



MUSC3706

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HYfa 'H\ fYY' ##' &\$&\$

GWcc ``cZH Y '5 frg' UbX 'A YX]U' ``# 'I BGK ``'5 frg' UbX 'Gc W]U' ``GWY bWg

7 ci fgY`Cj Yfj]Yk

GHJZZ`7 cbHJW`8 YHJ`g

7 cbj Ybcfg

B Ua Y	9a Uj`	5j Uj`UVj`]m	@cWJhcb	D\cbY
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GW`cc``7 cbHJW`bZcfa Uhjcb

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F cca `` %&ž@Y] Y`` žF cVYfhK YVgYf`6i]X]b[`f] %Ł

D\cbY. f\$&Ł- ' ,) '(,) *

9a Uj`. [gUa 4 i bgk "YXi "Ui](#)

K YVg]hY. [k k k "Ufng"i bgk "YXi "Ui #gUa](#)

H\Y`GW`cc``cZ`hY`5fng`UbX`A`YX]U`k`ci`X``_Y`h`F`YgdYVW`m5W`bck`YX[`Y`h`Y`HfUX]hcbU``7`i`g`h`X]Ubgž`h`Y`6YXY[`U`f`P`Ybg]b[`h`cb`W`a`di`g`Ł;`UX][`U`f`7`]m`UbX`5`fh`8`Yg][`b`7`Ua`di`g`Y`g`Ł`UbX`h`Y`B[`i`bb`Uk`U`d`Y`cd`Y`f`b`i`g`f`U]`Ub`8`YZ`b`W`:`c`f`W`5`W`U`X`Y`a`m]b`7`Ub`V`Y`f`U`Ł`c`Z`h`Y`U`b`X`g`k`Y`f`Y`Y`U`W`W`a`di`g`c`Z`I`B`G`K`]`g`c`W`h`Y`X"

7ci fgY'8YHJ`g

7fYX]hDc]bhtg`(`

Gi a a UfmicZh\Y'7ci fgY

A I G7' +\$* `DYfZcfa UbWw`@UvcfUhcfm7 `fA i g]W7 fYUhj Y`DfUWw]Ww / `A i g]WDYXU[c[nE`]g`h\Y`h`]fX
DYfZcfa UbWw`@UvcfUhcfmWci fgY`Zcf`gh XYbhtg`Ybfc`YX`]b`h\Y`A i g]W7 fYUhj Y`DfUWw]Ww`UbX`A i g]W
DYXU[c[mia U`c`fg`c`Zh\Y`6UWwY`c`f`c`ZA i g]Wdfc[fUa `` `h`W`b`g`c`]XUhf`g`h\Y`a`]Yg`h`b`Y`g`U`W`]Y`j`Y`X`]b`Y`U`f`]Y`f`
DYfZcfa UbWw`@UvcfUhcfmWci fgYg`z`Z`f`h`Y`f`X`Y`j`Y`c`d`]b[`h\Y`g`h` XYbhtg`h`W`b`]Ww`z`W`Y`U`h`j`Y`UbX`]b`h`f`d`f`Y`h`j`Y`
g`_]`g`"H\Y`Wci fgY`U`gc`Vi`]Xg`c`b`gh` XYbhtg`Uk`UfYbYgg`c`ZU`f`Ub[Y`c`Za`i`g]Ww`[Yb`f`Y`g`UbX`d`f`U`W`]W`g`
YbWci b`h`f`Y`X`]b`c`h`Y`f`Wci fgYg`]b`h\Y`a`i`g]Wdfc[fUa `` `G`h` XYbhtg`Y`U`f`b`h`c`U`d`d`m`W`]h`Ww`]g`h`b`]b[`UbX`
f`Y`U`X`]b[g`c`Z`d`Y`f`Z`c`fa` UbWw`]h`f`U`h` f`Y`UbX`[U`]b`z`f`h`Y`f`g`_]`g`UbX`Yi`d`Y`f`]Y`b`Ww`]b`h\Y`X`Y`j`Y`c`da`Y`b`h`c`Z`Y`b`g`Y`a`V`Y`
d`Y`f`Z`c`fa` UbWw`g`"

BchY. ``H\]g`]g`U`%&`i` C`7`Wci fgY`"Mci`k`]`Y`b`f`c`]b`(` `i`C`7`]b`Y`U`W`c`Z`h`f`Y`Y`gi`Ww`g`g`j`Y`h`f`a`g`k`]h`U`f`Y`gi`h`
f`Y`d`c`f`h`X`V`m`U`g`]b[`Y`[f`U`X`Y`U`h`h`Y`Y`b`X`c`Z`h`Y`h`]f`X`(` `i`C`7`Wci fgY`"

7ci fgY`@YUfb]b[`Ci`hWca`Yg

%`5`d`d`m`W`]h`Ww`]a`UbX`Ub`U`mg`]g`c`Z`h`Y`]h`f`U`h`f`Y`c`b`d`Y`f`Z`c`fa`UbWw`z`UbX`c`Za`U`g`h`f`W`U`g`g`d`f`Y`g`Y`b`h`]c`b`g`z`
h`c`h`Y`d`f`Y`d`U`f`U`h`]c`b`c`Z`h`Y`f`c`k`b`d`Y`f`Z`c`fa`UbWw`
&`:`c`f`a`i`U`h`U`f`h`]g`]W`c`V`Y`W`]j`Y`g`UbX`f`Y`U`]g`Y`h`Y`a`]b`U`f`Ub[Y`c`Z`g`m`Y`g`]b`d`Y`f`Z`c`fa`UbWw`c`f`Wca`d`c`g`]h`c`b`
'`5`d`d`m`d`f`]b`W`]d`Y`g`c`Z`h`Y`a`k`c`f`_`h`c`a`i`g]W`Y`b`g`Y`a`V`Y`

HYUWw]b[`G`h`f`U`h`[]Yg`

G`h`XYbhtg`f`d`Y`f`g`c`b`U`g`_]`g`]b`d`Y`f`Z`c`fa`UbWw`c`f`Wca`d`c`g`]h`c`b`k`]`V`Y`X`Y`j`Y`c`d`Y`X`h`f`c`i`[`c`b`Y`c`b`c`b`Y`
W`c`b`g`i`h`U`h`]c`b`g`k`]h`g`d`Y`W`U`]g`h`i`h`c`f`g`O`I`%`l`c`i`f`Y`U`W`h`f`]a`Y`g`h`f`O``e`k`c`f`_`g`l`c`d`g`O`I`%)` `l`c`i`f`g`Y`U`W`
h`f`]a`Y`g`h`f`O`]b`g`h`i`a`Y`b`h`U`UbX`j`c`W`]g`h`XYbhtg`k`]`[U`]b`d`Y`f`Z`c`fa`UbWw`Yi`d`Y`f`]Y`b`Ww`z`k`]`Y`Wca`d`c`g`]h`c`b`g`h`XYbhtg`
k`]`V`Y`Wca`Y`Z`Ja`]U`f`k`]h`]g`g`i`Y`g`U`Z`Y`W`]b[`d`Y`f`Z`c`fa`UbWw`UbX`d`Y`f`Z`c`fa`UbWw`d`f`Y`d`U`f`U`h`]c`b`"K`c`f`_`g`l`c`d`g`Y`h`]b[g`
k`]`U`gc`gi`d`d`c`f`h`Y`b[U`[Ya`Y`b`h`k`]h`]g`g`i`Y`g`W`c`b`W`f`b`]b[`a`i`g]W`]U`b`g`f`h`Y`U`h`UbX`k`Y`V`Y`]b[`z`h`Y`X`Y`j`Y`c`da`Y`b`h`
c`Z`g`h`U`[Y`W`c`b`X`i`W`z`UbX`Ub`Y`Ya`Y`b`h`c`Z`d`Y`Y`f`c`V`g`Y`f`j`U`h`c`b`Z`c`f`g`d`Y`W`U`]g`h`d`Y`f`Z`c`fa`UbWw`UbX`Wca`d`c`g`]h`c`b`
[f`c`i`d`g`"G`h`XYbhtg`k`]`U`h`Y`b`X`a`U`g`h`f`W`U`g`g`Y`g`Y`X`V`m`j`]g`]h`b[`Yi`d`Y`f`h`]b`U`f`Ub[Y`c`Za`i`g]Ww`]b`g`h`i`a`Y`b`h`z`
j`c`]W`g`UbX`g`h`m`Y`g`z`Y`b`Wci`f`U`[]b[`g`h`XYbhtg`h`c`X`f`U`k`]`b`_`g`UbX`Wca`d`U`f`]g`c`b`g`k`]h`h`Y`]f`d`Y`f`g`c`b`U`g`h`X`]Y`g`
O`W`c`c`g`]b[(`I`&`l`c`i`f`g`Z`f`c`a`b`]b`Y`a`U`g`h`f`W`U`g`g`Y`g`U`W`f`c`g`h`Y`m`Y`U`f`O`5`"g`h`XYbhtg`k`]`d`U`f`]W`d`U`h`]b`X`]f`Y`W`Y`X`
Y`b`g`Y`a`V`Y`g`z`W`c`c`g`]b[`Z`f`c`a`U`k`]X`Y`f`Ub[Y`c`Za`i`g]Ww`g`h`m`Y`g`UbX`W`h`f`Y`g`UbX`d`U`f`]W`d`U`h`]b[`]b`U`Z`b`U`
d`Y`f`Z`c`fa`UbWw`]b`Y`U`W`h`f`]a`Y`g`h`f`O`I`&`l`c`i`f`g`f`Y`Y`U`f`g`U`g`]b`Y`U`W`h`f`]a`Y`g`h`f`O`

5ggYgga Ybh

; YbYfU`]bZcfa U]cb`UVci hYI Ua]bU]cb`fYeI]fYa Ybhg`]g`Uj U]UVY`cb`hY`A ccX`Y`g]h`ZcF`h`g`Wci fgY"

5ggYgga YbhHUg_g`

5ggYgga YbhHUg_	K Y][\h	8i Y`8UH`	Gh XYbh`@YUfb]b[Ci hWca Yg`5ggYggYX
9bgYa V`Y`Wc`bf]Vi h]cbž dYfZcfa UbW]gž`dUfh`VX`YW_]b[hYgh	&\$i	9bgYa V`Y`dUfh`VX`YW_]b[bcfa U`mhc`VY`Wca	%o

%o

j]XYc[fUd\mUbX'bcH'g'cb'Uh'YUgh('a UghYf!WUggYgE'

DcfhZ'jcg'k]'VY'gi Va]H'X'h'fci [\ 'Hi fb]h'b'UbX'ZYXVUW_j]U'@A G

5XX]h]cbU'XYHJ]g.

F YZf'hc'h'Y'bcH'g'Zcf'h]g'hUg_'cb'A ccX'Y

Hi fb]h'b'gYH]b[. H\]g'Ugg][ba Ybh]g'gi Va]H'X'h'fci [\ 'Hi fb]h'b'UbX'ghi XYbhg'Wb'gYY'Hi fb]h'b'g)a]'Uf]m fYdcfHg"

5ggYgga Ybh' . DfUW]WU'YI Ua]bUH]cb

GhUfhXUH' .

8YHJ]g.

: cf'dYfZcfa UbW'ghi XYbhgZ'YI Ua]bUH]cbg'k]'VY'i bXYfU_Yb']b'H' "'Gh XYbhg'k]'dfYgYbhU'&) !a]bi h'Y dfc[fUa a Y']bW' X]b[) 'a]bi h'Y'g'cZHY'Wb]WU'k cf_Z'XYj]gYX']b' bY[ch]UH]cb'k]h' h'Y]f'gdYW]U']ghh' h'c'fg' h'c'gi]h h'Y]f'dYfgcbU']bh'fYghg'UbX'fU'Y'W'c'f]Yg"'Gh XYbhg]XYbh]Z]b['Ug' 'Unn'gdYW]U']ghg'k]'dfYgYbh'f'W'X'b]WU' k cf_Z'ca 'h'Y' 'Unn'gm'UVi g'XYj]gYX'Zcf'h]g'W'e' i fgY"'H\Y'YI Ua]bUH]cb'k]'U'gc']bW' XY'U'g'c'fHg][\h fYUX]b['h'Ygh'Zcf'U' 'gh' XYbhg"'H\]g'k]'VY'h'Y'Z]bU'UggYgga Ybh'Ug_'Zcf'dYfZcfa Yfg"

: cf'W'a dcg]h]cb'ghi XYbhgZ'dcfhZ'jcg'k]'VY'gi Va]H'X']b'H' "'DcfhZ'jcg'a Um]bW' XY'Ubmbi a VY'cZk cf_gZ Vi h'h'Y'hc'U'Xi fUH]cb'cZk cf_g'g'ci 'X'VY'%) !&\$'a]bi h'Yg"'G'W'fYg'g'ci 'X'VY'gi Va]H'X'Z'U'cb['k]h' fYW'c'f]b[g'cZU'k cf_gZ'UbX'cbY'cZ'h'Y'fY'W'c'f]b[g'a i gh'VY'cZU']j Y'dYfZcfa UbW' "'H\]g'k]'VY'h'Y'Z]bU' UggYgga Ybh'Ug_'Zcf'W'a dcgYfg"

: YYXVUW_ 'K f]H'Y'b'fYdcfH'cb'dfUW]WU'YI Ua 'UbX'W'a dcg]h]cb'dcfhZ'jcg'k]"

H\]g'h'Y'Z]bU'UggYgga Ybh'

.

.

5XX]h]cbU'XYHJ]g.

5h'h]g'dc]bhk Y Ybj]gU[Y']j Y'YI Ua]bUH]cbgZ'ZUW'hc'ZUW'"

5ggYgga Ybh(. DYfZcfa UbW'#dfYgYbhUH]cb

GhUfhXUH' .

8YHJ]g.

H\fYY'dYfZcfa UbW'#dfYgYbhUH]cbg'k]'VY'W'c'Xi W'Y'X'Xi f]b['k cf_g'cd'gYgg]cbg']b'H%Z'H&'UbX'H' "'

Gdc_Yb'ZYXVUW_k]'VY' []j Yb'Vm'h'Y'Y'W'h' fYf']b'WUggZ'UbX'k f]H'Y'b'ZYXVUW_j]U'@A G

5XX]hcbU`XYhJ]g.

F Ygci fWg

DfYgW]VYX`F Ygci fWg`

BchUj U]UV`Y

F YWca a YbXYX`F Ygci fWg

BchUj U]UV`Y

7ci fgY`9j U`i Uh]cb`UbX`8Yj Y`cda Ybh

: YYXVUW`cb`hY`Wci fgY`k]`VY`a UXY`hfc [\ `hY`a m9l dYf]YbW`E i Ygh]cbU]fY" H\]g`]g`U`bYk `Wci fgY" `kg
W`bH`bhUbX`hUW]b[`a Yh`cXg`\Uj Y`VYYb`g\UdYX`dUfhm]b`fYgdcbgY`h`Yj U`i Uh]cb`cZYUf]Yf`DYfZc`fa UbVW
@UVcfUhcfm7ci fgYg`Uh]g`Yj Y" `7\Ub[Yg`]bWi XY`U`ga U`Yf`WUgg`g]nYz`Yb\UbW`X`]b!WUgg`dYfZc`fa UbVW
cddcfh`b]h]Ygž`hY`d`Ubb]b[`cZ]bZc`fa Uh]cbU`"YW`h`fYg`]bj`c`j`]b[`dYfZc`fa UbVW`]ggi Ygž`U`ghfYb[hYbYX
W`bXi W]b[`Wca`dcbYbž`X]gW`gg]cbg`cZ]bXi`ghfmg_]`gž`UbX`hY`fYh]fYa`Ybh`cZ`hY`@]gh`b]b[`HYgh` `b
UXX]h]cbž`=\Uj Y`XYj Y`cdYX`U`a`cfY`X]gW`fg] Y`UddfcUW`h`a`UbU[]b[`gh`XYbh[cU`g`UbX`ZYXVUW`"

Gi Va]gg]cb`cZ5ggYgga YbhiHUg_g

Hi fb]h]b`Gi Va]gg]cb

Ʒmci`YbWci bHYf`U`dfcV`Ya`k` \Yb`UH`Ya` dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybhi`h`fci`[`\`Hi`fb]h]b`z`d`YUgY`
HY`Yd`\\cbY`9I`HYfbU`Gi`ddcfhcb`-`,`)`"``'``%cf`Ya`Uj`h`Ya`icb`YI`HYfbU`HY`hgi`ddcfh4`i`bgk`"YXi`"Ui`"Gi`ddcfh`
\\ci`fg`UfY`,`.\$\$Ua`-`-%\$.\$\$da`icb`k`YY`XUmg`UbX`-`.\$\$Ua`-`).\$\$da`icb`k`YY`YbXg`f1`*)`XUmg`U`mY`Uf2`Ʒmci`
UfY`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybhi`Xi`Y`hc`U`ZU`i`h`k`]h`Hi`fb]h]b`mci`a`UmUdd`m`Zc`f`Ub`YI`HYbg]cb`z`Vi`hmc`i`
a`i`ghf`YhU]b`mci`f`h]W`Yhbi`a`VYf`Z`ca`9I`HYfbU`Gi`ddcfh`f`U`cb[`k`]h`Ubmc`h`Yf`fY`Yj`Ubh`Xc`W`a`Yb`hg`L`hc`
]b`Wi`XY`Ug`Yj`]XYb`V`hc`gi`ddcfh`mci`f`YI`HYbg]cb`Udd`]W]h]cb`"Ʒmci`Ya`Uj`9I`HYfbU`Gi`ddcfh`mci`k`j`
Ui`hc`a`UH`WU`m`f`Y`W]j`Y`U`h]W`Yhbi`a`VYf`z`Vi`h]Z`mci`HY`Yd`\\cbY`mci`k`j`b`YYX`hc`gd`Y`W]Z`WU`m`Ug`_`Zc`f`cbY`"
Hi`fb]h]b`U`gc`d`fcj`]XYg`i`d`XU`HY`g`cb`h`Y]f`gm`gh`Ya`g`h`U`h`g`cb`Hk`]h`Y`f`"

;`Yb`Yf`U`m`z`Ugg`Ygga`Ybhi`Ug_g`a`i`gh`VY`gi`Va`]h`Y`X`Y`Y`W`f`cb]WU`m`j`]U`Y`]h`Y`f`Hi`fb]h]b`cf`U`A`cc`X`Y`
Ugg][`ba`Yb`h`i`h`]b`gh`U`b`W`g`k`\\Y`f`h`g`]g`b`ch`d`c`gg]V`Y`z`]h`k`]`VY`g`h`U`Y`X`cb`mci`f`W`ci`fg`Y`g`A`cc`X`Y`g`]h`k`]h`
U`HY`fb`U`h]`Y`gi`Va`]gg]cb`XY`hU]`g`"

:`cf`]b`Z`fa`U`h]cb`cb`\\ck`hc`gi`Va`]h`Ugg][`ba`Yb`hg`cb`]b`Y`j`]U`A`cc`X`Y`.\`h`d`g`#`gh`XYb`h`i`bgk`"YXi`"Ui`#`ck`!
gi`Va`]h`Ugg][`ba`Yb`h`a`cc`X`Y`"

5 WUXYa]W< cbYgmiUbX`D`U[]Uf]ga

D`U[]Uf]ga `]g`i`g]b[`h`Y`k`cfXg`cf`]XYUg`cZc`h`Yfg`UbX`d`fYgYbh]b[`h`Ya`Ug`mci`f`ck`b`" `#WUb`hU`_`Y`a`Ubm`
Zcfa`gZ`Zca`X`Y`]VYfU`h`V`X`Y`U`h]b[`h`c`U`W`W`X`Y`b`h`U`m`i`W`c`d`m]b[`Z`ca`U`g`ci`f`W`k`]h`ci`h`U`W`_`b`c`k`Y`X[`Ya`Y`b`h`

I`B`G`K` `[`f`ci`d`g`d`U[]Uf]ga `]b`h`c`h`Y`Z`c`ck`]b[`W`U`h`Y`[`c`f]Y`g.

7`c`d`m]b[`.`i`g]b[`h`Y`g`U`a`Y`c`f`j`Y`f`m`g]a`]U`f`k`c`f`X`g`h`c`h`Y`c`f][`]b`U`h`Y`h`c`f`]X`Y`U`k`]h`ci`h`U`W`_`b`c`k`Y`X[]b[`h`Y`

5 WUXYa]WbZcfa Uh]cb

: cfYggYbh]U`gh XYbh]bZcfa Uh]cb fY`Uh]b[`rc.

- fYei Yghg`Zcf`YI H`bg]cb/
- `UhY`gi Va]gg]cbg`[i]XY`]bYg/
- fYj]Yk `cZa Uf_g/
- I BGK `<YU`h`UbX`GUZY`mdc`]WYg/
- YI Ua]bUh]cb`dfcW`Xi fYg/
- gdYW]U`W`bg]XYfUh]cb`]b`hY`Yj YbhcZ]`bYgg`cf`a]gUXj Ybhi fY/
- gh XYbhYei]m]UbX`X]gUV`]m/
- UbX`c`hYf`YggYbh]U`UWUXYa]W]bZcfa Uh]cbz`gYY

[\ftdg.#k k k "Uftg"i bgk "YXi "Ui #W ffYbh\]gh XYbh\]UWUXYa \]W\]bZcfa Uh\]cb#dfch`W`g!\[i \]XY`\]bYg#](#)

⇒ U[Y`7 fYX]h

H\]g:]a U[Y`]g`hY`dfcdYfmicZ>c\b`B Ud]Yfz`hY`W`i fgY`W`bj Ybcf"

7F ⇒ CG

7F ⇒ CG`Dfcj]XYf`7cXY.`\$\$\$- ;

5W_bck`YX[Ya YbhcZ7ci bhfm

K Y`UW_bck`YX[Y`hY`6YXY[U`dYcd`Y`k`c`UfY`hY`fUX]h]cbU`W`ghcX]Ubg`cZ`hY`UbXg`cb`k` \]W`I BGK
? Ybg]b[rc`b`W]a`di`g`]g`c`W]hYX"