

=AB@C:FVO

4;O <548G=>3> 70AB>AC20==O ;V:0@AL:>3> 70A>1C

S!

!;;04:
4VNGV @5G>28=8: 1 3 <07V 10 <3, 15=70;::=VN E;>@84C 5 <3, ;V4>:0W=C 3V4@>E;>@84C 40 <3;
4?>?28=8: ?>;V5B8;5=3;V;>;L 1500 V ?>;V5B8;5=3;V;>;L 400 C A?V22V4=>H5==V 1.4.

V:0@AL:0 D>@<0. 07L.
A=>2=V DV178:>-EVABV:<07L 6>2BC20B>-75;5=C20B>3> ;>;L>@C >4=>@V4=>W =>A8AB5=FWW.

S0@<0>B5@0?52B8G=0 3@C?0. □5@<0B>;>3VG=V 70A>18. =B81V>B8:8 B0 EVB5@0?52B8G=V 70A>18. ><1V=0FVW. >4 % D06C.

S0@<0>;>3VG=V 2;0AB82>ABV.
S0@<0>:>48=007L G8=8BL ?@>B870?0;L=C, 0=0;357CNGC B0 0=B81=C 4VN.
B8: 3@C?8 ?B;V>?784V2 H8@>?>3> A?5;B@0 4VW. 8O2;OT 10;B5@8F84=C 4VN. :B82=> ?@>=8;0NG8 G5@57 ;;VB8=C<5<1@0=C 10;B5@V9, =5>1>@>B=> 72O7CTBLAO 7 30S cC1>48=8F5N 10;B5@V0;L=8E @81>A>
< , I> ?@83=VGCT A8=B57 1V;:0 71C4=8.0.
8A>;>0;B82=89 2V4=>A=> 05@>1=8E 3@0<=530B82=8E 10;B5@V9: Pseudomonas aeruginosa, EscherVch Va coli, Shigella spp., Salmonella spp., Klebsiella spp., Enterobacter spp., Serratia spp., ProvVdencVa stuartVV.
:B82=89 B0>6 2V4=>A=> 450;8E 3@078B82=8E 10;B5@V9: Staphylococcus spp. (C B. G. HB0 ?5=VF8;V=C, <5B8F8;V=C, 450;8E F5D0;>A?>@8=V2), 450;8E HB0
50;B82=89 2V4=>A=> 0=05@>1=8E 10;B5@V9.
5=70;::=VN E;>@84 <0T H8@>:89 A?5;B@0=B81=>W 4VW 2V4=>A=> 3@078B82=8E V 3@0<=530B82=8E @>3@V7;>:, A8=L>3=V9=C B0 :8H:>2C ?0;8G:8. 5E0=V7< 4VW 7C<=2;5=89 B8<, I> 2V= 72O7CTBLAO 7
@81>A>0<8, I> 2545 4=>572>@>B=>3> ?@83=VG5=O A8=B57C 1V;:, 0, DV:ACTBLAO =0 F8B?;>07;0B8G=8E <5<1@0=0E 10;B5@V9, ?>@CHCNG8 WE ?@>=8;=VABL, ;;VB8=0 2B@0GOT V=>8 :0;VN, 08A;>B8,
=C;::5B848.

V<5AC;V4 <0T ?@>B870?0;L=C (?@83=VGCT D07C 70?0;5=O 2=0A;V4; 7=865=O 0;B82=>ABV <54V0B>@V2 70?0;5=O, I> A?@8OT 7<5=H5=N ?@>=8;=>ABV AC48=>W ABV=>8) B0 0=0;357CNGC 4VN
(7=865=O 0=01@O:C B:0=8=8 AC?@>2>46CTBLAO 7<5=H5=O< 1>;L>28E 2V4GCBBV2).
V4>;0W= V=3V1CT GCB:82V =5@2>2V 70;V=G5=O H;V@8 V A;87>28E I>;>:, B>1B> A?@8G8=OT 72>@>B=5 ?@83=VG5=O ?@>2V4=>ABV B:0=8=8E 5;5=5=BV2 =5@2>28E ;;VB8= (=59@>=, 0:A>=,
A8=?A8), V4>;0W= ?@83=VGCT 0;B82=20=5 ?>4@07=8;>< B@0=78B>@=5 ?V42815=O ?@>=8;=>ABV 4;O V=>V2 =0B@VN V <5=H>N N 7=86CT ?0A82=C ?@>=8;=VABL 4;O V=>V2 :0;VN V =0B@VN, 70 @0EC=>;
G>3> 2V= AB01V;V7CT =59@>=V <5<1@0=8. V4>;0W= 7<5=HCT ABC?V=L 45?;>;O@870FVW, I> 2V41C20TBLOA C 2V4?>2V4L =0 DV7V>;>3VG=89 ?>4@07=8.; 0 B0>6 B5=V0;C 4VW, V ?@83=VGCT =5@2>2C
?@>2V4=VABL. 1A>@>1>20=89 ?VA;O3> 70AB>AC20=O ;V4>;0W= <=65 A?@8G8=OB8 71C465=O 01> 45?@5AVN 7 1>;C F5=B@0;L=>W =5@2>2>W A8AB5=8 (&1). >3> 27;82 =0 A5@F52>AC48=C A8AB5
>4>@=7G8=>0 A>=>20 <07V ?>;V5B8;5=>;A84 ?>A8;NT V ?>4>26CT WW 0=B810;B5@V0;L=C B0 ?@>B870?0;L=C 4VN, 28O2;OT 28@065=89 V B@820;89 >A>B8G=89 5D5;B. B65, ?@8 70AB>AC20=V <07V
2V41C20TBLOA ;V:2V40FV0 ?5@8D>;0;L=>3>=01@O:C V>G815=O @0=8 2V4 3=V9=>=>5;@>B8G=>3> 2B03><20-24 3>48=.

S0@<0>:>V=5B8:0. 5 282G0;0AL.
0=V I>4> 3> 70AB>AC20=O 0@1FVW ?VA;O3> 70AB>AC20=O <6=0>GV:C20B8, I> 0@V2=> @>?>4V;OTBLAO C ?>70;VB8=V9 @V48=V (22V0;L=0, ;V=50;L=0 @V48=8); C 28A>;8E :=F5=B@0FV0E
28O2;OTBLAO C A5GV; C =87L;8E C 6>2GV, 3@C4=>8GCTBLAO 2=CB@VH=L>;;VB8=>: 8A>; V :=F5=B@0FVW 28O2;ONBLAO 2 >@>30=0E 7 V=B5=A82=8< :@>2>?>AB0G0=O:0@4V, A5;57V=V B0 >A>1;82> C
:V@>2V9 @5G>28=V =8@>;, 1V;LH =87L;V :=F5=B@0FVW C <O70E, 68@>2V9 B:0=8=V V :VAB:0E # 4>@>A:8E C A5@54=VE B5@0?52B8G=8E 4>70E (C =>@8:0T G5@57 35<0B>5=F5D0;V G=89 10@T@. =8:0T
G5@57 ?;0F5=B0@=89 10@T@ 28O2;OTBLAO C :@>2V ?>;40 B0 =>V>B8G=V9 @V48=V.5 <5B01>;V7CTBLAO. 82>48BLAO =8@<0<8 H;O/E< ;>;C1>G>2>W DV;LB@0FVW (65-94 %) ?5@5206=> C =5748BLAO ?@8 35
<4V0;V7V V ?5@8B>50;L=>
VA;O 3> 70AB>AC20=O ;V4>;0W= (?@>=8:0T C B:0=8=8 V G8=8BL;N20;L=C 4VN. V4>;0W= H284> 2A<:>:BCTBLAO ?@8 =0=5A5=V =0 A:87>2C I>;>=:C V C@065=C H;V@C, 0;5 ?>30=> 2A<:>:BCTBLAO ?@8
=0=5A5=V =0 74>@>2C H;V@C. (284;VABL 2A<:>:BC20=O V ;V;L:VABL 0;B8=>W @5G@28=8, 0=0 ?>B@0?;OT C :@>2>>1V3, 70;560BL 2V4 4>78, B8?C, @>25@E=V, =0 O:C =0=A8BLAO ?@5?0@0B (H;V@0 01>
A;87>20 >1>=>=), 0 B0>6 B@820>ABV 5:A?>78FVW. 5B01>;V7CTBLAO C ?5GV=V. V =A?>G0B:C 4570;V;CTBLAO, 0 ?>B>V 3V4@>;V7CTBLAO. /: =5728=0, B0: V <5B01>;VB8 282>40BLAO ?5@5206=> =8@<0<8.

;V=VG=V E0@0:B5@8AB8:8.
>;070=O. # EV@C@3VG=V9 ?@0;B8FV ?@5?0@0B 70AB>A>2C20B8 4;QV:C20=O 3=V9=8E @0=C (3=V9=>=5;@>B8G=V9) D07V @0=>2>3> ?@>F5AC, 4;O ?@>DV;0;B8:8 =03=>T=O ?>25@E=528E V 3;81>8E
@0=, ?@8 ?>A;O?>5@0FV9=8E CA::04=5=OE (?VA;O?>5@0FV9=V =03=>T=O @0=, D;53=>0, DVABC;0, 01AF5A); ?>=>1CABV@>3VW 4;O ?@>DV;0;B8:8 ;V:C20=O =03=>T=O ?>V>28E @0=; C 45@
<0B>=>3VW 4;O ;V:C20=O 3=V9=>=;0?>0;L=8E 70E2>@N20=L H;V@8 ?@>V4=8@

@>B8?>:070=O. V42815=0 GCB;82VABL 4> 1C4L-O>3> ?>=>5=BV2 ?@5?0@0BCβ> B8?C, ?A>@V07, 5:75<0, 3@81>2V C@065=O H;V@8. 5 70AB>A>2C20B8 E2>@8<, C O:8E 0F5B8;A0;VF8;>20 :8A;>B0 01> V=HV
?@5?0@0B8, O=V V=3V1CNBL A8=B57 ?@>AB03;0=48=V2, A?@8G8=ONBL 0;5@3VG=V @50:FVW, B0;V O: @8=VB, @>?820=0 01> I@>=E>A?07

70T<>4VO 7 V=H8<8 ;V:0@AL:<8<8 70A>10<8 B0 V=HV 2848 270T<>4V9. @8 AC20=V ?@5?0@0BC 9>3> 270T<>4VO 7 V=H8<8 ;V:0@AL:<8<8 70A>10<8 =5 2AB0=>2;5=0. @8 FL>1EV4=> 2@0E>2C20B8, I> ?@8 >
<I>=>20=>AC20=V 071V;LHC20B8 (270T<>) 4VN :0@15=VF8;V=C, 15=78;?5=VF8;V=C, F5D0;>A?>@8=V2; =V<5AC;V4 AC;LD0=V;01V2, I> 7<5=HCNBL 73>@B0=O :@>2V; ;V4>;0W= =>2>0W=C V 1C?V20:0W=C.
>15@56=VABN ?@87=0G0B8 ?@5?0@0B >4=>G0A=> 7 0=B8>03C;O=B0<8, 483>A8=><, D5=VB>W=><, ?@5?0@0B0<8, ;VBNV, 4VC@5B8:0<8, 0=B83V?5@B5=782=8<8 ?@5?0@0B0<8, =5AB5@>W4=8<8
?@>B870?0;L=8<8 70A>10<8 (< , F8;:A?>@8=><, <5B>B@5;A0B>><, ?5@>0;L=8<8 3V?>3;V;5@8 >4=>G0A=>AC20=V ;V;L;E <=6;8289 @>728B>; :>;0;L>3>?>4@07=5=>O C 283;04V :@>7820=> ;>G5@2=>V=O
H;V@8, ;C15=O.
N;>;>@B8>W48 B0 ?@>B8@52<0B8G=V 70A>18 (?@5?0@0B8 7>=>B0, 0EV=>?>8) ?>A8;NNBL ?@>B870?0;L=C 4VN =V<5AC;V4C.
5=70;:=VN E;>@84 EV =5AC1=C 4VN 15=70;:=VN E;>@84C.

A>1;82>ABV 70AB>AC20=O. @5?0@0B A;V4 =0=>A8B8 BV;L:8 =0 CH>465=V 4V;O=8 H;V@8, 70?>1V30B8 ?>040=N<07V =0 5CH>465=V 4V;O=8 H;V@8, 2 >GV V =0 A;87>2V >1>;>=8.
5 A;V4 70AB>A>2C20B8 ?0FVT=B0< 7 2V4>=>N 3V?5@GCB;82VABN 4>. # 28?04:C @>728B:C @50:FV9 3V?5@GCB;82>ABV ;V:C20=O A;V4 ?@8?8=8B8.
?5@V>4 ;V:C20=O ?@5?0@0B< <=6;8289 @>728B>: @50:FV9 D>B>GCB;82>ABV.
>15@56=VABN B0 ?V4 :=B@>;:5< ;V:0@O 70AB>A>2C20B8 ?@5?0@0B ?0FVT=B0F ;VB=L>3> 2V:C ? ?@CH5=O<8 DC=>FVW =8@>;, ?5GV=8, V7 70ABV9=>N A5@F52>N =54>AB0B=VABN, 7 ?@>CH5=O<
:>2>B2>@5=O, 7 30AB@>4C>45<0;L=8<8 :@>2>B5G0<8, 28@07:0<8 C AB04VW 703>AB@5=O 01> B06;8<8 ?@>CH5=O<8 73>@B0=O :@>2V.

0AB>AC20=O C ?5@V>4 203VB=>ABV 01> 3>4C20=O 3@C44N. 57?5:0 70AB>AC20=O ?@5?0@0BC ?5@V>4 203VB=>ABV 01> 3>4C20=O 3@C44N =5 2AB0=>2;5=0.

40B=VABL 2?;820B8 =0 H284;VABL @50:FVW ?@8 :5@C20=V 02B>B@0=A?>@B< 01> V=H8<8 <5E0=V7<0<8. 52V4><0.

I?>AV1 70AB>AC20=O V 4>78. 07L =0=>A8B8 B>=>8< H0@<=O C@065=V 4V;O=8 1-2 @078 =0 4>1C 01> ?@>A>GC20B8 <077N AB5@8;L=V <0@;52V A5@25B:8, O=V =0;040B8 =0 @0=C. 5>1EV4=0 ;V;L:VABL
?@5?0@0BC 287=0G0TBLOA ?>;15N @0=>2>W ?>25@E=V V ABC?5=<3=V9=>W 5:AC40FVW. 07L<0T ?>:@820B8 2AN C@065=C 4V;O=<C.
@8 ;V:C20=V 3=V9=8E @0=, 3=V9=>=;0?>0;L=8E 70E2>@N20=L H;V@8<07L 70AB>A>2C20B8 I=45=>.
@8 ;V:C20=V >?V:V2 I=45=>=> 01> 2-3 @078 =0 B8645=L 70;56=> 2V4 ;V;L>ABV 3=V9=8E 284V;5=L.
"@820;VABL :C@AC ;V:C20=O 287=0G0TBLOA V=482V4C0;L=>70;56=> 2V4 5D5;B82=>ABV B5@0?VW V @>465=O. 5@5207:8 7 <077N @>18B8 4> ?>2=>3> >G815=O @0=8 2V4 3=V9=>=>5;@>B8G=>3>
?@>F5AC.

VB8. 57?5:0 B0 5D5;B82=VABL 70AB>AC20=O ?@5?0@0BC 4VB0<=5 2AB0=>2;5=0.

5@54>7C20=O. # 72O7C 7 =57=0G=8< ?@>=8;5=O< ?@5?0@0BC G5@57 A;87>2V >1>;>=8 H;V@C ?5@54>7C20=O<0;>9<02V@=5, 0;5 ?@8 =0=5A5=V <07V =0 25;8 V 4V;O=8 H;V@C;?>465=O, ?@8 ?5@52815=V
@5:>=<5>4>20=8E 4>7 V ?@8 B@820>AC20=V <07V <6;82V A8AB5=<V ?>1VG=V 5D5;B8, E0@0:B5@=V 4;O 0
28?04:C ?5@54>7C20=O =5>1EV4=> ?@8?8=8B8 70AB>AC20=O ?@5?0@0BC. V:C20=O A8=0B8G=5.

>1VG=V @50:FVW. ;5@3VG=V V ?>4@0?>N20;L=V O2810 (C B. G. H;V@=V 28A8?0=O, A25@1V6, ;C15=O, =01@O; , ?5GVO, 5@8B5<0), @50:FVW D>B>GCB;82>ABV; @V4>> C GCB;828E E2>@8E <6;825
28<8=5=O 0=0DV;0;B8G=8E @50:FV9, =0?@8;:04 =01@O:C 2V=5, 207>>B>@=>3> @8=VBC, 04CE8, 1@>=E>A?07
/:8 ?@5?0@0B 70AB>A>2CTBLAO 2V4?>2V4=> 4> V=AB@C:FVW, G0AB>B0 @>728B:C A8AB5=<8E 5D5;BV2 =04728G09=><0, >A;V;L:8 ;V;L:VABL 0;B82=>W @5G>28=8, 0=0<65 4>A03B8 @>2>>1V3C, 4C65
<0, 0 @8 70AB>AC20=V 28A>;8E 4>7 C @07V H284>3> 2A<:>:BC20=O ;V4>;0W=C 01> ?@8 ?V42815=V9 GCB;82>ABV, V4V>A8=>@07VW G8 7=865=V ?5@>=A8>ABV <6CBL @>728=CB8A0 ?>1VG=V
@50:FVW, 2;0AB82V3> B8?C @8 A8AB5=>AC20=V.

"5@ABV.2 @>8.

#<>28 715@V30=O. 15@V30B8 2 >@83V=0;L=V9 C?0>2FV @8 B51.

15@V30B8 C =54>28C?=>

#?0:>2.0. > 15 3 01> 25 3, 01> 50 3 C BC1V C :>@>1FV.

0B53>@VO 2V4?CA:C. 0 @5F5?B>

8@>1=8. "S0@<0F52B8G=0 :>@>2□O.

VAF57=0E>465=O 28@>1=8:0 B0 9>3> 04@5A020465=O 4VO;L=>ABV.

#:@0W=0, 61013, 2C; (52G5=0, 22.