ZLWK VWDWH ODZg 6WDWH PHGLFDO
PDULMXDQD LV QRW)'$ DSSURYHG DV D PHGLFDWLRQ DV DUH RWKHU
PHGLFDWLRQV HYHQ WKRXJK)HGHUDO [illegible]
VDIHW\ RI D PHGLFLQDO [illegible]
SRVLWLRQ FXUUHQWO\ RQ PHGLFDO PDULMXDQD DW WKH GLUHFWLRQ RI WKH
([HFXWLYH %UDQFK RI JRYHUQPHQW > @

H OHJDOL]DWLRQ SURSRQHQWV PD\ DUJXH OHJDOL]LQJ PDULMXDQD
PLQLPL]HV FULPH HOHPHQWV IURP [illegible]
RFFXUUHG GXULQJ fSURKLELWLRQ RI DOFKROg LQ WKH 86)XUWKHU
SURSRQHQWV DUJXH [illegible]
DV WKHUH LV IRU DOFKRO /HJDOL]DWLRQ RSSRQHQWV DUJXH WKDW PDULMXDQ
ZLOO ZRUVHQ SXEOLF KHDOWK [illegible]
PDULMXDQD [illegible]
DUJXPHQWV /HJDOL]DWLRQ PD\ UHGXFH KDUP E\ UHGXFLQJ FULPH EXW
LQFUHDVHV KDUP E\ LQFUHDVLQJ [illegible]

Z L W K R S L R L G D G G L F W L R Q D Q G L Q G X F H G G L V D E L O L W V X‰pG G L V D E L O L W V X0 L r S

6KDUPD 3 0XUSK\ 3 %KDUDWK 006 &KHPLVWU\ PHWDEROLVP DQG WR[LFRORJ\ RI FDQQDELV &OLQLFDO LPSOLFDWLRQV ,UDQLDQ - 3V\FKLDWU\

2UU /(0F.HUQDQ -) %ORRPH 0vHFRV $QWLHPHWLF WHWUDK\GURFDQQLELQRO FRPSDUHG ZLWK SODFHER DQG SURFKORURSHUD]LQH LQ FKHPRWKHUDS\ DVVRFLDWHG QDXVHD DQG HPHVLV $UFK ,QWHUQ 0HG

/DPDUL1H 0DULMXDQD 0RGHUQ PHGLFDO FKLPDHUD - 'UXJ (GXF

*URWHQKHUPHQH WR[LFRORJ\ RI FDQQDELV DQG FDQQDELV SURKLELWLRQ &KHP %LRGLYHUV

+XHVWLV &DQV +XPDQ FDQQDELQRLG SKDUPDFRNLQHWLFV &KHP %LRGLYHUV

3RWWHU '- &ODUN 3 %URZQ 0% 3RWHQF\ RI GHOWD 7+& DQG RWKHU FDQQDELQRLGV LQ FDQQDELV LQ (QJODQG LQ ,PSOLFDWLRQV IRU SV\FKRDFWLYLW\ DQG SKDUPDFRORJ\ -)RUHQVLF 6FL

(O6RKO\ 5RVV 6$ 0HKPHGLF = $UDIDW 5 <L % HW DO 3RWHQF\ WUHQGV RI GHOWD 7+& DQG FRQWHPSRUDU\ FDQQDELQRLGV LQ IRP -)RUHQVLF 6FL

0HKPHGL &KDQGUD 6 6ODGH ' 3RWHQF\ WUHQGV RI 7+& DQG RWKHU FDQQDELQRLGV IRP WR -)RUHQVLF 6FL

:DOVK = &DOODZD\ 5 &DQQDELV IRU WKHUDSHXWLF SXUSRVHV 3DWLHQW FKDUDFWHULVWLFV DFFHVV DQG UHDVRQ IRU XVH ,QW - 'UXJ 3ROLF\

$VKUD}RXQ%RKQHUW .0 -DQQDXVFK 0 ,OJHQ 0$

$PHULFDQ DVVRFLDWLRQ IRU FDQFHU UHVHDUFK RI WXPRUV DQG SXEOLVKV SHHU UHYLHZHG VFLHQWLF
RSHQV WKH GRRU IRU YLUXV WKDW FDXVHV FDQFHU RI SRVWLQIHFWLRXV PHGLFLQH GDLO\

$PHULFDQ FKHPLFDO VRFLHW\ 0DULMXDQD)DFW\ DQG)LJXUHV GHVLJQHG SURGXFW
FDXVH FDQFHU QHZ WHVW UHYHDOV 6FLHQFH LQ SUHJQDQF\ &DQQDELV XVH LQ SUHJQDQF\
6FKQHLGHU 0 &DQQDELV XVH LQ SUHJQDQF\ 8SGDWH RQ &DQDGLDQ 86 HIIRUWV GUXJ GPL
FRQVHTXHQFHV $QLPDO PRGHOV (XU $UFK 3V\FKLDWU\ &OLQ 1HXURVFL 1DQRQHZWRQ) $VWUDFKDQ
GLDJQRVLV RI PDMRU GHSUHVVLRQ DV D PX
2KOVVRQ /LQGJUHQ -(:KROHQ $ 3V\FKLDWU\ &OLQ 1HXURVFL
WHWUDK\GURFDQQDELQRO HIIHFWV RQ VXEVWDQ
LQWUDYHQRXV DGPLQLVWUDWLRQ HDUG VPRNLQJ &OLQ 3KDUPDFRO
86 IRRG &DQG GUXJ DGPLQLVWUDWLRQ &
0LOOHU 16)DLOXUH RI HQIRUFHPHQW
KHDOWK SROLF\ IRU SUHVFULELQJ RSLDWH P
PRUELGLW\ DQG PRUWDOLW\ $P -
6ZDQ -3)'$ RULJLQ 86 IRRG DQG GUXJ DGPLQLVWUDWLRQ
&HQWHU VDIHW\ DQG WUDQVSRUWDWLRQ 86
IRRG DQG GUXJ DGPLQLVWUDWLRQ ,V LW D FRVPHWLF D GUXJ RU ERWK"
2U LV LW VRDS" 3ODVW 6XUJ 1XUV

+RVNLQJ 5' =DMLFHN - $XWRQRPLF QHUYRXV V\VWHP PHGLFLQH %U - $QDHVWK
PHHU UHYLHZ RI FDQQDELV LQ SDLQ